انجمن علوم و فن آوری های شناختی ایران
Iranian Society for Cognitive Science & Technology

دانشگاه شهید بهشتی
Shahid Beheshti University

4th Iranian Human Brain Mapping Congress

چهارمین همایش نقشه برداری مغز ایران

۵-۳ آبان ۱۳۹۶ / 25-27 October 2017

مرکز همایشهای بین المللی ابوریحان-دانشگاه شهید بهشتی

دارای حداکثر ۱۵ امتیاز بازآموزی

humanbrainmapping.ir

content

Mojtaba Zarei
MD, PhD, FRCP(Lond.)

Welcome Message

Dear colleagues,

It is a pleasure to welcome you to the 4th Iranian Human Brain Mapping Congress held in Shahid Beheshti University. Shahid Beheshti is the fastest growing university in Iran with emphasis on human resources and new technologies and/as well as one of the major centers and pioneers of brain mapping science in Iran. Interest in brain mapping has grown considerable since we started this annual meetings. Given the interdisciplinary nature of brain mapping science, each year we welcome scientists with different backgrounds including neuroscience, medical sciences, bioengineering, mathematics, biophysics, psychology, computer science, etc. It has become the highlight of our activity when students and senior researchers, clinicians and scientists, policy makers and policy users are all getting together to discuss new findings and advanced technologies in the field of brain sciences. Our main endeavour is for the younger generation to get inspired by those who dedicated their lives to the advancement of science in order to alleviate human suffering.This year we continue our slogan: "Brain Mapping : From Molecule to Medicine".

We are aspiring to provide a medium for both domestic and world-renowned scientists to discuss and collaborate in order to obtain a better understanding of the nervous system and the related diseases.

If brain mapping has taught us only one thing, that would be the importance of networks for optimal functioning. For this reason and many more, we welcome international scientific collaboration. Iran has so much to offer in neuroscience in general, and brain mapping in particular. There is a wealth of talent and energy among our educated youth which should be put into good causes with appropriate mentorship and guidance. In recent years, many high quality clinical researches have been published in prestigious medical journals because of access to wide range of patients and their keen participation in research. We hope that this can be extended into clinical neuroscience as well.

I encourage you to engage with our participants to develop your own line of contact and to establish new networks to enhance your research. If there is anything that I can do to help, do not hesitate to contact me. I hope you enjoy the program and the social interaction.

Mojtaba Zarei
Program Chair of IHBM 2017

Chairs

Program Chair

Mojtaba Zarei MD, PhD, FRCP(Lond.)

Professor of Neuroscience and Neurology
Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Scientific Chair

Ehsan Kamrani PhD

Assistant Professor of Biomedical Engineering,
Institute of Medical Science and Technology,
Shahid Beheshti University, Tehran, Iran

Executive Chair

Masoud Tahmasian MD ,PhD

Assistant Professor of Neuroscience, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran

Scientific Committee Members

Scientific Secretary
Ehsan Kamrani

Aghamiri, Seyyed Mahmoud	Professor of Physics and Nuclear Engineering, Faculty of Nuclear Engineering, Shahid Beheshti University, Tehran, Iran
Alavi, Abbas	Professor of Nuclear Imaging, University of Pennsylvania, Pennsylvania, USA
Alavi, Seyyed Mohammad Mahdi	Assistant Professor of Control Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Bigdeli, Mohammadreza	Associated Professor of Biology, Faculty of Biological Science, Shahid Beheshti University, Tehran, Iran
Borhani, Khatereh	Assistant Professor of Cognitive Psychology, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Ganjgahi, Habib	Research Scientist, Department of Statistics, University of Warwick and Oxford, United Kingdom
Ghalei, Mohammad	Associated Professor of Radiochemistry, Insitute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Ghasemian, Mona	Assistant Professor of Communication Networks, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Kamrani, Ehsan	Assistant Professor of biomedical engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Kashani, Alireza	Neuroscientist, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran
Khazaei, Habibolah	Professor of Psychiatry, Kermanshah School of Medical Science, Kermanshah, Iran
Khosrowabadi, Reza	Assistant Professor of Biomedical Engineering, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Lashgari, Reza	Associated Professor of Brain Engineering Research Center, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran
Latifi, Hamid	Professor of Physics, Institute of Laser and Plasma Research, Shahid Beheshti University, Tehran, Iran
Mahdiani, Hamidreza	Faculty of Computer Science and Engineering, Shahid Beheshti University, Tehran, Iran
Masoudi, Reza	Professor of Physics, Institute of Laser and Plasma Research, Shahid Beheshti University, Tehran, Iran
Mazaheri, Mohammad Ali	Professor of Clinical Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Mohajerani, Ezzoddin	Professor of Physics, Institute of Laser and Plasma Research, Shahid Beheshti University, Tehran, Iran
Mohammadzadeh, Mohammad	Assistant Professor of Radiomedical Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Mohseni, Hamid	Assistant Professor of Biomedical Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Nejati, Vahid	Associated Professor of Cognitive Neuroscience, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Noorzadeh, Saman	Neuroscience Researcher, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Pouretemad, Hamidreza	Professor of Clinical Psychology, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Salamat, Behrouz	Assistant Professor of Electrophysiology and Neuroprosthetics, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Sarabi, Atieh	Assistant Professor of Cognitive Science, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran
Shahzadi, Sohrab	Professor of Neurosurgery, School of Medical Science, Shahid Beheshti University, Tehran, Iran
Tahmasian, Masoud	Assistant Professor of Neuroscience, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Tehranchi, Mohammad Mehdi	Professor of Physics, Institute of Laser and Plasma Research, Shahid Beheshti University, Tehran, Iran
Zarei, Mojtaba	Professor of Neuroscience and Neurology, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran

Executive Committee Members

Executive Chair
Masoud Tahmasian

Ahmadi, Reihaneh	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Amirpour, Mohammadreza	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Ebadi, Aida	Master Student of Biomedical Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Ebrahimi, Leila	PhD Student, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Emami, Tohid	Resident of Neurosurgery, School of Medical Science, Shahid Beheshti University, Tehran, Iran
Emamian, Farnoosh	Resident of Psychiatry, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
Faghihi, Omid	Master Student of Biomedical Engineering, School of Medical Science, Shahid Beheshti University, Tehran, Iran
Farzam, Golnaz	Bachelor Student, Al-Zahra University, Tehran, Iran
Fazlali, Zeinab	Assistant Professor of Neuroscience, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran
Ghaderi, Fatemeh	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Ghalei, Mohammad	Associated Professor of Radiochemistry, Insitute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Ghasemian, Mona	Assistant Professor of Communication Networks, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Heydarzadeh, Armin	Master Student of Industrial Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Jahangiri, Nadia	Bachelor Student of Laboratory Medicine, Faculty of Medical Branch, Islamic Azad University, Tehran, Iran
Javaheripour, Noushin	Master Student, Institute for Family Research, Shahid Beheshti University, Tehran, Iran
Karimipour, Mohammad	Master Student, Institute for Family Research, Shahid Beheshti University, Tehran, Iran
Khosrowabadi, Reza	Assistant Professor of Biomedical Engineering, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Mohseni, Hamid	Assistant Professor of Biomedical Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Noorzadeh, Saman	Neuroscience Researcher, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Obeydinia, Sara	Master Student of Biomedical Engineering, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Oumumi, Nadia	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Pazhavand, Shahriar	Bachelor Student, Islamic azad University, Tehran, Iran
Rashidian, Saba	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Rezvani, Zahra	PhD Student, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Salamat, Behrouz	Assistant Professor of Electrophysiology and Neuroprosthetics, Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran
Samea, Fatemeh	PhD Student, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Seyedebrahimi, Afrooz	Mechatronics Engineering Researcher, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Soluki, Solmaz	PhD Student, Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran
Tahaan, Maryam	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran
Yari, Abbas	Bachelor Student of Psychology, Faculty of Psychology and Education, Shahid Beheshti University, Tehran, Iran

Keynote Speakers

Alavi, Abbas MD,PhD, DSc

University of Pennsylvania,Pennsylvania, USA

Professor of Nuclear Imaging

Title: What can and cannot be accomplished with our ongoing attempts to map brain function with PET in Health and Disease; Rectifying Ongoing Misconceptions

Barker, Anthony PhD

University of Sheffield, United Kingdom

Associate Professor of Medical Electronics

Title: Transcranial Magnetic Stimulation - Past, Present and Future

Flemming Høilund-Carlsen, Poul MD

Odense University Hospital of Southern Denmark, Odense M ,Denmark

Professor of Nuclear Medicine

Title: Molecular brain imaging using PET-MRI hybrid technology

Gjedde, Albert MD, DSc

University of Copenhagen, Denmark

Professor of Neurobiology And Pharmacology

Title: The predictive brain and the future: To boldly go where no one has gone before

Golby, Alexandra J. MD

Department of Neurosurgery, University of Harvard, Boston, USA

Professor of Neurosurgery

Title: Non-invasive functional brain mapping: from neuroscience to patients

James, Anthony MB, MS, MRCP, FRCPsych

Department of Psychiatry, University of Oxford, Oxford, United Kingdom

Adolescent Psychiatrist

Title: Neuroimaging of adolescent-onset schizophrenia and bipolar disorder

Stein, John MA, MSc, BM, BCh, FRCP

Department of Physiology, University of Oxford, Oxford, United Kingdom

Professor of Physiology

Title: Recent advances in Deep Brain Stimulation in movement disorders, pain & psychiatry

Turner, Robert PhD

Leipzig Max Plank Institute for Human Cognitive and Brain Sciences, Germany

Professor of Physics

Title: 7T MRI: A Game-changer for Imaging Neuroscience

Seyedi Vafaee, Manouchehr BSc, MSc, MScA, PhD

Odense University Hospital of Southern Denmark, Odense M ,Denmark

Associate Professor of Nuclear Medicine And Clinical Physiology

Title: Dysfunctional dendritic spines and the link between Alzheimer´s disease and diabetes

Speakers

Alavi, Mahdi PhD

Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Assistant Professor of Control Engineering,

Title: Image analysis and optimization by using the hybrid phase and magnitude information

Alizadeh, Sara PhD

Institute of Medical Psychology and
Behavioral Neurobiology
University of Tuebingen

Research Scientist

Title: Effect of stress on amygdala-centered resting state functional connectivity

Ganjgahi, Habib PhD

Department of Statistics, University of Warwick
and Oxford, United Kingdom

Research Scientist

Title: Current statistical challenges in neuroimaging

Ghaderi, Reza PhD

Shahid Beheshti University, Tehran, Iran

Associated Professor of Electrical Engineering

Title: Uncertainty management in supervised learning for neuroimaging

Ghazizadeh, Ali PhD

National Institutes of Health ,
National Eye Institute,
Laboratory of Sensorimotor Research

Research Scientist

Title: Functional connectivity explains long-term memory in primate brain

Jamalabadi, Hamidreza

Human-computer Interaction,
Artificial Neural Network, Artificial Intelligence
University of Tuebingen

Research Scientist

Title: Decoding traces of memory during sleep and wakefulness

Kamrani, Ehsan PhD

Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Assistant Professor of Biomedical Engineering

Title: Wearable Brain Mapping with Multi-Modal Physiological Monitoring

Speakers

Kashani, Alireza PhD

Odense University Hospital, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran

Neuroscientist

Title: Glutamatergic neurotransmission in Parkinson disease

Khosrowabadi, Reza PhD

Institute for cognitive and brain sciences Shahid Beheshti University, Tehran, Iran

Assistant Professor of Biomedical Engineering

Title: Graph theory in neurodevelopmental researches

Mahmoudian, Saeid PhD

Head & Neck Research Center, Center for Auditory Neuroscience and Tinnitus University of Medical Sciences, Tehran, Iran

Associated Professor

Title: Functional and Structural Studies of Brain in Bothersome Tinnitus

Mohammadzadeh, Mohammad PhD

Institute of Medical Science and Technology Shahid Beheshti University, Tehran, Iran

Assistant Professor of Radiomedical Engineering

Title: Design and construction of RF coils – Iranian experience

Mohseni, Hamid PhD

George Institute of University of Oxford, Oxford, United Kingdom

Senior Researcher

Title: Neural Processing of Minor Structural Abnormalities in Infant Face: A MEG Study

Noroozian, Maryam MD

Tehran University of Medical Sciences Department of Psychiatry

Professor of Neurology

Title: Memory clinics and opportunity for research

Speakers

Noorzadeh, Saman PhD

Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Research Scientist

Title: Simultaneous fMRI-EEG signal acquisition and analysis

Radman, Narges MD, PhD

Institute for Research in Fundamental Sciences (IPM),
Tehran, Iran

Assistant Professor of Cognitive Science

Title: Bilingual brain and bilingual aphaisa: Role of the executive functions and mechanism of recovery

Salamat, Behrooz MSc, PhD

Institute of Medical Science and Technology,
Shahid Beheshti University, Tehran, Iran

Assistant Professor of Neuroscience

Title: Cortical responses to electrical stimulation with midbrain implants: response specificity

Tahmasian, Masoud MD, PhD

Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Assistant Professor of Neuroscience

Title: ENIGMA-Sleep Working Group

Valizadeh, Alireza PhD

Institute of Advanced Studies in Basic Sciences – Zanjan

Associated Professor

Title: Tailoring effective connectivity in the brain circuits

Zarei, Mojtaba MD, PhD, FRCP(Lond.)

