HAO WANG

Room 208, Brain Imaging Center, No. 19, XinJieKouWai St., Beijing 100875, China
Hao.Wang@mail.bnu.edu.cn

EDUCATION

Beijing Normal University, Beijing *Sept. 2018 - Jun. 2021*
Master of Engineering in Computer Science Application. Advisor: Dr.Li Zheng. GPA: 3.5/4.0
State Key Laboratory of Cognitive Neuroscience and Learning & IDG/McGovern Institute for Brain Research, Faculty of Psychology
Dissertation Title: *Decoding algorithms for motor cortical brain computer interfaces based on spikes and phase-of firing encoding*

Anhui Normal University, Wuhu *Sept. 2014 - Jun. 2018*
Bachelor of Engineering in Computer Science and Technology. GPA: 3.5/4.0

PUBLICATIONS

Software Copyright
Wang H, Yu Q, Li Q, Zhang W, Xia Y. (2017) **Wuhu Intelligent Bus Information Management System** *(Sign ID: 2017SR298147)*.

Zhang W, Xia Y, **Wang H**, Zheng Y. (2018) **Android-based Personal Memo** *(Sign ID: 2018SR725750)*.

Conference Abstracts
Wang H, Li Z. (Nov. 2019) **Decoding algorithms for motor cortical brain computer interfaces based on spikes and phase-offiring encoding**. (Poster presentation) *2019 International Conference on Neural Cells, Circuits and Behaviour*, Beijing, China.

MANUSCRIPTS IN PREPARATION

Journal Articles
Zhang C, **Wang H**, Tang S, Zhang Y, Li Z. (2019) **Rhesus Monkeys Learn to Control a 2D Bio-feedback Brain Machine Interface**. *Frontiers in Neuroscience*. In review.

Wang H, Li Z. (2020)**A review of nonlinear decoding algorithms for motor cortical invasive brain computer interface (iBMI)**. In Draft.

PHD POSITION LOOKING FOR

- Computer Science/ Electrical and Computer Engineering : Data Mining, Artificial Intelligence, Machine Learning, Neural Computation.
- Bioengineering: invasive Brain-Computer-Interface.

M.E. PROJECTS

Decoding algorithms for motor cortical brain computer interfaces based on phase-of-firing encoding and multi-role encoding *Sept. 2018 - Present*

- Trained rhesus monkey to control the joystick to finish "center-out" behavioral task.
- Summarized the preoperative preparation and operation procedures of rhesus monkey head stick implantation and utah-electrode implantation.

- Participated in electrode array implantation surgeries of rhesus monkey and learned basic surgical technique.
- Careful care of the macaque wounds: because of the slight exposure, the macaque wounds need to be disinfected frequently and the blood scabs of the macaques must be removed at the same time.
- Processed behavioral and electrophysiology data by self-written MATLAB scripts.
- Improved physical and electrical designs of experimental devices.
- Conducted more than 40 sessions of Rhesus monkey electrophysiology experiments.
- Programmed a control algorithm for a brain-machine Interface software suite.
- Analyzed neuronal tuning in multi-electrode array data using regression.
- Used tuning information to investigate how Rhesus monkey controlled cursor with past algorithms.
- Kalman filtering, RNN, LSTM, ESN and other algorithms are used to offline decode the macaque neural data, estimate the motion intention, and evaluate the performance of the decoder.
- Rhesus monkeys MRI scanning and 3D reconstruction of skull: give the monkey dozen anesthetic, fixed on the shelf, carried monkey to MRI lab for scanning. After obtaining the whole brain MRI image data, I used fsl-fast and human skull template for segmentation, but the effect was very bad. Finally, I used BrainSight to perform manual segmentation.

