Sourojit Goswami

Contact Information

LinkedIn

Github

goswamisourojit@gmail.com

+447824049258

Bramall Court, Alderson Road North, Flat 23, Room 3, Block C, Sheffield, S2 4UF.

Skills

- Experience in working with various software systems like- Arduino, Orange, Solid Works, TensorFlow.
- Knowledgeable in Circuit and PLC designing.
- Data modelling and analysis using Machine Learning and Signal Processing.
- Comfortable in working with MATLAB, Python with experience in LINUX, C++.
- Mathematical Modelling and Control System simulation using MATLAB-Simulink.
- Hands on experience on building both mechanical and autonomous bots from scratch.
- Building simulation and working with autonomous robots and arms using ROS and machine Vision.
- Worked on different Deep Neural Networks like CNN (mobilenet, googlenet, etc.) for Supervised and Reinforcement Learning.
- Multisensory data analysis and fault detection based on different Decision systems.
- MS Word, MS Excel, Latex, PowerPoint.

Academic Qualification

Master of Science (Robotics) *September 2021 - Present*
University of Sheffield.
Graduation Score – Predicted Merit.
Best modules- Deep Learning [91/100], Machine Vision [82/100], Mechatronics [78/100], Data Modelling [77/100], Manipulator Robotics [76/100].

Bachelor of Technology (Electronics & Communication) *August 2016 - July 2020*
Techno Main, Salt Lake, Kolkata (Maulana Abul Kalam Azad University of Technology)
Graduation Score- 8.38 (DGPA).
Best modules- Micro Electronics and VLSI Design [10/10], Digital Communications [10/10], Data Structures and C [9/10], Information Theory and Coding [9/10], Analog Electronic Circuits [9/10].

Work Experience

Electronics Regional Test Laboratory (East) *January 2019 - February 2019*

Internship on PLC (Programmable Logic Controller).

- Worked on SIEMENS S7 – 400 PLC.
- Gained knowledge on Ladder-Logic and its application.
- Worked on a project to control industrial motors for different time scenarios, mainly- Normal mode, Emergency alert, and complete Shutdown.

ORIENS INFOTECH PVT. LTD. *June 2019 – July 2019*

Industrial Training on Advanced IoT with Cloud Architecture.

- Familiarization with NodeMCU ESP8266.
- Worked with Arduino IoT Cloud.
- Build a home automation system using ESP8266 along with a relay module to control four different devices based on sending and receiving data to and from the Arduino cloud architecture with the help of Amazon Alexa.

Projects

Undergrad Final Year Project on Intelligent Traffic Light Control.
Worked on Intelligent traffic light control using image processing. The project's objective was to solve traffic congestion due to the increased number of vehicles. The brain of the project was Arduino Uno Microcontroller. Many images of a particular road had been taken for three different scenarios- small / moderate / large number of cars. Then those were compared with an image of the road with no cars. If the match is 40% or less then red light, yellow between 40% - 60% and if its 60% or above then green.

SLAM using turtlebot 3.
Different ROS nodes and packages were developed for exploration of an unknown environment autonomously. A map of the travelled area had been generated simultaneously.

- **Soft skills –** Flexible and Research oriented mindset, Collaborative attitude, Open to feedback, Good Communication skills with proficiency in English, Hindi, and Bengali.

Interests

- **Academic –** Brain Computer Interface, Deep Learning, Autonomous Systems.
- **Hobbies –** Sports, Music, Books.

Referrals

- **Dr. Mahanaz Arvaneh**
  Senior Lecturer at University of Sheffield
  LinkedIn
  m.arvaneh@sheffield.ac.uk

Autonomous pick and place bot using RFID.
Solid Works was used to develop a CAD model of the robot, Arduino Uno as microcontroller along with three IR sensors to calculate distance and to detect and avoid objects. RFID sensor was also incorporated so that it can read the cards place at pick-up and drop-off locations. Later the project was modified using a IMU sensor to follow shortest path. The inspiration of this came from working with e-puck 2.

Speech Recognition with CNN.
For this 1000 samples of different words had been taken to work with. A CNN structure based on 'googlenet' was used on the dataset after converting the audio files into spectrograms. To optimize hyperparameters Bayesian Optimization wad used, along with model with model averaging with 5 different models to train the data which in turn increased the validation accuracy.

Designing a PI-Controller
Different design possibilities of a Proportional-Integral (PI) Controller for a nuclear-powered vehicle is investigated. Nine different performance parameters, divided into Stability, Transient and Steady-State criterions are considered. First the Open-Loop transfer function of the system is designed, then the entire decision problem is divided into decision variables and performance space parameters subject to the requested constraints. Different sampling plans are discussed and evaluated based on their space-filling properties and for optimization, a population-based optimizer called-NSGA II optimizer is used.

Fault Classification in a Rotating machinery
A multiple fault classification method is discussed based on Principal Component Analysis (PCA) and K-Nearest Neighbor (KNN). After extracting features from the given signals and combining different fault types, PCA model is used for dimensionality reduction with KNN classifier to identify faults in abnormal data.

Treasure Hunting
This mostly consists of understanding of histograms along with optical flow estimation and object detection based on background subtraction; followed by creating different image processing techniques for decision making and autonomously hunting the required 'treasure' within an image.

Data Modelling using Machine Learning
Understanding the domains related to benchmark datasets; which were then pre-processed the to extract useful features. Techniques like Principal Component Analysis (PCA) had been use to get rid of bias and for dimension reduction. Diffent machine learning models were built to determine asked objectives like- customer satisfaction in an airport, sales price for housing market, etc.

Master's Thesis on Transfer Learning in Motor-Imagery BCI.
One of the major challenges in Brain-Computer Interface (BCI) is to increase or prevail its accuracy while reducing the calibration time. Generally, a large amount of data is needed before each session for tuning the parameters suitable for target user. For each session a calibration phase of 20-30 mins is needed due to differences between inter-person and inter-session, subjects being non-stationary. A potential solution to overcome this limitation is Transfer Learning, where raw data and features are collected from different domains that can be useful for the target domain to compensate the lack of labelled data. As because it is impossible for a single machine learning algorithm to perform well for every user, transfer learning shows a great promise where data from different users/sessions can be used to reduce the calibration time for the current user/session. Four different transfer learning algorithms have been developed using prior data to improve the performance of BCI model while reducing the calibration time, for the target user; based on correlation, data merging, weighting mechanism, and majority voting.