Institute of Medical Science and Technology
Shahid Beheshti University, Tehran, Iran

Professor of Neuroscience and Neurology

Title: State of brain mapping in Iran

Oral Presentation

Wednesday 25th

Presenter	Title	Abstract No.	Time
Abtin Doroudinia PET-CT Center. Masih Daneshvari Hospital, Tehran, Iran	Seizure focus localization using FDG-PET/CT scan in drug resistant epilepsy	02-205	17:00-17:15
Nooshin Abbasi Students' Scientific Research Center, Tehran University of Medical Sciences	Relationship between CSF biomarkers and structural brain network properties in Parkinson's disease	07-702	17:15-17:30
Leila Noorbala Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran	A clinical toolbox for the identification of the input-output curve in transcranial magnetic stimulation	03-303	17:30-17:45
Farzaneh Rahmani Neuroimaging Network, Universal Scientific Education and Research Network, Tehran, Iran	Comorbid depression and REM sleep behavior disorder is an eye-opener to prodromal parkinson disease	01-104	17:45-18:00
Maryam Kavyani Department of Kinesiology, Shahid Beheshti University, Tehran, Iran	The effect of the visual-spatial orienting on the dual task interference	06-603	18:00-18:15
Khadijeh Noori Sleep Disorders Research Center, Kermanshah University of Medical Sciences (KUMS), Kermanshah, Iran.	Structural alterations in paradoxical insomnia	01-118	18:15-18:30
Kamran Kazemi Department of Electrical and Electronics, Shiraz University of Technology	Brain extraction of pathological magnetic resonance images	01-108	18:30-18:45
Nooshin Javaheripour Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran	Neural correlates of alexithymia in absence of disorders: ALE meta-analysis	06-606	18:45-19:00

Thursday 26th

Presenter	Title	Abstract No.	Time
Kiyarash Farivar Faculty of Mathematical Sciences, Shahid Beheshti University, G.C. Tehran, Iran	Using motor imagery games to alleviate phantom limb pain	05-503	17:00-17:15
Ehsan Vahab Faculty of Computer and Information and Technology Engineering, Qazvin Branch, Islamic Azad University, Qazvin, Iran.	Contribution of Top-Down Expectation in Stimulus-Driven Category Information: An EEG Decoding Study	08-804	17:15-17:30
Behrad Taghi Beyglou Department of Biomedical Engineering, Amirkabir University of Technology, Tehran, Iran	Detection of right hand imagery activation using independent component analysis	08-806	17:30-17:45
Sadegh Marzban Biomedical Engineering Department, Amirkabir University of Technology	A possible effect of transcranial direct current stimulation on the motor function of Parkinson's disease	03-304	17:45-18:00
Afrooz Seyedebrahimi Institute for Cognitive and Brain Sciences, Shahid Beheshti University G.C., Tehran, Iran	Brain functional connectivity changes to controlled release of cortisol in stressful condition	08-813	18:00-18:15
Fatemeh Samea Institute of Cognitive and Brain Sciences, Shahid Beheshti University, Tehran, Iran	Functional and structural brain alterations in ADHD: an activation likelihood estimation meta-analysis	06-609	18:15-18:30
Zahra Sheikholeslami Medical Imaging Lab, Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran	A novel scheme for segmentation of T1-weighted brain magnetic resonance images	05-502	18:30-18:45
Mohamad Sheikholeslami Medical Imaging Lab, Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran	A New fMRI simulator with the capability of stimulation of every specified brain region	01-113	18:45-19:00

Wednesday 25th	Thursday 26th	Friday 27th
7:30-8:30		
Registration and Poster Setup		
Welcome	**Brain Stimulation**	**Clinical applications**
8:30-8:45	**9:00-10:00**	**9:00-10:00**
Mojtaba Zarei (SBU): Introduction	***Anthony Barker (University of Sheffield):*** Transcranial Magnetic Stimulation - Past, Present and Future	***Alexandra Golby (University of Harvard):*** Non-invasive functional brain mapping: from neuroscience to patients
8:45-9:00		
Hassan Sadoogh (Chancellor, SBU): Welcome speech		
PET		
9:00-10:00	**10:00-11:00**	**10:00-11:00**
Abass Alavi (University of Pennsylvania): What can and cannot be accomplished with our ongoing attempts to map brain function with PET in Health and Disease; Rectifying Ongoing Misconceptions	***John Stein (University of Oxford):*** Recent advances in Deep Brain Stimulation in movement disorders, pain & psychiatry	***Anthony James (University of Oxford):*** Neuroimaging of adolescent-onset schizophrenia and bipolar disorder
10:00-11:00		
Poul Flemming Høilund-Carlsen (University of South Denmark): Molecular brain imaging using PET-MRI hybrid technology		
11:00-11:30	**Break time and Poster Presentations**	
PET	**MRI**	**Brain Engineering**
11:30-12:30	**11:30-12:30**	**11:30-12:00**
Albert Gjedde (University of South Denmark): The predictive brain and the future: To boldly go where no one has gone before	***Robert Turner (Leipzig Max Plank Institute for Human Cognitive and Brain Sciences):*** 7T MRI: A Game-changer for Imaging Neuroscience	***Ehsan Kamrani (SBU):*** Wearable Brain Mapping with Multi-Modal Physiological Monitoring
		12:00-12:30
		Mahdi Alavi (SBU): Image analysis and optimization by using the hybrid phase and magnitude information
12:30-13:00	**12:30-13:00**	**12:30-13:00**
Manouchehr Vafaee (University of South Denmark): Dysfunctional dendritic spines and the link between Alzheimer´s disease and diabetes	***Mohammad Mohammadzadeh (SBU):*** Design and construction of RF coils – Iranian experience	***Ali Ghazizadeh (MIT):*** Functional connectivity explains long-term memory in primate brain
13:00-14:00	**Lunch**	

Wednesday 25th	Thursday 26th	Friday 27th
Miscellaneous	**MEG/EEG**	**Clinical applications**
14:00-14:30	***14:00-14:30***	***14:00-14:30***
Maryam Noorozian (TUMS): Memory clinics and opportunity for research	***Hamid Mohseni (SBU):*** Neural Processing of Minor Structural Abnormalities in Infant Face: A MEG Study	***Alireza Kashani (SBU):*** Glutamatergic neurotransmission in Parkinson disease
14:30-15:00	***14:30-15:00***	***14:30-15:00***
Mojtaba Zarei (SBU): *State of brain mapping in Iran*	***Reza Khosrowabadi (SBU):*** Graph theory in neurodevelopmental researches	***Masoud Tahmasian (SBU):*** ENIGMA-Sleep Working Group
15:00-15:30	***15:00-15:30***	***15:00-15:30***
Reza Ghaderi (SBU): Uncertainty management in supervised learning for neuroimaging	***Saman Noorzadeh (SBU):*** Simultaneous fMRI-EEG signal acquisition and analysis	***Hamidreza Jamalabadi (Tubingen):*** Decoding traces of memory during sleep and wakefulness
15:30:16:00	***15:30:16:00***	***15:30:16:00***
Habib Ganjgahi (University of Oxford): Current statistical challenges in neuroimaging	***Saeid Mahmoudian (IUMS):*** Functional and Structural Studies of Brain in Bothersome Tinnitus	***Sarah Alizadeh (Tubingen):*** Effect of stress on amygdala-centered resting state functional connectivity
16:00-16:30	***16:00-16:30***	***16:00-16:30***
Alireza Valizadeh (Zanjan University): Tailoring effective connectivity in the brain circuits	***Behrooz Salamat (SBU):*** Cortical responses to electrical stimulation with midbrain implants: response specificity	***Narges Radman (SBU):*** Bilingual brain and bilingual aphaisa: Role of the executive functions and mechanism of recovery
16:30-17:00	**Break time and Poster Presentations**	
Short Talks	**Short Talks**	**Miscellaneous**
17:00-17:15	***17:00-17:15***	***17:00-17:15***
Abtin Doroudinia: Seizure focus localization using FDG-PET/CT scan in drug resistant epilepsy	***Kiyarash Farivar:*** Using motor imagery games to alleviate phantom limb pain	*Best Papers Awards*
17:15-17:30	***17:15-17:30***	***17:15-18:00***
Nooshin Abbasi: Relationship between CSF biomarkers and structural brain network properties in Parkinson's disease	***Ehsan Vahab:*** Contribution of Top-Down Expectation in Stimulus-Driven Category Information: An EEG Decoding Study	*Brain Mapping A&Q Panel: Alavi, Gjedde, Carlsen, Barker, James, Golby, Turner, Stein.*
17:30-17:45	***17:30-17:45***	
Leila Noorbala: A Clinical Toolbox for the Identification of the Input-Output Curve in Transcranial Magnetic Stimulation	***Behrad Taghi Beyglou:*** Detection of Right Hand Imagery Activation Using Independent Component Analysis	
17:45-18:00	***17:45-18:00***	
Farzaneh Rahmani: Comorbid Depression and REM Sleep Behaviour Disorder is an Eye-opener to Prodromal Parkinson disease	***Sadegh Marzban:*** A possible effect of transcranial direct current stimulation on the motor function of Parkinson's disease	
18:00-18:15	***18:00-18:15***	
Maryam Kavyani: The effect of the Visual-Spatial orienting on the Dual task Interference	***Afrooz Seyedebrahimi:*** Brain functional connectivity changes to controlled release of cortisol in stressful condition	
18:15-18:30	***18:15-18:30***	***18:00-19:00***
Khadijeh Noori: Structural alterations in paradoxical insomnia	***Fatemeh Samea:*** Functional and structural brain alterations in ADHD : an activation likelihood estimation meta-analysis	*Iranian Society for Cognitive Science and Technology (General Assembly) – for members only.*
18:30-18:45	***18:30-18:45***	
Kamran Kazemi: Brain Extraction of Pathological Magnetic Resonance Images	***Zahra Sheikholeslami:*** A Novel Scheme for Segmentation of T1-Weighted Brain Magnetic Resonance Images	
18:45-19:00	***18:45-19:00***	
Nooshin Javaheripour: Neural Correlates of Alexithymia in Absence of Disorders: ALE Meta-Analysis	***Mohamad Sheikholeslami:*** A New fMRI Simulator with the Capability of Stimulation of Every Specified Brain Region	

Workshops

Workshop on EEG data analysis and its applications		
Date	Lecturer	Location
23-24 October 2017	Saman Noorzadeh Reza Khosrowabadi Hamid Mohseni Hamid Karimi-Rouzbahani	Shahid Beheshti University, International Conference Center(SBUICC)

Shahid Beheshti University, International Conference Center(SBUICC)		
Date	Lecturer	Location
28-30 October 2017	Mojtaba Zarei Masoud Tahmasian Reza Khosrowabadi Habib Ganjgahi	Shahid Beheshti University, International Conference Center(SBUICC)

انجمن علوم و فن آوری های شناختی ایران

پژوهشگاه دانش‌های بنیادی IPM

پژوهشکده علوم و فناوریهای پزشکی

4th Iranian Human Brain Mapping Congress

چهارمین همایش نقشه برداری مغز ایران

۵-۳ آبان ۱۳۹۶ / 25-27 October 2017

مرکز همایشهای بین المللی ابوریحان-دانشگاه شهید بهشتی

Workshop on EEG/MEG data analysis and its applications

REZA KHOSROWABADI *PhD*

Assistant Professor at the Institute for Cognitive and Brain Sciences, Shahid Beheshti University. Research fellow Institute for cognitive and brain sciences Shahid Beheshti University and neuroscience research partnership (NRP), Duke-NUS graduate medical school, Singapore. He focuses on multimodal Neuroimaging and modeling of Neurodevelopmental process and its deficits.

SAMAN NOORZADEH *PhD*

A researcher with expertise in biomedical signal processing and data analysis. She received her MSc and PhD in University of Joseph Fourier France. Her major experience is on the analysis of biomedical signals (mostly ECG, EEG, fMRI) and her current research include multimodal EEG and fMRI analysis to be used in epilepsy and neurofeedback. She is currently a post-doc researcher at Institute of Medical Science and Technology, SBU, Tehran, IRAN.

HAMID MOHSENI *PhD*

Senior Researcher Oxford martin school University of Oxford, UK. He has a substantial experience in statics and biomedical data analysis. Currently, he is a data scientist at george institute for global healthcare.

HAMID KARIMI-ROUZBAHANI *PhD*

A cognitive neuroscientist who has received his MSc form Iran University of Science and Technology in 2013 and his PhD from Shahid Rajaee University in 2017 in electrical engineering. He has a good experience in object recognition, attention and neuromuscular systems. He is the lab manager at Iran Neural Technology Research Center.

23-24 October 2017

۲-۱ آبان ۱۳۹۶

More information and registration:
humanbrainmapping.ir

ظرفیت محدود است.

