

Sujit Roy

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EDUCATION

ULSTER UNIVERSITY

PHD IN COMPUTER SCIENCE

Nov 2017 - Nov 2020 | Magee, UK
MEG-based hand exoskeleton control,
Tasks: MEG/EEG signal processing, Deep
learning framework for real time
classification of motor imagery tasks,
Step-wise control of hand exoskeleton

INDIAN INSTITUTE OF TECHNOLOGY

VISITING RESEARCH FELLOW

Nov 2017 - Nov 2020 | Kanpur, India
Robotics, algorithm and control design for
step-wise pneumatic-based control

MANAV RACHNA INTERNATIONAL UNIVERSITY

B.TECH IN COMPUTER SCIENCE

July 2013 - June 2017 | India
First Class; Curriculum: Software
development & Computer Science, Award:
Best Project in the National Capital Region

SKILLS

TECHNICAL

Python3 • Matlab • C++ Linux • Git •
Tensorflow • Theano • Keras • Signal
processing • Image processing •
Generative Networks • Machine Learning
models • NLP • Reinforcement Learning

SOFT SKILLS

Results-Oriented • Resourceful • Leader
• Creative/Innovative • Team Player •
Excellent Communication (both written
and verbal) skills

MENTORING

• App Droid Life (2014): B.Tech Final Year
students in Electronics • Toll Crossing
Systems via RFID (2014): B.Tech Final
Year students in Electronics • Wireless
Health Monitoring System (2014-2015):
PhD student in Manav Rachna
International University

EXPERIENCE

BRAINLIVE RESEARCH PRIVATE LTD.

| PRINCIPAL CONSULTANT | BUSINESS STRATEGY & PRODUCT

Jan 2019- | Kanpur, India

- Lead a team of researcher to make proprietary software for facial recognition and pupil tracking
- lead to successful completion of design of new EEG headset along with real-time signal analysis

SS INNOVATIONS CHINA CO. LTD. | SOFTWARE ENGINEER INTERN

Jan 2017- Jun 2017 | Hangzhou, China

- Built robotic control and video transmission in QT creator
- Worked on reducing latency of video transmission

MANAV RACHNA INNOVATION & INCUBATION CENTER (MRIIC)

PART TIME RESEARCH & INNOVATOR IN CSE AND ELECTRONICS

August 2013 - 2016 | Faridabad, Haryana, India

- Youngest researcher.
- Software Development, Electronics, Project Management, Research (in areas of a) Brain Computer Interface b) Machine Learning c) Image Processing d) Robotics e) Internet of Things
- Training/Mentoring students from all backgrounds in app development /programming /IoT

PENDING PATENTS

Application Number	Title
201711018934	Call Swapper in Mobiles
201711023730	An Innovative Digital Product for Reading, Writing, Learning and Sharing Information Digitally
1705/DEL/2014	Gesture controlled multipurpose wearable communication device
201611040136 Applied	DE-FLATOR Dentist Posture Belt

GRANTS

£14,553 x 3	PhD fellowship for 3 years	UK-India Education and Research Initiative
INR 1,50,000	Dentist Posture Belt	MRIIC
INR 6,25,000	Enterprise Grant for Sparsh	MSME, Govt of India
INR 55,000	Wireless Health Monitoring System	Research Promotional Group M.R.E.I.
INR.70,000	Non-Invasive Method for Diagnosis of Jaundice	Research Promotional Group M.R.E.I.

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WORKSHOPS TAUGHT

- Machine learning with Python and Tensorflow (IIT Kanpur, 2020) - Basic mathematics and ML models - SVM, RAndom Forest, LDA, etc. other techniques- CNN, Natural Language Preprocessing.
- Signal Processing, Machine Learning for EEG (2016), Faculty Development Programme ECE- 20 faculty members.
- Holography- An introduction to design and implementation – Faculty Development Programme CSE - 28 faculty members.
- Gesture recognition for robotics (2015 - Atmel Professors Summit) – 20 Professors
- Android App development (2015) – 190 Participants
- Windows software development using C# (2014) – 56 Participants
- Windows App development (2014) – 188 Participants