Which customer characteristics can predict customer churn? - SVM classification, model optimization and evaluation Based on R *Oct. 2019 - Dec. 2019*

- Used Support Vector Machine(SVM) to complete data classification, Chose the penalty factor of SVM, visualized SVM model.
- Class prediction based on the SVM training model.
- Analysed and interpreted model results: evaluated model performance based on k-fold cross-validation method(Used "e1071","caret" package to complete cross-validation). Used the "caret" package to find highly correlated features, select features. Evaluated the performance of regression models(Used the confusion matrix to evaluate the prediction ability of the model, ROCR to evaluate the predictive power of the model, "caret" package to compare ROC curve, "caret" package to compare model performance differences).
- Compiled project report via LaTeX.

Predict houses sales prices (Kaggle Competition) *Nov. 2019 - Dec. 2019*

- The prediction of house prices through the characteristics of houses explores the processing of characteristic variables in R language and the addition of missing values.
- A feature selection method was used, and the simplest linear model was established to predict house prices.

TECHNICAL QUALIFICATIONS AND SPECIAL SKILLS

Programming Language	MATLAB, C++, Python, LaTeX, HTML, R
Modeling and Analysis	TensorFlow, Keras, Caffe, Pytorch, Scikit-learn
System and Software	Linux, Git, Inkscape, MATLAB parallel computing cluster, Docker
Surgical Technique	Primate Electrode Implantation Surgery
Neurobiological Technique	Monkey Training, Electrophysiology Experiment, MRI Experimenter

HONORS AND AWARDS

First-class scholarship, Beijing Normal University. *2019*
Outstanding graduate student cadres, Beijing Normal University. *2019*
Outstanding public welfare contribution award, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University. *2019*
Freshman scholarship, Beijing Normal University. *2018*
Postgraduate scholarship, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University. *2018*
Outstanding undergraduate's dissertation, Anhui Normal University. *2018*
Undergraduate scholarship (3 times), Anhui Normal University. *2014-2018*
The second prize in the fourth "ACM program design competition", Wuhu. *2014*

UNIVERSITY SERVICE

Vice President of Graduate Students' Union *Sept. 2018 - Jun. 2019*
State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University

- Held 50+ attendants' badminton competition: served as the Minister of Propaganda Department, responsible for coordinating the publicity work before the game, and distributing the work to the members; Wrote a small program for badminton registration, processed the information, handed it to the schedule production staff; Made the pre-match badminton competition poster using Adobe Illustrate; Docked work with the senior student who had ever managed the official account; Negotiated with the property and gym staff to make the game held on time, borrowed the table and chair and moved them into the designated venue; As a badminton matchmaker; post-game overall photo selection and review of the public number to push the article; Distributed to teachers and students materials, notifications, delivered water, information transfer.
- Working for "May 25th Mental Health Festival (Brain Festival)" activity of Beijing Normal University: Explained the scientific research project of the brain school; Explained the rules of the game to the students who wanted to play the game; Cleaned up the site after the event.

Student Assistant *Sept. 2018 - Jun. 2019*
Administrative Office, SKL of Cognitive Neuroscience and Learning, Beijing Normal University

- Recovered essential missing data while the computer crashed, repaired several broken computers, helped the teacher reinstall the computer system.
- Submitted the contract document and went to the principal's office for stamping. Helped the teacher copy, print, and scan the document, helped teachers go to the print shop to get the exhibition boards, took all kinds of materials, conference listings, meeting materials and delivered them to the building. Went to the Student Employment Guidance Center to receive stamps and obtains information. Went to the receiving room to collect remittance slips, magazines, newspapers, letters from teachers, etc. every week.
- Helped organized graduation ceremony: helped teachers distribute the bachelor uniforms, cultural shirts and shawls of the college graduation ceremony.
- Helped teachers in the school of psychology to send thousands of exam papers and classify thousands of test papers.

EXTRACURRICULAR ACTIVITIES

- Attended the conference "IAS Workshop on Neural Engineering and Rehabilitation", HKUST, HongKong. *Jun. 2019*
- Member of Communist Party of China. *Dec. 2016 - present*
- A white belt in taekwondo.