انجمن علوم و فن آوری های شناختی ایران

پژوهشگاه دانش‌های بنیادی IPM

پژوهشکده علوم و فناوریهای پزشکی دانشگاه شهید بهشتی

4th Iranian Human Brain Mapping Congress

چهارمین همایش نقشه برداری مغز ایران

25-27 October 2017 / ۳-۵ آبان ۱۳۹۶

مرکز همایشهای بین المللی ابوریحان-دانشگاه شهید بهشتی

Workshop on functional and structural Magnetic Resonance Imaging

MOJTABA ZAREI *MD, PhD, FRCP*

Head of School of Cognitive Science, IPM. Professor of neuroscience and neurology at Shahid Beheshti University Tehran, Iran. He is a consultant neurologist with considerable academic profile particularly in functional and structural neuroimaging (MRI) and neurodegenerative disorders. He also has expertise and experience in Alzheimer, Parkinson and multiple sclerosis as well asclinical neuropsychology (EEG, EMG, MEG)

MASOUD TAHMASIAN *MD, PhD*

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28-30 October 2017

۶-۸ آبان ۱۳۹۶

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MRI

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Poster Presentation

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جمعه ۵ آبان ماه ۱۳۹۶ | ساعت ۱۸:۰۰ الی ۱۹:۰۰

ABSTRACTS

Poster No. 01-112

How do Intrinsic resting Functional Networks in Parkinson's disease Alter?

Ali Foroutannia[1], Mahdieh Ghasemi[1]

[1] Electrical Engineering Department, Biomedical Engineering Laboratory, University of Neyshabur, Neyshabur, Iran

Abstract:

Introduction: Resting-state fMRI (rsfMRI) is recently used in many pathologic and mental conditions [1]. The study of resting state networks (RSNs) have revealed differences in many neurodegenerative disorders, especially in Parkinson disease (PD). In this study, we investigated differences of RSNs using dual regression method.

Methods: FMRI data have been recorded of 10 Parkinson's and 10 healthy people in the 3T Siemens MRI system. Low resolution affine co-register fMRI volume to bet structural image of the corresponding subjects and further to MNI152 standard space. After the other preprocessing as usually analyze in FSL, Time series concatenation was implemented by 0.7 excitation threshold. (Melodic 3.14) The whole brain RSNs were identified using high model order independent component analysis (ICA) with variance normalization to analyze between group network characteristics by Multi session temporal concatenation. Between two groups analysis was carried out using FSL dual regression technique with threshold corrected p-value for voxel-wise comparisons and 5000 permutations with GLM matric [2,3]. With variance normalization, the dual regression reflects differences in both activity and spatial spread of the RSN [4].

Results: Resting-state networks from the heath subject identified as RSNs and which were used for the dual regression analysis. The normal resting-state networks are shown in FSL yellow color (Fig 1, Table 1). The differences between patients with Parkinson disease and healthy controls were markedly smaller in the dual regression with normalization (Fig 2, Table 2).

Conclusion: The differences between groups in the network shape seemed to be relatively limited when gray matter differences were adjusted. The variance normalized dual regression results suggest that the functional connectivity of the baseline RSNs is altered rather than the shape of the network in patients with Parkinson disease when compared with healthy controls. Using this protocol, increased connectivity was found in several networks within patients with Parkinson disease compared to the control group.

Poster No. 01-101

White-matter changes correlate with peripheral neuroinflammatory processes in Parkinson's Disease

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Abstract:

Introduction: Neuroinflammation is a common funnel for many neurodegenerative mechanisms while contributing to of the many initial events that eventually lead to neurodegeneration. Neuroinflammatory pathology has been identified in Parkinson disease. Early microstructural changes in white matter tracts might give a clue for earlier detection of PD.

Methods: We investigated through diffusion MRI connectometry the structural correlates of white matter tracts of 81 patients with PD, with whole blood neutrophil to lymphocyte ratio (NLR), controlling for age and sex. Diffusion data were reconstructed in the MNI space using q-space diffeomorphic reconstruction to obtain the spin distribution function. The spin distribution function (SDF) values were used in the connectometry analysis.

Results: The connectometry analysis identified white matter QA of the following fibers to be correlated with NLR score after adjustment for age and sex: bilateral cingulum, bilaterally fornix, bilateral corticospinal tract (CST), body and splenium of corpus callosum (CC) and right superior cerebellar peduncle with decreased connectivity related to NLR (FDR=0.04542).

Conclusion: Our findings are compatible with major white matter tracts with a known role in PD pathology or prodromal PD symptoms. Keeping with emerging evidence on the role of neuroinflammation in PD pathology, these results bring new insights to pivotal role of peripheral inflammation in CNS neurodegeneration.

Poster No. 01-114

A New Compressed Sensing Algorithm based on Wavelet Denoising for Brain Magnetic Resonance Imaging

Sajjad Jafari [1], Mahdi Saadatmand-Tarzjan [1], Javad Safaie [2]

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[2]Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran

Abstract:

Introduction: Although MRI is widely used to diagnose neurodegenerative diseases, it usually requires a lot of time to collect all k-space data. To tackle this problem, *k*-space subsampling methods such as compressed sensing (CS) was proposed (Hamtaei, 2013). Especially, based on sparsity of the k-space, CS uses sampling frequencies lower than the Nyquist rate (Pawar et al., 2015). However, CS-reconstructed MR images are usually corrupted by noise/artifact. In this paper, we address this problem.

Methods: As shown in the block diagram of Fig. 1, we improve the performance of the CS algorithm by using a wavelet-based denoising approach (Hamtaei, 2013). For this purpose, after collecting the undersampled k-space data, the missing coefficients are primarily set to zero. Then, by computing the inverse Fourier transform (IFT), a noisy MR image is obtained. Next, the 4th-order Daubechies wavelet transform (WT) is computed. After setting the weak wavelet coefficients to zero for noise rejection, the inverse WT (IWT) is performed. Then, FT of the resultant image is computed to obtain the enhanced k-space data. Next, the fused k-space coefficients are obtained by substituting missing coefficients of the original k-space with the corresponding coefficients of the enhanced version. Finally, by using the CS reconstruction algorithm (Lustig et al., 2007), the optimal MR image is obtained.

Results: Fig. 2 compares the error maps of the proposed method with those of full k-space reconstruction (FKSR), defective K-space reconstruction (DKSR), Hamtaei (2013), and Lustig et al. (2007), for three different phantom MR images. Also, as shown in Table 1, our method provided the best solution quality compared to the specified counterpart algorithms in terms of peak signal-to-noise ratio (PSNR).

Conclusion: In this paper, we proposed a new CS reconstruction algorithm based on wavelet denoising. Experimental results demonstrated superior solution quality of the proposed method compared to a number of counterpart algorithms.

Poster No. 01-115

Two New 1D Under-Sampling Schemes for Compressed Sensing of Brain Magnetic Resonance Images

Sajjad Jafari [1], Mahdi Saadatmand-Tarzjan [1], Javad Safaie [2]

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[2] Department of Electrical Engineering, Faculty of Engineering, Ferdowsi University of Mashhad, Mashhad, Iran

Abstract:

Introduction: Nowadays, MRI plays an important role in the diagnosis of neurodegenerative diseases. Unfortunately, when we use this brilliant technology a lot of time needs to be spent for extracting the *k*-space information. The *k*-space subsampling methods (e.g. compressed sensing (CS)[1]) are used to overcome this problem. Since the middle part of *k*-space contains the main part of information, under-sampling should be intense in the center. Moreover, high degree of subsampling randomness ameliorates the CS performance. 1-Dimension variable polynomial density (1DP) is a typical under-sampling mask in different CSMRI methods [1, 3, 4], which we try to improve it in this study.

Methods: Two 1D masks are proposed. In the first step, the *k*-space is under-sampled by 33.5% (86-from-256 lines). Afterwards, in order to increase the randomness and decrease the amount of data (which reduce the computational time), the next polynomial mask (in other *k*-space direction) is applied on the 70% of given samples from previous step. This combined mask is called ProposedMask1 (PM1). In another proposed mask, the k-space is divided into 3 equal segments. The central part is undersampled differently from the two lateral segments. This mask undersamples 26.8% (68-from-256 lines) from the central part by polynomial method, and 3.35% (9-from-256 lines) from each lateral ones by random method. This mask is called ProposedMask2 (PM2).

Results: All mentioned masks were implemented simultaneously with the M.Lustig toolbox reconstruction CSMRI [2] and just the under-sampling scheme was changed. The proposed masks were compared with the M.Lustig's 1DP mask [1]. Fig.1 represents the applied masks. All of them undersample 33.5% with a polynomial degree of two. The simulations have been done for 3 images: MatlabPhantom (P1), T1-weightedBMRI, and GuerquinPhantom. Average PSNRs of 10-trials for all masks and the related error bars are shown in table1/Fig.2.

Conclusion: The simulation shows that PM2 has a better reconstruction quality than the 1DP due to a better sampling of the central k-space region and a high degree of randomness. Moreover, it is true that the PM1 slightly reduces the quality compare to the 1DP, but it decreases the amount of data as well, which results in computational time reduction.

Poster No. 01-108

Brain Extraction of Pathological Magnetic Resonance Images

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[1]Department of Electrical and Electronics, Shiraz University of Technology

[2]Shiraz University of Medical Sciences

Abstract:

Introduction: Magnetic resonance imaging (MRI) is a non-invasive imaging system which is used to study brain structure and function in healthy and pathological brain. A fundamental step in brain imaging research is to accurately extract brain by using MRI. Although there are many studies in the literature on brain extraction in healthy individuals, few studies have investigated it in pathological images. This study proposes an automated and multi-atlas based method for brain extraction of pathological MRI.

Methods: The proposed automated brain extraction method of pathological images is tested on 40 brain tumor MRI, of which 12 images are selected for training and creating the multi atlas libraries. In the first step, the training images are divided into 4 groups according to the tumor location: right frontal lobe, right parietal lobe, left frontal lobe, and left parietal lobe. Then, a brain mask is manually extracted for each image. In the second step, the images in each group are normalized to ICBM adult brain atlas. The normalized images in each group are used to create a template and probabilistic brain model which is used to form four template libraries required for brain segmentation. In the third step, according to the tumor location in the input test image, one of the templates is selected. Then, the training images (templates) and their corresponding brain masks in the library of the group are registered affinely and nonlinearly to input test image. Finally, the registered brain masks of the selected library are averaged to create a brain mask for the test image.

Results: This method can appropriately extract the brain mask from input images.

Conclusion: Multi-atlas based brain extraction method to extract the brain from MRI with pathology is a novel method with high accuracy.

Poster No. 01-106

Shrinkage prediction of the subject-specific seed-based correlation map:A Resting-state Functional Magnetic Resonance Imaging study

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Abstract:

Introduction: Functional connectivity is identified by synchronous activation in spatial distinct region of the brain in Resting-state functional MRI. Seed-based correlation analysis is often performed to explore temporal correlation between ROI or a seed region and other voxels of the brain (1, 2).

Methods: How well the subject-specific seed-based correlation map from first replication data can predict the second replication correlation map of the study? A potential prediction of second replication connectivity map is the first replication connectivity map of the same subject, "raw estimator". This estimator can shrink towards group correlation maps from first replication of all subjects in study and improve it in terms of mean squared error (MSE), "shrinkage estimator"(3). Also the group correlation map from first replication of all subjects can be used as a predictor, "mean estimator".

Results: We reanalyze scan-rescan rsfMRI data of 21 healthy individuals who were participated to "ADHD-200 Global Competition" in 2011(4). Functional preprocessing steps were done (e.g. removing the first four volumes, slice timing correction, motion correction, removing nuisance variance), data were also transformed to MNI space at 4×4×4 mm^3 resolution, temporally filtered using 0.009-0.08 pass-band filter and spatially smoothed (6-mm kernel). We choose precentral gyrus as ROI, the first ROI was studied for functional connectivity, based on "Type II Eve Atlas" to assess prediction performance (1, 5). Both mean and shrinkage estimator show sizeable reduction in terms of MSEs for all subjects. On average, the improvement in prediction for mean and shrinkage estimator are 48.45% and 49.14%, respectively. We display results for one subject who has similar improvement in MSE for its shrinkage estimator (49.43%) with the overall average MSE improvement in Fig.1.

Conclusion: Shrinkage method can improve prediction of brain connectivity when there is a large scan-rescan variability. Even, the group correlation map have a great improvement in MSE in comparison with raw estimator.

Poster No. 01-118

Structural alterations in paradoxical insomnia

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[2]Institute of Medical Science and Technology, Shahid Beheshti University, Tehran, Iran

Abstract:

Introduction: Paradoxical insomnia or sleep misperception is a subtype of insomnia disorder; which is defined by subjective complaints of insomnia symptoms and normal objective polysomnographic parameters. Functional and structural neuroimaging has been widely applied in patients with insomnia, but neural mechanism underlying paradoxical insomnia is poorly understood. We aimed to identify specific structural deficits in patients with paradoxical insomnia compared to good sleepers.

Methods: All patients underwent subjective sleep questionnaires and polysomnographic assessments for objective evaluation of their sleep. T1-weighed anatomical magnetization-prepared rapid gradient MRI images were obtained using 1.5 T MRI scanner at the Farabi Hospital, Kermanshah University of Medical Sciences. In this case-control study, voxel-based morphometry was used to compare the regional grey matter changes of 28 paradoxical insomnia with of 11 matched control subjects with normal sleep.

Results: The whole brain voxel-based morphometry analysis revealed significant decreased gray matter volume in the temporal lobe and caudate compared to normal sleepers ($p < 0.05$ FWE corrected, cluster level).

Conclusion: The gray matter atrophy in the temporal lobe and caudate may be associated with the difficulties in sleep perception of patients with paradoxical insomnia.

