Yuanyuan Gao

Sy1007212@gmail | Personal Page
Yuanyuan-Gao | Yuanyuan-Gao

Education

PhD | Mechanical Engineering
RPI | 2015-2020

- Research: machine learning, image processing, Brain imaging, surgical skill assessment, neuromodulation
- Advisor: Suvranu De, Xavier Intes

Visiting scholar| industrial & Systems Engineering
University of Buffalo|2018-2019

- Advisor: Lora Cavuoto

MS | Mechanical Engineering
Beihang University | 2010-2013

BS | Aircraft Environment and Life Security Engineering
Beihang University | 2006-2010

Skills

Programming language

Python • C/C++/C# • VB • SQL

Statistical tools

Matlab • SPSS • Minitab • G*Power;

Hardware

fNIRS spectrometers • Trans-cranial electrical stimulation device
Laparoscopic skill trainer

Others

Microsoft Office Series • Latex

Certification

Introduction to Transcranial Direct Current Stimulation
Harvard Medical School | 03.2016

Language Skills

English and Mandarin

Patents

201210110543X • 2012100914371
2012101268206

Experience

Research Assistant | Rensselaer Polytechnic Institute (2015-2020)

- Project 1: Evaluating brain activation changes during motor learning
  - I demonstrated that specific brain areas (PFC, M1 and SMA) were activated neuromodulation and the bimanual motor skills were enhanced as well.
  - Led the collaboration with researchers and surgeons from **University of Buffalo** and **Harvard Medical School**
  - Drafted Army grant proposal **($6.5M)**
- Project 2: Predicting surgical skills from fNIRS
  - Achieved R^2 = 0.73 and AUC = 0.91 by designing a CNN model to extract features from fNIRS data to regress out the motor skill level, which is much higher than SVR, KPLS and RF.
- Project 3: Predicting learning curve characteristics
  - Predicted accurately (R^2 = 0.81) the learning curve characteristics from the initial ten trials performance of the medical students.
- Project 4: Removing motion artifacts in fNIRS data
  - Constructed a sophisticated designed deep learning model to remove the motion artifact existing in fNIRS data.

Motor Design Engineer | SAIC MOTOR (Shanghai) (2013-2015)

Publication and Talks

Journal Papers

- A Machine Learning approach to predict surgical learning curves. **Gao, Y.** *et al.* 2019. ***Surgery***
- Functional brain imaging reliably predicts bimanual motor skill performance in a standardized surgical task. **Gao, Y.** *et al.* 2019.IEEE TBME (Under review). ***Preprint***
- A comprehensive review of experimental neuroimaging studies of the effect of transcranial electrical stimulation on human motor skills, **Gao, Y.** *et al.* 2020. Science Translational Medicine. (In preparation)

Conference Presentations

- SPIE.bios, San Francisco, 2019.
- OSA Biophotonics Congress: Optics in the Life Sciences, 2019.

Workshops

- Multiple invited talks in 'Deep Learning Journal Club' in RPI, 2016-2020

Teaching and mentoring

- Graduate Teaching Assistant at RPI (4 Semesters)
- Undergraduate Research Program (URP) mentor at RPI