- The 161st in "Half marathon invitational race of Anhui's Universities". *2018*

PERSONAL HOMEPAGE

Personal Website: Hao Wang

GitHub: Hao Wang

LinkedIn: Hao Wang

LeetCode: Hao Wang

cnblog: Hao Wang

STANDARDIZED TEST SCORES

- TOEFL: 89 (R25, L21, S21, W21). *Oct. 2020*
- GRE: V138 Q164. *Oct. 2020.*
- CET-6: 560 (L189, R213, W158, Speaking: level B). *Jun. 2018*

Student's Academic Record of Anhui Normal University

Name:Wang Hao　　ID NO.:340304199604090635　　Student No.: 14111204056

Department:School of Computer and Information　　Major:Computer Science and Technology (Non-teacher Education)

Score	Attr.	Credit	Score	Rebu.	Csgp.
2014-2015 Academic Year 1st Term					
Advanced Mathematics(I)	Comp.	5	80		3.00
Linear Algebra	Comp.	3	68		1.80
Basic Program Design	Comp.	3	81		3.10
Basic Experiment in Programming	Comp.	1	96		4.60
Introduction of Computer Science	Comp.	2	93		4.30
Cultivation of Ideology & Morality and Foundation of Law	Comp.	3	85		3.50
Situation and Policy (I)	Comp.	0.5	Excellent		4.50
Military Course	Comp.	2	Qualified		2.50
Military Theory	Comp.	1.0	90		4.00
College English (I)	Comp.	4	82		3.20
Physical Education (I)	Comp.	1	97		4.70
Labor Practice Class	Comp.	1	Excellent		4.50
2014-2015 Academic Year 2nd Term					
Advanced Mathematics(II)	Comp.	5	61		1.10
Experiment on Electrical and Electronic Technology	Comp.	1	98		4.80
Discrete Mathematics	Comp.	4	93		4.30
Orient-Objected Program	Comp.	3	85		3.50
Object-oriented Programming Experiment	Comp.	1	96		4.60
Electrical and Electronic Technology	Comp.	3	76		2.60
Introduction to the Basic Principle of the Marx Doctrine	Comp.	3	94		4.40
Situation and Policy (II)	Comp.	0.5	95		4.50
Psychological Health Education of College Students	Comp.	1.0	94		4.40
College English (II)	Comp.	4	78		2.80
Physical Education(II)	Comp.	1	90		4.00
Career Planning and Development	Opti.	1.0	95		4.50
2015-2016 Academic Year 1st Term					
Probability and Statistics	Comp.	3	74		2.40
Data Structure	Comp.	3	84		3.40
Digital Electronic Circuit	Comp.	3	86		3.60
Course Project for Programming	Comp.	2	94		4.40
Data Structure Experiments	Comp.	1	95		4.50
Outline of Modern and Contemporary Chinese History	Comp.	3	74		2.40
Situation and Policy(III)	Comp.	0.5	Excellent		4.50
College English (III)	Comp.	4	86		3.60
Physical Education(III)	Comp.	1	86		3.60
Explore the Theory of the World	Opti.	1	98		4.80
Null	Opti.	1.0	85		3.50
Java Advanced Program	SC	2	91		4.10
2015-2016 Academic Year 2nd Term					
Principle of Database	Comp.	3	90		4.00
Algorithm Design and Analysis	Comp.	3	78		2.80
Constitution Principle of Computer	Comp.	3	76		2.60
Computer Organization Principle Experiment	Comp.	1	85		3.50
Practice for Principle of Database	Comp.	1	95		4.50
Practice for Algorithm Design and Analysis	Comp.	1	92		4.20
Course Project for Application System(I)	Comp.	2	87		3.70
Introduction to Mao Zedong Thought and Socialist Theoretical System with Chinese Characteristics	Comp.	5	73		2.30
Situation and Policy(IV)	Comp.	0.5	90		4.00
College English(IV)	Comp.	4	94		4.40
Physical Education (IV)	Comp.	1	89		3.90
Citizen Quality Education	Opti.	1	100		5.00
History of Chinese songs in twentieth Century	Opti.	1	98		4.80
Matlab and Image Process	SC	2	90		4.00
Artificial Intelligence	SC	2	82		3.20
Practical Technology of Software Development	SC	2.0	95		4.50
2016-2017 Academic Year 1st Term					
Compilers Principles	Comp.	3	82		3.20
Introduction to Software Engineering	Comp.	3	91		4.10
Computer Working Principle and Computer Interfacin	Comp.	3	77		2.70
Operation System	Comp.	3	80		3.00
Operating System Experiment	Comp.	1	88		3.80
Practice for Principle of Micro computer And Interface Technology	Comp.	1	94		4.40
Operations of Entrepreneurial Management	Opti.	1	99		4.90
Human-Machine Interaction Technology	SC	2	90		4.00
Communication Principle	SC	2	85		3.50
2016-2017 Academic Year 2nd Term					
Computer Graphics	Comp.	3	75		2.50
Embedded System	Comp.	3	89		3.90
Computer Networks	Comp.	3	86		3.60
Numerical value Analysis	Comp.	3	89		3.90
Practice for Computer Networks	Comp.	1	85		3.50
Course Project for Application System(II)	Comp.	2	85		3.50
Vocational Guidance for Graduates	Opti.	1.0	86		3.60
Entrepreneur Guidance for College Students	Opti.	1	99		4.90
Design and Development of World Wide Web	SC	2	88		3.80
2017-2018 Academic Year 2nd Term					
Thesis Writing	Comp.	8.0	Excellent		4.50
Professional Trainee and Practice	Comp.	10.0	Good		3.50
Quality-oriented development	Comp.	6.0	Qualified		2.50
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Overall GPA	3.47	Comp.GPA	3.37