Poster No. 01-103

Sequential Language Learning and Language Immersion in Bilingualism: Diffusion MRI Connectometry Reveals Microstructural Evidence

Farzaneh Rahmani[1], Soheila Sobhani[2], Mohammad Hadi Aarabi[2]

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[2]Students' Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran

Abstract:

Introduction: Study of bilingual brain has provided evidence to probable advantageous outcomes of early second language learning and brain structural correlates to these outcomes. DMRI connectometry is a novel approach that tracts fibers based on correlation of the adjacent voxels with a variable of interest or group differences.

Methods: Using the data deposited by Pliatsikas et al. we investigated through diffusion MRI connectometry and correlation analysis, the structural differences in white matter tracts of 20 healthy sequential bilingual adults who used English as a second language on a daily basis, compared to 25 age matched in fiber differentiation analyses.

Results: Connectometry results revealed increased connectivity in corpus callosum (CC), bilateral cingulum, arcuate fasciculus (AF) and left IFOF of sequential bilingual adults. All of the above fibers except cingulum had positive association with language immersion period.

Conclusion: We introduce cingulum as a tract with increased connectivity in late bilingual adults. We also found an increase in white matter connectivity conventional language related fibers such as arcuate fasciculus, and areas that had been shown in previous studies addressing WM differences between early or late bilinguals and monolinguals, inferior fronto-occipital fasciculus and corpus callosum. Pliatsikas reported a confounding effect for the immersion period, as a regressor in TBSS model. Through DMRI connectometry and correlation analysis we showed that quantitative anisotropy of all of the significant fibers from connectometry analysis, except cingulum, had direct correlation with the duration of immersion period of the bilingual group into the second language.

Poster No. 01-104

Comorbid Depression and REM Sleep Behavior Disorder is an Eye-opener to Prodromal Parkinson disease

Mina Ansari[1], Farzaneh Rahmani[2], Mahsa Dolatshahi[2], Mohammad Hadi Aarabi[1]

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Abstract:

Introduction: Search for Parkinson's disease (PD) progression biomarkers has led to identification of both motor and non-motor symptoms relevant of prodromal PD that could be eye opening to the spreading underlying lewy body pathogenesis. One most robust predictor of PD is the REM-sleep behavior disorder (RBD) [1], and one most common early non-motor symptom of PD is depression. With RBD, frequently co-existing with clinical depression and both predicting dopamine transmission dysfunction [2], we aimed to survey structural associates of depressive symptoms in early PD patients with comorbid RBD.

Methods: Through diffusion MRI connectometry we tracked fiber differences comparing DWI images obtained from 14 patients with depressive symptoms and 18 without depression from a group with comorbid RBD and PD. DWI images and patients were recruited from the Parkinson's Progression Markers Initiative (PPMI) database (Table 1).

Results: PD-RBD patients with depressive symptoms showed pathways with significantly reduced connectivity in the right cingulum, left and right fornix, left inferior longitudinal fasciculus, right corticospinal tract, and genu of corpus callosum (FDR=0.0228) (Figure 1).

Conclusion: Diffusivity alteration of the mentioned fibers in depressed, early PD patients with RBD might reflect underlying PD pathology and serve as common structural DWI signatures for early PD diagnosis.

Poster No. 01-105

Does Apolipoprotein A1 Predict Microstructural Changes in Subgenual Cingulum in Early Parkinson?

Farzaneh Rahmani[1], Mohammad Hadi Aarabi[2]

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[2]Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran

Abstract:

Introduction: Higher plasma cholesterol levels are associated with lower Parkinson's disease (PD) risk. Apolipoprotein A-1
(ApoA-1) is a surface marker of brain HDL-like particles with association with PD onset. Clinical correlates of serum Apolipoprotein A1 levels with structural brain connectivity are still unclear in PD-related disorders.

Methods: Here, we applied a novel diffusion-weighted imaging approach (Diffusion Magnetic Resonance Imaging (MRI) Connectometry) to explore the association between ApoA-1 and structural brain connectivity in PD. Participants involved in this research were recruited from Parkinson's Progression Markers Initiative (PPMI). Diffusion MRI connectometry was conducted using a multiple regression against apoA-1 for 36 patients with DTI measurements available in the baseline visit. Fiber Results of the connectometry were then reconstructed for each patient and diffusion parameters were extracted and regressed against apoA-1 levels.

Results: Connectometry results revealed the subgenual cingulum to be associated with ApoA-1, with different FDR yields. This result was further supported by significant negative correlation of Quantitative Anisotropic (QA) of left subgenual cingulum (Pearson's coefficient = -0.398, p = 0.020) and Generalized Fractional Anisotropic (GFA) of right subgenual cingulum (Pearson's coefficient -0.457, p = 0.007) with plasma apoA-1 levels, in a multiple regression model with age and sex. The subgenual cingulum encompasses fibers from the anterior cingulate cortex and anterior thalamus.

Conclusion: These structures are involved in PD associated psychosis and executive cognitive decline. We demonstrated for the first time that apoA-1, as a blood marker, can predict microstructural changes in white matter regions in PD patients with undisturbed cognition and mild motor disability.

Poster No. 01-107

Brain Pathway Differences between Parkinson's disease Patients with and without REM Sleep Behavior Disorder

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Abstract:

Introduction: REM (rapid eye movement) sleep behavior disorder (RBD) is characterized by increased muscle tone and violent limb movements and is a usual symptom of the early stages of Parkinson's disease (PD). PD patients with RBD represent faster motor and cognitive dysfunction progression. However, there are limited studies on possible structural brain changes underpinning this disorder.

Methods: Diffusion Magnetic Resonance Imaging (DMRI) was used to assess whether microstructural abnormalities in the brain of 23 RBD positive PD are detectable compared to 31 RBD negative PD. DMRI scans were analyzed without a prior hypothesis. Diffusion MRI connectometry was used to carry out group analysis between age and gender matched PD patients with and without RBD. Diffusion MRI connectometry is based on spin distribution function (SDF) which quantifies the density of diffusing water and is more sensitive to psychological differences between groups.

Results: Patients with RBD positive showed microstructural white matter changes in the left and right cingulum, inferior front occipital fasciculus (IFOF), bilateral corticospinal tracts (CST) and middle cerebellar peduncles (MCPs), compared to patients without RBD.

Conclusion: White matter alterations in the cingulum, IFOF regions and corpus callosum, might explain faster cognitive deterioration in PD patients with RBD, in terms of visual recognition and visuospatial dysfunction and executive function. Disturbed brain structural tissue markers in CST in PD+ RBD patients, could be justified in the light of faster motor progression in these patients.

Poster No. 01-110

Changes in Brain Connectivity Associated with Memory-Guided Attention

Fereshteh Saliminia[1], Gholamreza Chalabianloo[2], Milad Amini Masouleh[1]

[1]MSc in Cognitive science, Azarbaijan Shahid Madani University, Tabriz, Iran

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Abstract:

Introduction: Memory has a significant role in guiding attention; individuals face similar objects and scenes constantly and the past experiences, either declarative or non-declarative memory, may affect attention in analyzing the old and new parts of the environment. The present study analyzes the functional connectivity patterns during the function of procedural and episodic memory-guided attention in the fronto-parietal network, dorsal attention, and the default mode during search task.

Methods: The fMRI database of a research done in New York University during a visual search task was used for this study. Thirty-five right-handed healthy participants (51% female, mean age = 21.7 years) were recruited at New York University. We used the CONN toolbox to determine the strength and significance of bivariate Pearson correlation between each pair of ROIs.

Results: The results of this study revealed that during the episodic and procedural memory-guided attention tasks, the fronto-parietal network has a positive correlation with dorsal attention and default mode network while these two networks have a negative correlation with each other.

Conclusion: The findings of the study demonstrated that DMN and DAN networks play an inhibitory role against each other and suppress each other's activities in the function of memory-guided attention due to the severe competition between the functions of memory and attention. Also, the fronto-parietal network supports the intermediaries among mental representations and has a controlling role in the function of the brain.

Poster No. 01-111

Age-related differences in Default Mode and fronto-parietal control network during resting state: A functional connectivity analysis using graph theory

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Abstract:

Introduction: Procedures based on graph theory, model the complex system of the brain in a form of a collection of nodes and edges; the aim of the recent study is to investigate change/stability resting-state anticorrelations between healthy younger and older participants in the medial prefrontal cortex (MPFC) and the dorsolateral prefrontal cortex (DLPFC), components of default mode (DMN) and fronto-parietal control (FPN) networks, respectively.

Methods: We used the fMRI database of a research done in Dallas University (n = 24 [12M/12F]; ages: 20-71) for this study. The CONN toolbox was used to determine the change/stability of bivariate Pearson correlation between MPFC and DLPFC areas.

Results: A random-effect analysis of fMRI data in older participants revealed the significant decrease in the anticorrlation between MPFC and DLPFC in comparison to younger participants.

Conclusion: The results of this study indicated that there is a meaningful relationship between aging and the anticorrlation of MPFC and DLPFC; these results contribute to an emerging understanding that aging can influence the resting-state networks with decreasing activity in DMN and FPN networks.

Poster No. 01-113

A New fMRI Simulator with the Capability of Stimulation of every Specified Brain Region

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Abstract:

Introduction: Every fMRI image is obtained by processing a temporal sequence of MR images recorded through BOLD-contrast imaging. Since BOLD imaging is time-consuming and expensive, simulated fMRI data can be used as an alternative ground truth for evaluating fMRI analysis methods (Drobnjak et-al., 2006; Allen et-al. 2012; Türkay, 2009; Hilla et-al., 2017). In most fMRI simulators, the anatomical position of the activation stimulus was not precisely determined. In this paper, we propose a new method to overcome this shortcoming.

Methods: As shown in Fig. 1, the proposed fMRI simulator takes advantage of a resting-state (RS) T2-weithed MR data set and its corresponding T1-weighted MR image. First, the T1-weighted MR image is registered with the ICBM152 atlas (Fonov et-al., 2011) by using rigid (Saadatmand-Tarzjan et-al., 2016) and non-rigid (Sarani and Saadatmand-Tarzjan, 2013) transformations. Then, the MR image is segmented by using the TPM atlas (Ashburner and Friston, 2011). Next, the gray-matter of the brain is further separated into different anatomical regions given by the labeled MICCAI2012 atlas (http://Neuromorphometrics.com/). All the above atlases are illustrated in Fig. 2. Then, the stimulation signal is obtained by convolving the hemodynamic response function (HRF) with the boxcar function of stimulus pattern of simulated task. Finally, the simulated fMRI data is obtained by adding the stimulation signal to voxels of the brain region of interest previously determined by the labeled atlas.

Results: We computed a simulated fMRI data by using a temporal sequence of RS-MR images with 36-s duration (www.fil.ion.ucl.ac.uk/spm/data/spDCM/). The simulated task consisted of three 12-s periods; each with 6-s off and 6-s on conditions. As shown in Fig 3 and Fig 4, most of the stimulation regions of the simulated fMRI data were successfully detected by using the general linear model of the SPM toolbox (www.fil.ion.ucl.ac.uk/spm/software/spm12/).

Conclusion: In this paper, we proposed a new fMRI simulator to induce stimulation pattern in every anatomical region of interest.

Poster No. 01-117

Noise Suppression of fMRI data considering correlations in spatial and temporal neighbourhood

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Abstract:

Introduction: Due to high intrinsic noise in the functional images and the small effect of BOLD change on the intensity of the signal, fMRI data suffers from a low signal-to-noise ratio (Monir et-al., 2011). As a result, functional MR images are often pre-processed for denoising before being subjected to statistical analysis (Salimi et-al., 2014; Monir et-al. 2011; Kay et-al. 2013; Monir et-al. 2009). While univariate (single voxel) analysis is extensively applied in fMRI and temporal correlations are the focus of most investigations, only a few applications investigate the spatial dependence of fMRI data (Jin et-al., 2012). That is why we involve spatial dependence in our method.

Methods: Our method is as follows: To involve the spatial and temporal neighborhoods, we used a 3-D and 1-D kernel for spatial and temporal averaging, respectively. In the framework of general linear model (GLM), we used weighted least square (WLS) to minimize the noise term which the weights are Gaussian terms. To minimize this term, we have employed the gradient descent algorithm to find the optimum values for the model parameters (BOLD response amplitudes). These model parameters are more accurate and precise rather than obtaining it from ordinary least square (OLS).

Results: In order to evaluate the proposed method, we utilized simulated fMRI data which was obtained by adding a computer-generated activation time-series to resting state fMRI data which the mask activation region can be seen in Fig. 1. First, we have applied our method to the data and then, we used SPM12 (http://www.fil.ion.ucl.ac.uk/spm/software/spm12/) for our statistical analysis of obtained data from our method. The result can be seen in Fig. 2. The result of SPM12 without applying our method to the data is illustrated in Fig. 3.

Conclusion: Experimental results show that current denoising method has more efficiency than the SPM's. Taking advantage of temporal and spatial neighborhood information makes this method beneficial.

Poster No. 01-116

A New Automated Method for Segmentation of Brain Magnetic Resonance Images

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Abstract:

Introduction: Region classification is an essential process in the visualization of Brain tissues of MRI. Brain image is basically classified into three main regions which includes gray matter (GM), white matter (WM) and CSF (Ahirwar, 2013) and also bone, soft tissue (ST) and air (Fig. 1). There are some methods for brain regions segmentation such as (Prajapati et al., 2015) which represented a method for MRI segmentation based on Self Organizing Maps. A well-known approach which is used in SPM toolbox was proposed by Ashburner and Friston (2011). The aim of this work is to register a patient's image with standard TPM atlas, which is divided into six regions and by doing this; the patient's image is being segmented. This method is sensitive to morphological changes of brain and may fail for some brain images with neurodegenerative diseases such as Parkinson disease (PAD).

