

Sanika Phatak

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EDUCATION

Johns Hopkins University (JHU) | Expected: May 2021

MS Biomedical Engineering - with Thesis

Neuroengineering specialization | GPA: 3.93/4.0

BITS Pilani, Goa Campus | Aug 2017

MS Biological Sciences and BE Electronics Instrumentation

Dual-degree | GPA: 7.6/10.0

RESEARCH EXPERIENCE

Center for Imaging Science, JHU | Research Assistant - ML

Sep 2019 – present | Dr. Tilak, Ratnanather

- **Masters Thesis:** Designed;engineered morphological classification of 3D projection neurons from mouse brain scans
Models: semi-supervised learning; kernel PCA
- Implemented Alzheimer prediction from BIOCARD data leveraging PCA based dimensionality reduction
Models: LDA, QDA, Random Forest; SVM; KNN; Neural Network
- Built tools for feature extraction and classification as a part of "Brainlit" python package for reading and analyzing brain data

PROFESSIONAL EXPERIENCE

Intel Technologies, India | SDE - Promoted in Jan 2019

Aug 2017 – May 2019

Brain Computer Interface

- Enhanced open source ML framework, built K-fold cross validation feature to optimize training time by 8X with 90% accuracy on SVM
- Developed dynamic-selection of EEG electrodes to lower the no. of active electrodes (14 to 2) in emotion detection with 94% accuracy
- Conceptualized and executed neural network based concentration level detection from EEG data for BCI gaming applications

Virtual Game Coach

- Spearheaded LSTM based recommendation system for "PUBG" game coaching app, trained on telemetry player data (**Patent filed**)

Multi-modal Sensing

- Implemented multi-modal sensing (ECG;video;audio) for emotion recognition as a plugin for streaming apps with 90% accuracy
- Incorporated heart-rate variability sensing in a gaming system with webcam as a contact-less PPG sensor

Intel Technologies, India | Machine Learning Intern

Jan 2017 – Jun 2017

- Integrated EEG-based mental commands from user as a feature to attack the opponent in a prototype game
- Accomplished head position correction to avoid VR-sickness with continuous learning neural network (MSE-5.4)

Intel Labs, India | Machine Learning Intern

Jul 2016 – Dec 2016

- Optimized power usage of cuff-less blood pressure device by down-sampling 10X with local polynomial regression to curve fit ECG/PPG signal peaks (**Patent published**)

SKILLS

Programming

- Python : PyTorch; Tensorflow; Keras
- MATLAB • C++ • C# • Java • C

Technology

- Machine Learning • Deep Learning
- Signal Processing • Algorithms
- Data structures • Neural coding
- Probabilistic modeling

PROJECTS - JHU

- Designed a comparative study on performance of structured SPORF against established models on data for grasp detection (Kaggle)
- Decoded listener attention to different audio stimuli with CNN and RNN models on EEG data
- Analysed class activation of Inception/Xception models for localization of calcium deposits in arteries from CT scans
- Built a prototype COVID-19 exposure risk app trained with MLP on weather, population density etc. coupled with GPS coordinates as features

PATENT

U.S. Patent 20180303353: "Optical heart rate sensor with reduced power", *Published - Oct 25, 2018*

PUBLICATIONS

- [1] Bijan Varjavand, Matt Figdore, Ryan Lu, **S. Phatak**, et al. Brainlit: Automated data handling, processing, visualization and classification software for brain images. *ASEE, Mid-Atlantic Conf. Poster*, 2020.
- [2] Sreenidhi Koti and **S. Phatak**. Adaptive power and performance optimizations of brain control interface (using eeg signals) for real time applications. *Intel SWPC, internal*, 2018.

ACHIEVEMENTS

- Won 3rd place in student poster presentation at ASEE conf. 2020
- Lead sensing and BCI projects at CSI team in Intel