AWARDS

- 2019 AINI Datathon 2nd Position (Team leader)
- 2017 UKIERI fellowship 14553 GBP per year (PhD)
- Microsoft Imagine Cup 2017 National Finalist India (Team leader)
- FIA Best project, Dentist Posture Belt – CSE 2017 (Team leader)
- Gold Medal for Best Paper out of 500 papers presented at 30th IACDE (2016), Amritsar
- Best Project in Health Sciences North Zone, 2016 - Association of Indian Universities
- Manav Rachna International University Best Project award in 2014, 2017 (CSE)
- Best Video Presentation at 31st IACDE 2016 Kolkata
- Manav Rachna International University Best Project Award in 2015 (Electronics)
- Texas Instruments - India Innovation Challenge 2016 - Quarter Finals
- FIA 3rd Best project – Electronics 2015
- Youngest Winner Best Project at FIA 2014 - Faridabad Industrial Association

PROJECTS

I HAVE DELIVERED MORE THAN 30 PROJECTS IN THE DOMAIN OF MACHINE LEARNING, IoT AND OTHER AREAS OF FRATENITY OF DEVELOPMENT, HIGHLIGHTS ARE NOTED BELOW

BLACK BOX FOR VEHICLE: THIRD PRIZE FIA 2015 (TEAM LEADER)

- Python scripts to read data from OBD port of car using Raspberry Pi
- Added more sensors to the car, like - accelerometer, pressure sensor
- Predict condition of car and also for drowsiness

ROBOT CONTROLLED VIA GESTURES: FIRST PRIZE UNIVERSITY (2015)(TEAM LEADER)

- Developed windows application (c#) to control robotic arm using kinect
- Extended it for home automation, controlling of lights (pwm) and electric appliances

DENTIST POSTURE BELT (2016-2017), BEST PROJECT FIA 2017, BEST PAPER IACDE 2016 (TEAM LEADER)

- Tasks: Designing algorithm for posture measurement and informing bad posture through haptic feedback for dentist based on IMU and EMG
- PCB design based on ATMEGA 328, C#, Python for posture measurement and classification using Neural Network

NON-INVASIVE METHOD FOR DIAGNOSIS OF JAUNDICE (2016)

- Windows Mobile App for Clicking image of sclera
- Python and C#, Image processing and training with respect to bilirubin value, SVM

SPEAKER RECOGNITION USING ANN - 2017

- Matlab program for recognising speaker, MFCC, speech signal processing

DETECTING AND HANDLING BIAS IN EMPLOYMENT DATA (DATATHON 2019- 2ND PRIZE) (TEAM LEADER)

- Data by Smashfly Co.
- Python, Adaboost for classification, Isolation forest for outlier detection, Null hypothesis, P-value and Chi square for statistical significance

CONTROLLING EXOSKELETON ARM VIA EEG AND MEG SIGNAL (2017-2019)

- Python & matlab scripts, design algorithm for classifying EEG/MEG signals.
- CNN based architecture for transfer learning in EEG/MEG

PUBLICATIONS

- [1] Sujit Roy, Anirban Chowdhury, Karl McCreadie, and Girijesh Prasad. Deep learning based inter-subject continuous decoding of motor imagery for practical brain-computer interfaces. *Frontiers in Neuroscience*, 14, 2020.
- [2] Sujit Roy, Dheeraj Rathee, Anirban Chowdhury, Karl McCreadie, and Girijesh Prasad. Assessing impact of channel selection on decoding of motor and cognitive imagery from meg data. *Journal of neural engineering*, 2020.
- [3] Sujit Roy, Shirin Dora, Karl McCreadie, and Girijesh Prasad. Mieggan: Generating artificial motor imagery electroencephalography signals. In *Proceedings of International Joint Conference on Neural Networks 2020*. IEEE, 2020.
- [4] Sujit Roy, Karl McCreadie, and Girijesh Prasad. Can a single model deep learning approach enhance classification accuracy of an eeg-based brain-computer interface? In *2019 IEEE International Conference on Systems, Man and Cybernetics (SMC)*, pages 1317–1321. IEEE, 2019.
- [5] Sujit Roy, Prayag Yadav, Saugat Bhattacharya, Ashish Dutta, and Girijesh Prasad. Design of a magnetoencephalography compatible hand-exoskeleton for bci based neurorehabilitation of stroke patients. In *2021 International Conference on Robotics and Automation (ICRA)*, Under Review.
- [6] Dheeraj Rathee, Haider Raza, Sujit Roy, [6] and Girijesh Prasad. A magnetoencephalography dataset for motor and cognitive imagery bci. In *Scientific Data*. Nature, under review.