Methods: In current paper, we proposed a new method to solve the shortcoming of SPM method. So, we propose an energy function consisting of sum of three terms. The first term minimizes difference between grey levels of corresponding pixels in both the patient's image and the ICBM152 atlas (Fonov et al., 2011 & 2012). The second term is a regulator which preserve continuity and differentiability in smoothed areas. The third term is segmentation term which is segment images by aligning image with TPM atlas (Ashburner & Friston., 2005).

Results: In Fig. 2, slices of three MR brain scans with PAD (dataset was obtained from [7]) was illustrated. As you can see in Fig. 3 and Fig.4, our approach could segment these images but Ashburner's method is failed.

Conclusion: In current paper, we proposed a new method to tackle difficulties of Ashburner's method for some images by representing a new energy function. Experimental results show that suggested method has better performance compare to Ashburner's method.

Poster No. 02-205

Seizure focus localization using FDG-PET/CT scan in drug resistant epilepsy,Interesting case presentation and review of literature.

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Abstract:

Introduction: Positron emission tomography (PET) using 18F-fluoro-deoxyglucose (FDG) can be used to assist localization of seizure foci in patients with drug-resistant epilepsy. Surgery may be beneficial in carefully selected patients. Post-operative seizure control depends on accurate localization of epileptogenic zones. Appropriate other imaging studies including MRI must also be performed to assess the risks of resection.

Case presentation: A 33 years old female with history of complex partial seizure since the age of 6 and associated automatism and hallucination symptoms was referred to Masih daneshvari hospital PET/CT unit for seizure focus localization. On MRI and MR spectroscopy bilateral hippocampal sclerosis with associated left temporal and left frontal lobes atrophy were evident. On FDG PET/CT, there was obvious decreased metabolic activity in the mesial left temporal lobe with associated atrophy, highly suggestive for seizure foci.

Conclusion: FDG-PET/CT is a useful tool to localize the seizure foci in the patients with drug resistant epilepsy. PET should be integrated into the overall patient evaluation including MRI, fMRI, MRspectroscopy and EEG (Figures). If MRI is normal, but PET is clearly indicative of focal lesion and consistent with clinical and EEG localization, surgery can be considered.

Poster No. 02-201

Efficacy of Utilizing Quantitative Analysis Alongside Visual Evaluations in Localizing Epileptic Regions with 18F-FDG Brain PET Scan

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Abstract:

Introduction: FDG Brain PET is a precious clinical tool in handling patients with epilepsy who are under assessment for surgical treatment. So identifying the functional deficit and preoperative evaluation of partial epilepsy with PET becomes a practical routine method. The aim of our study was to assess the efficacy of quantitative software-aided approach in localizing epileptic brain disorders besides physician qualitative interpretation in 18F-FDG Brain PET scan.

Methods: The subject selection in our study was concentrated on patients who suffered from epilepsy disorders and referred for brain PET imaging. 14 patients (5 men -9 women; 29±10 YO) underwent PET scan using SIEMENS Biograph6 PET/CT scanner. We employed the Scenium software, which supplies potent quantification tools for the statistical analysis of brain PET and equipped with Talairach stereo-tactic atlas of the human brain [1]. Scenium provides color-coded statistical analysis as z-score, the number of standard deviations from normal brain. Z-scores less than -2 were considered abnormality. Two expert physicians reported the PET scans based on visual qualitative and quantitative software-aided approach separately.

Results: Figure (1) shows 18F-FDG Brain PET and related statistical image rendered by quantitative analysis software for one of the patients. Table (1) displays quantitative versus qualitative information for fourteen patients in hypo-metabolic regions candidates for epileptogenic zones.

Conclusion: Destructive effects of epilepsy, declines the quality level of life [2]. So accurate physician diagnosis becomes very important. The foregoing study has attempted to show the effect of using quantitative analysis on diagnosis of epileptogenic sites alongside visual analysis. As shown in table (1), five of fourteen cases were reported normal via visual physicians' interpretation while quantitative evaluations identify hypo-metabolic disorders in those patients. The results demonstrate the importance of quantitative Brain analysis in accurately localizing epileptic regions mostly in temporal and extra-temporal lobes [3] for diagnosis and surgical treatments.

Poster No. 02-202

The Impact of PET Image Reconstruction Parameters On Quantitative Assessment of Epileptogenic Sites in 18F-FDG Brain PET Scan

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Abstract:

Introduction: PET is a widespread functional imaging tool in the pre-surgical evaluation of patients suffering from epilepsy disorders. In PET, epileptogenic regions show a decreased glucose metabolism, however, precise detection of hypo-metabolic spots depends on SNR and image quality. Many or insufficient iterations can create noise and artifacts so knowing when to stop becomes a problem. In this study we evaluate the influence of PET reconstruction parameters on quantitative results by means of variations in Z-score and SUVmax values.

Methods: Different number of iterations (i), subsets (s) and smoothing filter (G) with/without resolution recovery (HD/i-3D) were used for brain PET iterative image reconstruction in SIEMENS Biograph 6 PET/CT scanner. Furthermore, PET images were attenuated corrected using low dose CT images (80-130 kV,50-80 mAs). The reconstructed PET images were normalized to talairach stereotactic atlas of human brain and variations in z-scores were reported in functional deficit cerebral zones using scenium software. As compared to FBP, Iterative reconstruction methods provide images with better spatial resolution and improved SNR and image quality [1,2].

Results: Figure (1) shows reconstructed PET images and corresponding statistical image of a patient with epileptogenic lobe using different reconstruction settings. Table (1) reports z-scores and SUVmax variations against normal database recommended reconstruction settings (bold fonts) which have been derived from statistical and PET images respectively.

Conclusion: As quantitative and semi-quantitative information derived from 18F-FDG brain PET images can be strongly affected by noise, optimized reconstruction settings should be implemented. Various reconstruction settings can affect z-score and SUVmax differently. They make variations up to 30% and 42.2% in SUVmax values in iterative 3D and HD respectively. Besides, they may underestimate up to 119% and 278% in z-score values in iterative 3D and HD respectively which results in many false positive epileptogenic sites. Accurate use of reconstruction parameters has a vital role in diagnosis, characterization and treatment response.

Poster No. 02-204

Thyroid Dose Assessments from Brain CT scan in Children Group of 1 to 5 Years Old

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Abstract:

Introduction: The Thyroid gland is highly susceptible to radiation carcinogenesis and exposure to high-dose ionizing radiation is the only established cause of thyroid cancer and is more prominent in early ages of life. In this study, Conversion Coefficients were calculated using ImPACT CTDosimetry software to convert CTDIvol to Organ Dose in children (1 to 5 years old and both genders). The calculations are done based on different effective diameter and scan lengths for each group of children. Methods to estimate Organ absorbed dose of Thyroid gland, effective organ dose and associated cancer risk to the patients were also evaluated. The purpose of the study is to introduce accurate and robust measurements of organ absorbed dose (thyroid) in examinations of brain CT scan.

Methods: METHODOLOGY 2-1 Organ Dose Calculation Algorithm 2-3 Effective Dose calculation 2-4: Cancer risk assessment:

Results: Conversion coefficients were calculated using ImPACT DOSE software version 2.3. The coefficients were calculated for the group of children under the study based on different scan lengths and effective diameters (effective diameter=√AP × LAT; AP and LAT are the anterior posterior (AP) and lateral (LAT) dimension of the patient's cross section on the mid-level of the scan range) as presented in Table 1.

Conclusion: According to the brain scans taken in children, the major contributor in thyroid exposure during radiation is scan length. Therefore, using absorbed dose value is important for dose absorption optimization and decreased cancer risk. Considering different dosimetry methods available the most convenient approaches is estimating conversion coefficients which help in approximating thyroid dose. This method can utilize the optimized radiation and could also evaluate unit's calibration efficacy.

Poster No. 03-302

The role of brain stimulation for Obsessive-Compulsive Disorder

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Abstract:

Introduction: Music has been used as a non-invasive method to change the plasticity of the brain. Increase of brain rhythm activity, particularly in the frontal lobe, has been reported in several EEG studies of obsessive compulsive disorder (Desarkar et al., 2007; Velikova et al., 2010; Ischebeck et al., 2014). Resent reviews has shown several brain disorders are improved following tDCS. Studies showed that music can lead to Plasticity and it can increase or decrease of particular frequencies of the brain (Wan et al., 2010; Herholz et al., 2012). In this study we measured the baseline EEG activity in OCD patients and normal subjects followed by interventions: tDCS plus music.

Methods: 8 OCD patients (3 male) and 8 appropriately matched healthy controls were recruited. A 64-channel EEG used to record a 5-minute before and at the same time listening to two type music (Light and Rock music as separately) after applying tDCS. It was applied for 15 minutes 2mA where anode was placed on the left dorsolateral prefrontal cortex (DPLFC) and cathode was placed on the right (DPLFC).

Results: The results show that following anodal tDCS, hyperactivity in Delta and Theta bands declined in most of the channels, particularly in DLPFC (F3, F4) and became similar to normal signals pattern. In addition, listening to light music after electrical stimulation caused the power Delta and Theta bands frequencies to increase again. However, no significant difference in terms of statistically was observed. Whereas after listening to rock music no significant difference was observed in the power bands after tDCS.

Conclusion: In this study, light music increased the power of frequency bands of Delta and Theta in OCD Patients. However, listening to Rock music showed similar effects after electrical stimulation. The pattern of EEG activity after Rock music became particularly similar to after tDCS and may have potential clinical application.

Poster No. 03-301

Efficacy of Transcranial Direct Current Stimulation (tDCS) to treat symptoms of Friedreich Ataxia: A single case study of Quantitative Electroencephalography (QEEG) guided protocol

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Abstract

Introduction: Nowadays studies based on neuroscience technologies shown that the neuromodulation of the cerebellum using Transcranial direct current stimulation (ctDCS) could suggest a novel therapeutic method for the management of ataxia.

Methods: We reported a 24 year-old female patient with ataxia underwent clinical and functional evaluation pre- and post-anodal and cathodal transcranial direct current stimulation based on QEEG brain map of the patient, also she checked after 4 months follow-up.

The first treatment protocol was anodal stimulation of C3 (1.2 mA, 15 min) and cathodal stimulation of C4, after one month we checked the patient's brain map in order to investigate the effects, there was no changed so we tried the second protocol based on patient's QEEG, anodal stimulation of CZ (1.5 mA, 17 min) and cathodal stimulation of OZ, again after one month we checked the patient's brain map to follow any changes, we didn't find any improvement, finally we used the anodal stimulation of FZ (2.0 mA, 20 min) and cathodal stimulation of OZ based on patient's QEEG, after one month we checked the patient's brain map and we found that the third protocol was effective clinically.

Results: Patient showed better walking speed, less gait disturbance, decreased symptom severity, and her hopefulness was also improved. Transcranial Current Stimulation based on QEEG can improve symptoms in patients with ataxia and might represent a promising tool for future rehabilitative approaches.

Conclusions: Transcranial Direct Current Stimulation based on QEEG can improve symptoms in patients with ataxia and might represent a promising tool for future rehabilitative approaches applying the most precise brain area for stimulation.

Key words: Friedreich Ataxia, Transcranial direct current stimulation, Quantitative Electroencephalography, Frontal & Occipital stimulation.

Poster No. 03-304

A possible effect of transcranial direct current stimulation on the motor function of Parkinson's disease

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Abstract:

Introduction: Electrical stimulation of the deep brain (DBS) is one of the therapeutic tools for patients with Parkinson's disease (PD), but it has been carried risks and is not plausible for all patients. Recently non-invasive brain stimulation has been widely interested. One of these stimulations is transcranial direct current stimulation (tDCS) that is more safe and inexpensive than other noninvasive stimulations [1]. A weak electrical current adjusts the resting membrane potential, according to the anodal or cathodal stimulation and its duration. One of the common motor symptoms of PD is slow movement (called bradykinesia). The aim of this study was to investigate the effect of the anodal tDCS, which increases cortical excitability by 20 minutes stimulation [2], on motor function of PD.

Methods: A spiral task (Figure 1) was designed for a participant. In this task, the participant traced a spiral clockwise from inside to outside [3]. Participant underwent a single session of anodal tDCS at two mA of current intensity over the M1 (C3) for 20 minutes. Pen trip trajectory was recorded during drawing the spiral, before and after stimulation. It was repeated for three times.

Results: Velocity, acceleration, time, and Lyapunov exponent of the velocity were extracted from the data, before and after the stimulation. Velocity and acceleration respectively increased 0.06 and 3.00 points per second after stimulation with respect to the before. In contrast, time and Lyapunov exponent respectively decreased 7.37 second and 0.12 after the stimulation.

Conclusion: Results demonstrated a decrease in chaotic behavior and time of performing task. Therefore, it can be showed that anodal tDCS can recuperate the patient suffering from bradykinesia. Thus, tDCS of the motor cortex may have therapeutic potential in PD. However, more investigation with multiple stimulation sessions needs to be sure about the obtained result.

