EDUCATION AND SCHOLASTIC ACHIEVEMENTS

Program	Institute	% / CGPA	Year

COURSEWORK

Pattern Recognition, and Machine Learning	Probability, and Stochastic Processes	Fundamentals of Deep Learning
Introduction to Computing and Visualization	Programming and Graphics using Python	Error Control Coding
Introduction to Robotics	Virtual Reality Engineering	Control Systems

SKILLS

Programming: C, C++, C#, Python, MATLAB, Mathematica | **Frameworks**: OpenGL, OpenCV, My SQL, NumPy, PyTorch, TensorFlow, PyQt

Modeling and Simulation: Fusion 360, ANSYS ACP and Workbench, CATIA, AutoCAD, Diptrace, Altium

Others: Arduino IDE, Race Studio 2, Unity Game Engine, Unreal Game Engine, Adobe Photoshop, Adobe Illustrator

PROFESSIONAL EXPERIENCE

Bosch Ltd.
Automotive Intern

Virtual Sensor-based Lean Angle Estimation in Two-Wheelers
- **Calibrated Accelerometer** values of MPU6050 using algorithms like the **Levenberg–Marquardt** algorithm
- Used an **RPi** to link sensors to the **Inbuilt-CAN Bus**, storing data in a **CAN Data Logger** for analysis
- Developed a **Soft sensor for Lean Angle estimation** of 2-wheelers with an **AI-based model using Wheel Speed Sensors** and a **Physics-based model** using GPS values
- Developed a **Kalman Filter for Vehicle Speed estimation** with **Wheel Speeds and Accelerometer** readings
- Built an **RNN Model** with an **LSTM Module** to estimate the Lean Angle of two-wheelers using Wheel Speed Sensors

AIOTEL
Research and Development Intern

Digital Twinning using a Motion Capture Suit
- Designed a **Motion Capture Suit** for a **VR/AR environment** in Unity (C#) using 22 IMUs and ESP 12 Es, simulating the collision using multiple Haptic Motors i.e. **Digital Twinning**
- Implemented the **Multiplayer System** and **Object Interaction Simulation** without the need for any **Dedicated Game Server**
- Testing was done using a custom PCB with **optimal power consumption**

Super Saga
Research and Development Intern

Development of a Low-Cost Motion Capture Suit
- Designed a **Motion Capture Suit** prototype built from scratch for less than **Rs. 15,000** using **17 IMU Sensors** and streamed it to Unreal Engine(C++) using UDP Protocol with ESP8266.
- Designed **Gesture Hand Gloves** to detect hand gestures using **5 Flexi Sensors**.
- Experimented with various filters like **Kalman Filter, Complementary Filter, and Mahogany Quaternion Filter**

Team Avishkar Hyperloop
Embedded Subsystem Head

Student team to develop the 5th Mode of Transportation
- Participated in **European Hyperloop Week online** and won the **Most Scalable Design** award among 24 other teams worldwide, with nominations in mechanical, levitation, and propulsion subsystems.
- **Led a team of 8** and made the overall **PCB more efficient** and the **Error Loop Code safer** and faster.
- Tested multiple components and synchronized all the other subsystems using robust algorithms and multiple sensors using **Microprocessors and a Custom PCB.**
- Used various protocols with an **interactive GUI** to communicate fast and efficiently between the Base Station and the Pod.

PROJECTS

Aerial Aquatic Drone
Prof. Asokan Thondiyath

- Designing a **Morphable Quadcopter** for **multi-medium explorations.**
- **Motor Propeller Matching technique** used for direct Aerial Aquatic operations **without the use of a Gearbox Mechanism**
- **Dynamic and CFD Analysis** of the **quadcopter** done using **Simulink** and **ANSYS** respectively

Smart Glass, Envisage
Project Member

- Recreated a Social Distancing Smart Glass as a **team of three** controlled by the mobile phone app designed.
- The Smart Glass is controlled via **HC-05 Bluetooth Module** and has many sensors like Temperature, Humidity, PIR Sensors, and **Human Gait Analysis** using the in-built IMU Sensor.
- Created a notification system that made the person **notified of calls**.

COURSE PROJECTS

Control Systems

- Used **MATLAB** to analyze and get the correct **PD controller** for a given system
- Devised a **PID controller** suitable for **electro-pneumatic brake in EV** using MATLAB
- Designed a **heading angle controller** for an autonomous ground vehicle in cornering

SOC Prediction

- A **Deep LSTM network** was developed to accurately estimate **SOC (State of Charge)** using the **UNIBO Dataset**
- **Employed various temperature conditions** during **training and testing**, utilizing **discharge cycles** with **constant and dynamic currents** to enhance model robustness

Mercedes Monowiper Redesign

- Designed a **more energy-efficient novel car wiper design** made of a **single shaft** with more area coverage
- Varied the number of linkages and link lengths using **CATIA** to optimize the design and improve its potential
- Designed a 3-D model of the given design and is currently tested with panes of different areas

Pattern Recognition and Machine Learning

- Built and compared **eight different models**, namely **Logistic Regression**, **Bayesian Classifiers**, **GMM**, **HMM**, **DTW**, **KNN**, **SVM**, **MLFFNN** for various datasets like **Spoken Digits**, **Handwritten Telugu Characters**, **Image Classification**.
- Implemented cross-validation on the above models and executed exhaustive hyper-parameter (**activation functions, batch size, epochs, nodes, and layers**) tuning on **MLFFNN**, maximizing its performance.
- Plotted **decision boundaries, level curves, and surface plots** for the above-mentioned models