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北京師範大學
BEIJING NORMAL UNIVERSITY

Academic Transcript of Graduate Student

Name: Wang Hao
School: Faculty of Psychology
Major: Computer Science and Application

Student ID: 201821061107
Advisor: Li Zheng
Degree: Master

Term	Course Title	Credits	Mark	Remark
Fall 2018	Thesis Writing and Academic Norms	2.0	90.0	
	English toward Master's Degree（Core Courses）	3.0	79	
	Public Speaking in English	1.0	92.0	
	The Theory and Practice of Socialism with Chinese Characteristics	2.0	86.0	
	Introduction to Natural Dialectics	1.0	87.0	
	Artificial Intelligence and Deep Learning	3.0	83.0	
	Stochastic Processes	3.0	88.0	
	Research Methods in Psychology: Design and Technology	3.0	72.0	
	Cognitive Neuroscience	3.0	89.0	
	Data Mining	3.0	89.0	
	Science Visualization	3.0	98.0	
Spring 2019	Public Physical Education (Build-up & Personal Defense Skill of Wushu)	1.0	92.0	
	The Design and Analysis of Computer Algorithms	3.0	95.0	
	Machine Learning	3.0	93.0	
	Nerve Interface	2.0	100	
	Intelligent Optimization Algorithm	3.0	94.0	
Fall 2019	Some Basic Statistical Methods with R Implementation	2.0	92.0	
	Public Physical Education（Aikido and Practical Self-defense Course）	1.0	91.0	
	Techniques and Methods in Neurobiological Research	2.0	81.0	
	Digital Image Processing	3.0	77.0	

Credits Awarded 47.0

----------End of Record----------

北京师范大学
教务部（研究生院）
证明专用章
BEIJING NORMAL UNIVERSITY

Beijing Normal University
(Official Stamp)

Grading System: Qualified (60~100), Excellent (90~100), Good (80~89), Satisfactory (70~79), Pass (60~69), Fail (0~59).
Graduate School of Beijing Normal University
Date: 2020-04-01