Poster No. 03-303

A Clinical Toolbox for the Identification of the Input-Output Curve in Transcranial Magnetic Stimulation

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Abstract:

Introduction: Medical research has shown that there is a meaningful relationship between pulses of transcranial magnetic stimulation (TMS) and motor evoked potentials (MEPs), which is known as the input-output (IO) curve in the literature, [1]. The IO-curve can provide quite important information about neurological parameters. For instance, it can be used as a metric for the determination of the corticospinal pathway excitability [2]. In this work, we develop a user-friendly Graphical User Interface (GUI) for the estimation of IO curve and its parameter for clinical and research applications.

Methods: Conventionally, the IO-curve is identified by recording a high number of stimulus–response pairs and applying an off-line curve fitting method [3]. However, it is not clear how many data is sufficient for the IO-curve fitting, and that, how the magnitude of the TMS stimuli should sequentially be adjusted so that the accuracy of the IO-curve parameter estimation is improved after applying each TMS pulse. We propose an algorithm for the multi-parameter estimation of the TMS IO curve, by using sequential sampling and the Fisher information matrix. The proposed algorithm aims to optimally select the sequence of the input so that the system parameters are estimated with a satisfactory level of accuracy through fewer experiments.

Results: The GUI is tested and the results of estimations are presented and discussed.

Conclusion: The results show that the proposed algorithm can significantly reduce the duration and cost of the TMS treatment.

Poster No. 05-503

Using motor imagery games to alleviate phantom limb pain

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Abstract:

Introduction: Phantom limb pain (PLP) is the condition experienced by people who have had a limb loss due to removal by amputation or a birth defect. Although the limb no longer exists the pain (apparently originating from that limb) is quite real. We postulate that this condition happens due to the inactivity of the part of the brain that corresponds to the lost limb. Reengaging this part of the brain might help the patient by bringing back the balance.

Methods: Brain stimulation is done by means of motor imagery exercises such as playing simple games like "simplified snake" in conjunction with an EEG recording device which enables us to detect the imagination of the limb(s) movement. We have used the common spatial patterns (CSP) filtering method with a simple Linear discriminant analysis (LDA) classifier to detect right or left hand movements in the OpenViBe environment. To make the task more engaging and potentially more efficacious, three simple games are designed in the MATLAB environment. The EEG data was recorded using the EMOTIV EPOC+ device. The EMOTIV EPOC+ has 14 EEG channels with a sampling rate of 2048 Hz.

Results: Using the EMOTIV EPOC+ device we got an accuracy of 75 to 78 percent in classifying the right and left hand movements.

Conclusion: It remains to be seen how these games can improve the PLP condition in the patients but we are optimistic since previous researches such as [1] have shown promising results.

Poster No. 05-502

A Novel Scheme for Segmentation of T1-Weighted Brain Magnetic Resonance Images

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Abstract:

Introduction: Automatic brain segmentation is widely used for brain volume analysis and disease progress/remission assessment (Bandyopadhyay, 2011; Ahirwar, 2013). Some researchers attempted to employ medical brain atlases as a priori shape information to handle segmentation uncertainties (Fonov et al., 2011). The most well-known and frequently-used method in this category (employed in the SPM toolbox) was proposed by Ashburner and Friston (2011). They performed full brain segmentation by registering T1-weighted MR images with a probabilistic atlas (so-called TPM) consisting of separate gray-matter (GM), white matter (WM), CSF, bone, soft tissue, and air regions (see Fig. 1). Ashburner's method may fail for brain images with neurodegenerative diseases, such as Alzheimer disease (AD), for sensitivity to brain morphological changes. To tackle the above problem, we should primarily compensate brain deformations by increasing the similarity between the brain image and TPM atlas.

Methods: According to the block diagram of the proposed scheme shown in Fig. 2, we primarily register the brain image with the ICBM152 atlas (Fonov et al., 2011) by using the rigid and non-rigid image registration algorithms suggested by Saadatmand-Tarzjan et al. (2016) and Sarani and Saadatmand-Tarzjan (2013), respectively. Then, the transformed brain image (through the obtained rigid and non-rigid transformations) is given to Ashburner's method for brain segmentation. Finally, the resultant segmented image is transformed back to the spatial space of the patient's image.

Results: Fig. 3 illustrates four slices of four brain MR images with AD. As shown in Fig. 4, our approach provided better segmentation results for all benchmark images, compared to those obtained by Ashburner's method.

Conclusion: In this paper, we proposed a new scheme to tackle major difficulties of Ashburner's method in segmentation of T1-weighted MR images by using rigid and non-rigid registration algorithms. Experimental results demonstrated superior performance of the suggested method.

Poster No. 07-702

Relationship between CSF biomarkers and structural brain network properties in Parkinson's disease

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Abstract:

Introduction: Pathologic accumulation of Lewy body components in the brain is considered critical for Parkinson's disease (PD) development. Here we aimed to investigate the association between CSF Lewy bodies, brain structural connectivity, and the Unified Parkinson's Disease Rating Scale (UPDRS) in PD.

Methods: Diffusion tensor images and CSF biomarkers (α-synuclein, Aβ42, total-tau, and phosphorylated-tau181) from 132 drug-naïve, nondemented PD patients and 61 healthy controls were included in the analysis. Data were obtained from the Parkinson's Progression Markers Initiative database. Using ExploreDTI, baseline DTI scans were corrected for subject motion and eddy current distortions and were non-rigidly registered to the automated anatomical labeling atlas (AAL) for further atlas based network construction. White matter tracts of the brain were reconstructed based on 90 cortical and subcortical regions of the AAL atlas and afterward were weighted with fractional anisotropy as a sensitive biomarker in PD. Eventually, a 90*90 weighted connectivity matrix was obtained for each patient. Global interconnectivity measures (global efficiency, clustering coefficient, and characteristic path length) and local efficiency were calculated using the Brain Connectivity Toolbox. The network properties and CSF biomarkers were compared between PD patients and controls. The association of CSF biomarkers with network properties and UPDRS score was then investigated.

Results: Global measures (but not local efficiency) and CSF α-synuclein were significantly lower in PD. Global efficiency and clustering coefficient were positively correlated with α-synuclein, Aβ42, and total tau levels. Characteristic path length was negatively correlated with α-synuclein level. Furthermore, CSF biomarkers showed no significant association with UPDRS score.

Conclusion: This is the first study that examined the contribution of CSF biomarkers to structural brain connectivity and UPDRS in PD. Our results revealed an association between abnormal Lewy bodies' aggregation and structural connectivity disruption in PD patients. In summary, a combination of structural imaging and measurement of CSF biomarkers provide a better understanding of PD pathogenesis.

Poster No. 07-701

Impaired Structural Frontotemporal Connectivity in Schizophrenia is Associated with Poor Verbal Learning and Working Memory

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Abstract:

Introduction: Schizophrenia (SZ) is a disorder of brain connectivity. Many studies showed functional frontotemporal uncoupling. We investigated structural frontotemporal dysconnectivity by means of Uncinate Fasciculus (UF) using Diffusion Tensor Imaging (DTI) and its correlation with psychological tests.

Methods: After quality control, 32 SZ and 25 Healthy (H) subjects were included from MIND Clinical Imaging Consortium Database. DTI images were in 60 directions (b-value=700; 10 b0s) and were analyzed using ExploreDTI. After tensor estimation and Eddy current correction, all images were rigidly registered to ICBM Mori template. Tractography with angle threshold=45° and stepsize=0.5mm was performed. Manual UF extraction using Regions of Interests delineation was done (figure). Fractional Anisotropies (FA) and Apparent Diffusion Coefficients (ADC) were calculated. Using SPSS, to see H and SZ differences, ANCOVA with age, sex, handedness, and education years as covariates was done. To see FA and ADC association with letter number sequencing (LNS) and vocabulary tests (VT), linear regression with same covariates was performed.

Results: In left UF, ADC was significantly higher in SZ group ($p=0.001$), and FA and ADC were both associated with VT and LNS ($p<0.05$). In right UF, ADC and FA were not significant, but they were associated with both tests ($p<0.001$)

Conclusion: We showed impaired left UC in SZ subjects. FA and ADC abnormalities in both UC fibers were associated with poor scores in psychological tests. Our results confirmed frontotemporal structural dysconnectivity with roles in SZ symptoms.

Poster No. 08-807

ECG Artifact Removal from EEG Signals Using MULTICOMBI Algorithm

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Abstract:

Introduction: Electroencephalogram signals contains lots of information about not only the brain function, but also the whole body health status. So analyzing these signals may pave the way for automatic detection of many neurological diseases. The EEG signals recorded from the scalp can be due to the electrical activity of either the brain or other sources [1] such as cardiac activity or ECG signal which can be due to the use of common reference or in some diseases like cardiomegaly or epilepsy [2].

The methods for ECG artifact reduction during signal acquisition cannot always be achievable. So signal processing techniques may be needed. In this research we used BSS to reduce the effect of ECG signals with less information loss.

Methods: A 19 channel EEG signal contaminated with obvious ECG signal [4] especially in C3 channel was used to test our method.

An elliptic band pass (0.1-80 Hz) and a 50 Hz notch filter were used for signal preprocessing. Then source components were extracted using MULTICOMBI method realized using ICALAB toolbox [4].

Results: The ECG related component which is shown in fig. [1], was chosen manually by visual inspection, eliminated and finally, all remaining components were back-projected to the initial space. In order to find how much information artifact free signal shares with the raw EEG signal, mutual information was calculated and shown in table [1].

Conclusion: In this research, we tried to eliminate the effect of ECG on EEG signal using ICA algorithm. Fig. [2] indicates that our algorithm has eliminated the ECG effect on our signal perfectly while the amount of information loss measured by mutual information (table 1.) is not impressive in all channels except C3. Actually this information loss in C3 was expected while this channel had the most correlation (0.7) with the eliminated component. So the use of this method is recommended.

Poster No. 08-812

Cortical state modulates stimulus evoked oscillations in barrel cortex

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Abstract:

Introduction: Cortical state modulates both background activity and stimulus driven responses in cortical area. State-dependency of sensory responses has been frequently reported, predominantly with a focus on spiking activity. Here, we investigated the link between cortical state and stimulus evoked oscillations in the cortex.

Methods: We recorded local field potentials (LFP) from barrel cortex along with pre-frontal electroencephalogram (EEG) while presenting brief whisker deflections under urethane anesthesia. Deflections were delivered to a principal whisker using a piezoelectric device. Stimuli were centered at neurometric threshold (0, 1/2T, T, 3/2T, and 2T) and were presented in a pseudorandom order with 5second inter-stimulus interval. Cortical states were identified based on the power of low to high-frequency components of EEG (referred to as the L/H ratio)[1]. Each trial was then classified as being in "synchronized" or "desynchronized" state based on the L/H ratio at the time of stimulus. Short time Fourier transform (STFT) was used to calculate time frequency domain of LFPs.

Results: We observed that cortical state prominently modulated 7-12 Hz oscillations following the early response of the LFP in a stimulus dependent manner; the power of 7-12 Hz components was significantly higher in desynchronized state at 3/2T and 2T stimulus intensities. Moreover, we observed a significant modulation in gamma range frequencies (30-80).

Conclusion: Our results suggest that post-stimulus oscillations may communicate information regarding the sensory input in a state-dependent manner.

Poster No. 08-811

Dynamics of Locus Coeruleus Firing and Oscillation in Changing Cortical State

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Abstract:

Introduction: Cortical state modulates the background activity of cortical neurons, and their evoked response to sensory stimulation. Multiple mechanisms are involved in switching between cortical states including various neuromodulatory systems. Locus Coeruleus (LC) is one of the major neuromodulatory nuclei in the brainstem with widespread projections throughout the brain and modulates the activity of cells and networks.

Methods: Here, we quantified the link between the LC spontaneous activity, and cortical state in urethane anesthetized rat. We simultaneously recorded unit activity from LC and prefrontal EEG. The ratio of low to high frequency components of EEG (referred to as the L/H ratio) was employed to identify cortical state.

Results: We found that the spontaneous activity of LC units exhibited a negative correlation with the L/H ratio. Cross-correlation analysis revealed that changes in LC firing preceded changes in the cortical state: the correlation of the LC firing profile with the L/H ratio was maximal at an average lag of -1.2 s. In addition to this consistent correlation, we also tested some specific effects in those sessions that showed log-term desynchronized and synchronized state. We found that LC firing rate marks the transition from synchronized to desynchronized state; there was a sharp increase in LC firing rate before transition from synchronized to desynchronized. We also quantified pattern of activity along with firing rate. We determined an oscillation index which calculated from power spectra (0.5-5 Hz) of the LC auto-correlations. LC oscillation index alternates between state and drops with LH ratio.

Conclusion: We found that regular oscillation of LC coincides with synchronized state and terminates with synchronized to desynchronized transition.

Poster No. 08-808

Optimal Feature Selection of EEG Signal during Motor Imagery-based Brain Computer Interfaces

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Abstract:

Introduction: A brain–computer interface (BCI) is a direct communication pathway between the brain and an external device. This system providing a non-muscular channel for sending commands to the external world, so it can be considered as being the only way of communication for people affected by a number of motor disabilities. In recent years, the research has tended to focus on the selection of stronger classification algorithms and new features extraction methods. In the previous research on motor imagery–based brain computer interfaces (MI-BCI), only a few linear and fractal features were studied. Therefore, in this research, we analyze some linear and nonlinear features and look for the optimal features to improve the performance of these systems.

Methods: This paper investigates the classification of multiclass MI-BCI using the combination of non-linear and linear features. The proposed method was evaluated on 4-class (left-hand, right-hand, foot and tongue) single-trial motor imagery data of BCI Competition IV Datasets IIa. All linear and nonlinear features (Table 1 and 2) are applied as input features matrix and then, using the two methods of feature selection: genetic algorithm and SFFS. The optimal features is selected for each subject, and they are classified by LDA and SVM classifier (Table 3 and 4).

Results: The results showed that optimal features can improve the performance of classifiers. Also the selected features by SFFS method have better results than genetic algorithm method. In the method of genetic algorithm, by increasing neighborhood radius, the resolution accuracy of LDA classifier has increased, but in the SVM classifier, it has decreased.

Conclusion: The proposed algorithm has better discrimination ability than other submission. The winner of this competition was the first group which used the Filter bank Common Spatial Pattern (FBCSP) algorithm and achieved an average Kappa of 0.57. But it is observed that the proposed algorithm (combination of nonlinear and linear features) has reached 85%.

Poster No. 08-805

Effective connectivity biomarkers can predict non-responders to rTMS in treatment resistant MDD

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Abstract:

Introduction: In this study, we investigated several effective connectivity metrics in EEG in order to differentiate between non-Responders (NR) and Responders (R) to rTMS in patients with Major Depressive Disorder. Basically, to avoid large costs on treating MDD using rTMS antidepressant method, we need to be able to predict the outcome whether it would be effective. Accordingly, we searched for some features among measures of Granger Causality (GC) in order to classify subjects into two categories.

Methods: 45 patients diagnosed with MDD (including 24 R and 21 NR) participated in this research. 32 channel pre-treatment resting-state EEG of subjects have been recorded for 3 minutes. We pre-processed these signal with PREP pipeline using EEGlab Plugins. We segmented time series into 2 sec and then calculated brain connectivity for each, based on a corresponding Multi-Variate Auto-Regressive (MVAR) model which has been fitted on individual data using SIFT. Due to the preference of having longer data, we averaged measures over segments. Intend to select productive features, we applied an independent t-test (level of significance: 0.05) to compare two groups of interest. Averaged features distinguished R from NR significantly in some regions (according to channel locations). Eventually, with SVM algorithm we yielded an accuracy that could be considered above chance.

Results: Brain connectivity estimators Directed Direct Transfer Function, Partial Coherence and Generalized Partial Directed Coherence have demonstrated a noticeable difference; particularly dDTF in the alpha band. The classification identified NR with a sensitivity of 89% and overall accuracy of 83%. Area under ROC curve value was 0.87.

Conclusion: Our results had a strong association with finding in a former study which had shown that pre-treatment alpha EEG on parieto-temporal could be a predictor of response to rTMS. The approach of connectivity could be a controversial way of determining clinical outcomes with the utility of Machine Learning concept but it's potentially useful and outperforming.

Poster No. 08-813

Brain functional connectivity changes to controlled release of cortisol in stressful condition

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Abstract:

Introduction: Stress is defined as a nonspecific response of the body to a stimulus or stressor. Stress response causes cortisol release and cortisol mediates short-term and long-term physiological changes in our bodies. Studies showed that chronic release of cortisol can damage brain (Lupien, Maheu et al. 2007). For preventing damage of brain after a longterm cortisol release, it is essential to control stress level (Wegner 1988). Our hypothesis was that detecting Specific areas of brain that work together to control the amount of released cortisol in stressful condition. Cortisol represents an important part of the response to stress in human subjects. Healthy human subjects undergoing psychological stressors demonstrate a robust increase in cortisol levels (Bremner 1999). Electroencephalography (EEG) is a neuroimaging technique suited to capture these interactions, because they provide whole head measurements of brain activity in the millisecond range (Schoffelen and Gross 2009) (Achard, Salvador et al. 2006). This study establishes a new data-driven approach to brain functional connectivity networks using EEG recordings in stressful condition.

Methods: We recorded data from 20 male subjects with ages 18-28 years. Resting-state EEG data was recorded in 3 sessions contains before stress, after stress and 20 minutes after rest. EEG data were preprocessed through the matlab toolbox EEGlab. In this research, was used functional connectivity approach in high density resting state EEG data in eyes open and eyes closed. To analyze the functional connectivity (FC), we first extracted band specific FC maps by measuring partial correlation between all pairs of 30 channels. FC maps of three sessions (before stress, after stress and 20 minutes after rest) with significant changes were compared. A paired T-test was applied between data of before and after stress condition to identify how stress changes the brain connectivity pattern and after recovery and stress condition to identify how brain behaves after stress.

Results: Brain functional connectivity (FC) changes from before stress to after stress appeared in the fronto-temporal connections especially in delta, alpha, beta and gamma bands. FC changes from after stress to 20 minutes after release of stress, a significant FC alteration ($P<0.05$, FDR corrected) was observed at the tempro-parietal connections especially in theta and beta bands. This flexibility in changes of the brain functional connections has an important role in inducing and changing of the stress effects. Interestingly, changes in FCs are significantly correlate with relative cortisol level.

Conclusion: The rewiring pattern in stressful condition could help ones to cope with a stressful situation and prevent its consequences. Stress condition changes will influence the cortisol level in a way to change the FCs.

Poster No. 08-806

Detection of Right Hand Imagery Activation Using Independent Component Analysis

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Abstract:

Introduction: EEG Signals can reveal some patterns associated with actual hand movement and its imagination related to the brain sensory motor area. Although both the imagination and execution states have rhythmic activities, there are some differences in their EEG signals. According to recent progress and future prospects of BCI systems, detection of movement imagery is an interesting subject for researchers in this field. In this study, we used independent component analysis to extract right hand Motor Independent Component (MIC).

Methods: MICs have some characteristics such as power spectrum density (PSD) and ICs weights localization (scalp map). To be more precise, 1) band power of mu rhythm (8-12 Hz) and central beta rhythms (20-25 Hz); 2) Right Hand MIC topographical map activity in left sensory motor cortex area [1]. Our experiment is evaluated on the BCI Competition IV dataset 2a. This dataset contains 25 channel EEG data from 9 healthy participants during left hand, right hand, foot, and tongue imagination; while, in this study, just one of these four classes (right hand imagination) were used to evaluate our method. ICA weights were calculated using FastICA algorithm and realized by EEGLAB toolbox. Finally, PCA clustering was applied to all ICs with K-Means method and 25 clusters based on PSD, scalp map, Event Related Potential (ERP), ERSP and ITC were reached.

Results: Our results show that Right Hand MIC is well recognized by a separate cluster, which meted MICs properties. As shown in Fig. 1 which is belonged to Right Hand MIC cluster representative, scalp map shows a considerable activity in left hemisphere sensory motor cortex area. Fig. 2 shows ERSP Activity in proposed frequency band.

Conclusion: The proposed method can be used to separate right hand movement imagination with two main properties such as band power of mu and central beta rhythms, and Right Hand MIC topographical map activity in left sensory motor cortex area.

Poster No. 08-809

Visual Saliency Dynamic Detection Based on Fused Implementation of a Fuzzy Learning Method and Visual Attention based on EEG signal

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Abstract:

Introduction: "Active brain" and accordingly "sustained attention" and as a result "active Learning", are all considered to be resulted from the existence of effective stimuli during a visual observation procedure. So far it has been revealed that the saliency parts of a given input could be extracted as effective stimuli based on the mechanism of human Visual Brain Memory (VBM) to optimize learning. On the other hand, Active Learning Method (ALM) has recently been proven to be a powerful Fuzzy modeling and control algorithm which uses operators behaving very similar to what happens in natural processing mechanisms.

Methods: The novelty of this work is the ability to dynamically obtain the salient parts in order to infer the salient regions in frames with low contrast foreground, and also to eliminate learned future and noisy parts in repeated tasks. Hence, the combination of two versions of ALM is proposed to detect salient parts of an input captured by video. Moreover, these two versions of ALM simulate active learning by considering the interaction between neural data obtained from Electroencephalographic signals (EEG) and neural modeling.

Results: The results show that learning the saliency parts and also the distortion in learning irrelevant data help compensate the imprecisions in VBM. Finally, the results support the hypothesis in which learning mechanisms-active and optimized learning-based on the concepts presented in VBM feature compensatory behavior to deal with imprecisions.

Conclusion: This investigation claims that the proposed method dynamically extracts meaningful patterns of a given visual input as saliency parts in an unsupervised way. The neural modeling is carried out by applying Ink Drop Spread (IDS) and Center of Gravity (COG) as spatial density convergence operators of ALM which simulate the natural diffusion phenomenon taking place in synaptic gaps. In turn, model extraction and canceling possible noises occur due to modeling abilities of proposed method.

Poster No. 08-804

Contribution of Top-Down Expectation in Stimulus-Driven Category Information: An EEG Decoding Study

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Abstract:

Introduction: Human object recognition is strikingly rapid and precise, even in the face of drastic variations of objects and environmental conditions. Despite decades of research, the underlying mechanisms of object recognition have remained elusive. The literature is dominated by studies, which investigated the role of bottom-up sensory mechanisms in object recognition [1-5], giving lower weight to top-down cognitive influences such as attention and expectation, which can modulate sensory representations of objects.

Methods: To investigate the spatio-temporal dynamics of object representations under top-down expectation we designed an EEG experiment in which ten human subjects categorized four object categories while their brain activity were recorded using a 32-channel amplifier. The color stimuli were equalized for intensity, contrast and object area across categories. The experiment was go/no-go in which cued and non-cued object categories were presented sequentially, each for 900 ms in random order with 800 ms inter-stimulus interval. Subjects' task was to report the perception of cued category as soon as possible after stimulus offset. Using multivariate pattern analysis (decoding), we evaluated the impact of top-down cognitive processes on the processing of objects categories.

Results: Results showed that, in the sensory window of brain information processing (as around 150 ms post-stimulus), cued category information were more robustly decodable from brain signals, compared to non-cued. The amount of information difference between cued and non-cued conditions became significant in the second half of presentation time (after 400 ms), showing decision-related information and motor preparation in cued trials. Category information became first (at around 40 ms) available on occipito-temporal areas of the brain, while it then (at around 200-250 ms) covered also more pre-frontal areas, showing respective regions involved in the processing of sensory and cognitive information.

Conclusion: These results add support to separate but cooperative operation of sensory and top-down cognitive processes for accurate object recognition.

Poster No. 08-803

Detection of Epileptic Seizure from EEG Signals by Using Teager Energy and Hilbert Transform

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Abstract:

Introduction: With regard to electrical interactions in the brain, Electroencephalographic (EEG) records are strongly considered to be one of the most applicable methods in diagnosis of neurologic diseases. One of the neurologic diseases is called Epilepsy, which has influenced upon nearly 1% of the population worldwide. Today, employing computerized systems, to use in quick diagnosis of illnesses that has been a paramount interest of study among researchers, has productively led to a great accuracy and immediate response. In this study, on account of Electroencephalographic signals epileptic seizures, a classification of the healthy and the epileptic is applied.

Methods: In this paper, descriptive database has been acquired from Physionet which includes two groups of data; first data belongs to healthy individuals which consists of 400 samples, and subsequently the second one belongs to the epileptic that is composed of 100 samples whose resolution and velocity are 16 bits and 256 samples per second respectively. The mentioned signals fall into 3 to 23 age range that has been sampled by the 10-20 standard.

Results: From extracted features, Hilbert transform and Kaiser_Teager energy value have been used for the act of classification. After applying the proposed method on the mentioned data, maximum correctness using KNN, Multilayer Neural Networks, classifiers, are 95.75% and 99% respectively. Finally, our proposed method could successfully classify and distinguish between EEG of healthy individuals and epileptic ones with an accuracy of higher than 95%.

Conclusion: From extracted features, Hilbert transform and Kaiser_Teager energy value have been used for the act of classification. After applying the proposed method on the mentioned data, maximum correctness using KNN, Multilayer Neural Networks, classifiers, are 95.75% and 99% respectively. Finally, our proposed method could successfully classify and distinguish between EEG of healthy individuals and epileptic ones with an accuracy of higher than 95%.

Poster No. 06-605

Locus Coeruleus Stimulation and Sensory Response Adaptation in Rat Barrel Cortex

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Abstract:

Introduction: Stimulus driven responses in the cortex reduces due to a prior exposure to sensory stimuli, a phenomenon called sensory adaptation. Depression of synaptic supplies and after hyperpolarization (AHP) following each action potential are the main proposed mechanisms for adaptation. In vitro studies have shown that the neuronal adaptation in barrel cortex depends on slow AHPs (Dıaz-Quesada and Maravall, 2008). Such AHPs can be affected by neuromodulators, such as noradrenaline (Madison and Nicoll, 1986; Foehring et al., 1989). This evidence suggests that Locus Coeruleus (LC) noradrenergic system may reduce sensory adaptation through this cellular mechanism. We proposed that LC stimulation prior to whisker deflection can affect the degree of adaptation in the barrel cortex, depending on the nature of noradrenergic interactions in the barrel cortex.

Methods: We coupled adapted or non-adapted whisker deflections with LC phasic stimulation with a 400ms interval. A 50 ms sinusoidal vibration was applied to the whisker immediately before the test deflection. Neuronal activity was recorded from barrel cortex (BC) in urethane-anesthetized rat. We quantified the effect of LC stimulation on the degree of adaptation in BC; lower adaptation index shows lower adaptation.

Results: Our result showed that LC stimulation significantly modulated adapted response in 30% of units with insignificant modulation on adaptor or non-adapted response. This modulation was in two directions; adaptation decreased in 5% of units and increased in 25% of units. In addition to LC modulation on adaptor response in the level of individual units, adaptor response was lower modulated in around 70% of units, on average. This modulation was not correlated by LC modulation on non-adapted response.

Conclusion: Although sensory adaptation in BC was attenuate by LC stimulation in majority of units, but there was limited number of units that showed significant modulation.

Poster No. 06-606

Neural Correlates of Alexithymia in Absence of Disorders: ALE Meta-Analysis

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Abstract:

Introduction: Alexithymia (absence of words for emotions) is referred to a personality construct defined as a disturbance in affective information processing and social cognition by inability identifying and describing feelings which involves restricted imaginative processes. It is highlighted as a major risk factor for unexplained medical conditions and psychiatric disorders. Recently, several neuroimaging studies revealed corresponding brain regions of alexithymia. However, data retrieved from these studies are inconsistent, due to different underlying disorders, imaging modalities, preprocessing and analyses and small sample size of each study. The aim of present quantitative meta-analysis is to integrate the results of various structural and functional neuroimaging studies to delineate a distinct neural correlates of alexithymia.

Methods: We included 16 papers from PubMed database based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement. Afterwards, stereotactic data of reported coordinates were extracted from each study, and statistically tested for convergence using Activation Likelihood Estimation approach.

Results: We found a convergent evidence of altered activity in left medial superior frontal gyrus and increased activation in left insula for individuals with higher level of alexithymia compared to subjects with lower level of alexithymia ($p < 0.05$ Threshold-Free Cluster Enhancement).

Conclusion: Our results show that altered activation in the superior frontal gyrus might be linked with aberrant emotional processing in alexithymia. Increased activation of insula might indicate difficulties in internal bodily awareness that could also lead to disturbances in emotional processing. Taken together, this study highlights the role of superior frontal gyrus and insula in neural mechanisms underlying emotional processing in alexithymia.

Poster No. 06-603

The effect of the Visual-Spatial orienting on the Dual task Interference

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Abstract

Introduction: Visuo-spatial attention is known to improve performance when stimuli are presented at attended locations (1). Also, when people are required to perform two speeded tasks in rapid succession, it is generally found that response times (RTs) on the second task become increasingly long as the stimulus onset asynchrony decreases (2,3). The present study examined whether orienting the attention by manipulating the cue-target spatial compatibility would affect the central processing in multiple-task situations.

Methods: A modified psychological refractory period paradigm was incorporated in which a valid or invalid cue was presented before the first stimulus. Each dual-task trial began with a visual cue on either the left or right. The first task (T1) was a two-alternative forced localization visual task, where participants were required to indicate whether the stimulus had been presented at the left or right. Task 2 required a speeded response to a color box in a particular color. The cue to target time interval (CTOA) was 200 ms and the time interval between the first and second target (TTOA) was 200 or 800 ms.

Results: Mean response times to the first and second stimulus were significantly faster in the valid than in the invalid condition ($F=8.56$, $p=0.009$). In Short SOA, analyses on T2-locked ERPs revealed that the amplitude of the occipital P1 (MD = 2.44, $t=3.12$, $p=0.007$) and N1 (MD = 2.49, $t=4.05$, $p=0.001$) was larger in the valid cue condition than in the invalid cue condition. In long SOA, the occipital P1 (MD = 2.28, $t=3.67$, $p=0.002$) and N1 (MD = 2.18, $t=2.49$, $p=0.02$) was larger in the valid than invalid condition. The latency of the occipital P2 was larger in the valid than invalid condition (MD = 1.73, $t=6.79$, $p=0.04$).

Conclusion: Therefore, central processing leading to the PRP effect interferes with the deployment of visual–spatial attention. Thus, the facilitation effect as a consequence of orienting can lead to decrease the central interference in dual task performance.

Poster No. 06-602

The Effect of ZnO NP on induced memory loss and Hippocampal CA1 Health Neurons

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Abstract:

Introduction: A series of cytotoxic effects exposed to zinc oxide nanoparticles (ZnO NPs) are observed, such as oxidative damage and cell death. Oxidative stress has been recognized as an important mechanism underlying the toxic effects of metal oxide NPs, which has been extensively studied in vitro and in vivo. Oxidative stress is definitely caused by an imbalance between production of various reactive oxygen species (ROS) and antioxidant defense. ROS has been identified as signaling molecules in various pathways regulating both cell survival and cell death. This study focused on the effects of ZnO NPs on spatial learning and memory and number of CA1 pyramidal neurons in the hippocampus of male rats.

Methods: The experimental groups consist of control group, care groups with ZnO NPs (0.25, 0.5, 1, 1.25 mg/kg) and group treated with ZnO NPs (1.25) +N-acetyl-cysteine (300 mg/kg). Intraperitoneal administration of saline or ZnO NPs was down 30 minutes before training. The animals' memory was examined with passive avoidance test and the number of intact neurons in CA1 area in experimental groups were counted. The statistical analysis was performed using SPSS software and one-way analysis of variance and Graph Pad prism software.

Results: Injections of ZnO NPs (1.25 mg/kg) significantly reduced memory retention ($p<0.01$) and intact neurons in CA1 area ($p<0.0001$) compared to the control group. In the group of ZnO NPs (1.25) + NAC (300 mg/kg), NAC improved the effect of ZnO NPs on memory retrieval and intact neurons in CA1 area.

Conclusion: Injection of ZnO NPs in high dose lead to memory deficiency and reduced hippocampal CA1 neurons.

Poster No. 06-601

Ghrelin improved morphine-induced memory impairment in male rats

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Abstract:

Introduction: Ghrelin is a peptide mainly produced by the stomach and released into the circulation, affecting energy balanced and growth hormone release. It is well known that learning and memory in laboratory animals can be affected by ghrelin treatment. The extensive evidence suggests that the hippocampus is involved in learning and memory. In this study, we examined the involvement of the hippocampus on ghrelin effects on morphine induced memory impairment in male rats.

Methods: The experimental groups consist of control group, morphine groups and treated groups with morphine + ghrelin. A single trial step through passive avoidance task was used for the assessment of memory retention in male wistar rats. Animals were bilaterally cannulated in the CA1 by stereotaxic instrument, and were allowed to recover for one week before behavioral testing.

Results: Post-training subcutaneous administration of different doses of morphine (0.5, 2.5, 5, 7.5 mg/kg) dose dependently decreased the learning and induced amnesia. Intra-CA1 injection of ghrelin (0.03, 0.3, 3 nmol) 5 minutes before the injection of effective dose of morphine (7.5 mg/kg) dose dependently restored the memory retrieval ($p<0.0001$).

Conclusion: The results suggested that learning and memory can be effected by ghrelin. Intra-hippocampal ghrelin administration after training improved morphine-induced memory impairment.

Poster No. 06-607

Effect of melatonin on irradiation-induced lipid peroxidation and Catalase level in rat Subventricular zone

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Abstract:

Introduction: During radiotherapy, ionizing irradiation interacts with biological systems to produce free radicals, which attacks various cellular components. Neural stem cells are self-renewing, multipotent cells which could be found in Subventricular (SVZ) and subgranular (SGZ) zones of the brain of mature ones. These zones are vulnerable to radiation-induced apoptosis and stress oxidative. Melatonin is a protector of neural cells against toxic material.

Methods: In this study, we used 30 rats in 5 groups. Control, Sham radiation, group received only 100 mg/kg melatonin, Group exposed to dose of 25 Gy irradiation, and Group received 100 mg/kg melatonin and 25 Gy irradiation. Following exposure to radiation, rats were sacrificed after 6 h.

Results: Exposure resulted decline in the antioxidant enzymes activity increase in the Malondialdehyde (MDA) levels of the SVZ. Pre-treatment with melatonin (100 mg/kg) ameliorates harmful effects of 25 Gy irradiation by increasing antioxidant enzymes activity and decreasing MDA levels.

Conclusion: In conclusion, melatonin is likely to be a threshold concentration for significant protection against 25 Gy gamma irradiation.

Poster No. 06-604

The effect of medication therapy on attribution bias and jumping to conclusion bias in schizophrenic patients

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Abstract:

Introduction: Anti-psychotic drugs reduce dopamine release, as the result of this reduction; this mechanism would be effective in reduction of some cognitive biases. Previous studies have reported contradicting results about the effect of medication therapy on cognitive biases in schizophrenic patients. Comparing attribution bias and jumping to conclusion bias in schizophrenic patients with and without medication therapy is the aim of this study. Some cognitive biases are postural trait so by medication therapy are reduced but some others are a character-based trait and are not reduced by medicine.

Methods: This study is a casual-comparative research. 28 people including 14 schizophrenic patients, who have not used drugs already, and 14 schizophrenic patients, who have used drugs at least for past 4 weeks, were selected and they did not show any significant difference in terms of age, gender and education level. Computer-based similarities task and Internal-Personal-Situational Attributions questionnaire were used for analyzing jumping to conclusion bias and attribution bias, respectively.

Results: The independent T-test was used to analyze data. The results showed that schizophrenic patients, who had used drug at least for 4 weeks, gained higher scores in similarities task in contrast to patients, who did not use drugs; however, they did not show any significant difference in score of personalization subscale in Internal-Personal Situational Attributions Questionnaires.

Conclusion: Jumping to conclusion bias was reduced after medication therapy, Since the dopaminergic system in Schizophrenic patients with delusion increases Perceptual salience of the environmental stimulators, it is possible that such patients consider the environmental data more important than they really are, so it is a postural trait whereas Attribution bias was not reduced by medication therapy, so it is a character-based trait.

Poster No. 06-609

Functional and Structural Alterations in ADHD: An Activation Likelihood Estimation Meta-analysis

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Abstract:

Introduction: Functional and structural alterations in ADHD have been investigated through a few neuroimaging meta-analyses. However, the findings are not convergent. In the current study, a comprehensive meta-analysis of Voxel-Based Morphometry (VBM), Task based functional MRI (t-fMRI), Resting-state functional MRI (r-fMRI) and Positron Emission Tomography (PET) studies in children with ADHD was conducted to overcome the inconsistency of brain alterations in ADHD.

Methods: Neuroimaging studies published from 1990 to 2016 were identified by a literature search in PubMed. Original published cross-sectional whole-brain VBM, t-fMRI, r-fMRI and PET studies that reported group comparisons' findings between children with ADHD and healthy individuals were selected. Reported peak coordinates from significant difference of regional activation or gray matter volume between ADHD and healthy controls were extracted. By using the revised Activation Likelihood Estimation (ALE) algorithm, meta-analysis was conducted for structural and functional experiments, as well as their combination.

Results: In total, 82 studies including seven r-fMRI, 55 t-fMRI, 20 VBM and 0 PET studies with 112 individual neuroimaging experiments comprising of 2539 patients were included. The analysis across all aberrant structural and functional experiments revealed no significant consistent alteration in ADHD (P = .051). Moreover, performing separate analyses for each modality (VBM, t-fMRI, r-fMRI) has not revealed any significant results.

Conclusion: We observed no significant convergent findings in our comprehensive meta-analysis of whole-brain neuroimaging experiments including different structural and functional modalities, suggesting variation of assessing in each individual experiments. These variations could be referring to uncorrected inference procedures, differences in experimental design and contrasts, or heterogeneous clinical populations in ADHD studies.

Poster No. 06-608

Lateralized reduction in functional connectivity and volumetric measures in HIV-infected patients

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Abstract:

Introduction: The effects of HIV virus on the brain can be seen, even after antiretroviral treatment. These have been shown using brain imaging methods such as resting-state fMRI (rs-fMRI) and Volumetric Brain Morphometry (VBM). Our aim in this study was to replicate previous findings, and provide evidence for a lateralized reduction in functional connectivity and volumetric measures in this population.

Methods: We acquired structural and functional images (5-minute resting state) from 25 individuals, 12 HIV-infected patients and 13 non-clinical ones, using an Avanto Siemens 1.5t MR scanner. All images were preprocessed (i.e., spatial normalization with modulation, segmentation, and smoothing, with DARTEL) using SPM12 and relevant toolboxes under Matlab software. The structural MRI images (axial, T1-weighted) were analyzed using VBM and LI toolbox (for anatomical lateralization). The BOLD images were analyzed for functional connectivities and lateralization using CONN toolbox. The pre-processed functional data were de-noised and checked for quality assurance.

Results: A second-level analysis was done using VBM analysis (t-test) on gray matter ($p < 0.001$, corrected) and white matter (0.001, uncorrected), revealing a decreased volume in HIV-infected patients compared to Control, with a stronger left-lateralized, especially in white matter. The ROI-to- ROI and seed-to-voxel maps (ALFF and fALFF, < 0.1 Hz frequency band) were compared between HIV-infected patients and the control group (applying $p < 0.001$, corrected). The results revealed decreases in functional connectivity especially from seed in right-lateralized frontoparietal connections in patients compared to control group. Also, lower connectivity was found in the patient group, mainly in default mode network.

Conclusion: The results of HIV-infected patients showed a decrease in brain volume which w as mainly left-lateralized, and involved white matter. On the other hand, the functional connectivity results also revealed differences between patients and control groups, but it was right-lateralized, especially in frontoparietal connections. Therefore, the lateralization was reversed in functional and structural measures.

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