Animesh Singh

2179040951 | animeshsingh98@gmail.com | https://github.com/animeshsingh98 | https://www.linkedin.com/in/animesh-singh-44ab35142/

Personal Profile

Graduate student in Mechanical Engineering, with experience in software architecture, controls and electrical embedded domain simulation. As a software architect, I've led teams in developing virtual validation platforms, integrating software, and simulation of electrical components. My multidisciplinary expertise drives innovation in robotics, optimizing system performance and accelerating product development.

Education

University of Illinois, Urbana-Champaign *Illinois, USA*

MS in Mechanical Engineering *August 2023 - Present*

Indian Institute of Technology, Bombay *Mumbai, India*

B.Tech in Mechanical Engineering - 9.57/10 CPI *July 2016 - June 2020*

Work Experience

Jaguar Land Rover *Bangalore, India*

Software Engineer *September 2020 - present*

- **Software in Loop** Helped save **1700 man hrs per rig** for support of **Hardware in Loop** rigs by offering the feature of automated virtual rigs
  - Simulation of **QNX ARM64 OS** on **AWS Gravitron** and **QEMU** with Graphical user Interface support for testing Infotainment Screen
  - Architectured a platform that can support different levels of testing - application level, integration level and system level
  - Support for two types of Operating System - **AUTOSAR**(Core Functionality) and **POSIX**(Connectivity, Infotainment)
  - **Squad Leader** for development of Level 3 Autosar Rig - with a **virtual simulation** of Electronic Control Unit
  - Represented the team in presenting work done to the top management of the company as a Technical Specialist
- **Research and Development** - JLR India promotes 20 per cent independent research during work hours
  - **Patent filing** in process for a Machine Learning model of **Predictive Maintenance of Automotive system**
  - **Architectured** a Python-based platform that can help get system performance data for different control strategies - PID, Model Predictive Control etc - for a bicycle model
  - Developed virtual simulation of Range Rover Evoque in **Unreal Engine** extendable to a fully virtualized **Vehicle Simulation**
- **Scrum Master:** Led the Planning and Retrospective meetings for my squads, synchronized with different squads at Group level Scrums.
- Awarded **Top performer** for the year 2021-22 for exceptional contribution

Purdue University *Indian, USA*

Research Intern *May 2019 - July 2019*

- Worked on the development of a **"Digital twin"** of the laboratory for the **remote operation** of different robots
  - Integrated **Kuka**, **Doosan** and a CNC machine on **ROS** for seamless relay of information across them and synchronising their movements
  - Integrated models of the robots onto a virtual environment in **Unity** using **MTConnect** (open sourced software for digital factories)
  - Interconnected Haptic device - **Phantom Omni**, capable of digitalizing human movements with KUKA and DOOSAN robots using ROS
- Created a virtual environment in **Unity** where we could control the virtual robot for replication of movement in the real world
- **Tele-operation model** designed to be used as a digital twin of factories and for virtual labs helping people to perform experiments remotely

University Projects

Smart Metrology, Thesis Project *Illinois, USA*

University of Illinois, Urbana-Champaign *Aug 2023 - Present*

- Developed a **Smart Pattern Matching system** for Dimension Measurement by parsing CAD information - dimensions, tolarecnes etc.
- Executed measurement of tolerances, encompassing both geometric and dimensional aspects, and verified them against CAD models.

Obstacle Avoidance with Segway - Controls *Illinois, USA*

University of Illinois, Urbana-Champaign *Aug 2023 - Dec 2023*

- Implemented controls for a **Segway with IR sensors** in C using Texas Instrument C2000 micro-controller to detect and avoid obstacles
- State Space approach by having different operation modes - Navigation mode, Wall following mode to follow the obstacle and then back to Navigation mode after avoiding the obstacle - https://www.hackster.io/513149/obstacle-avoidance-and-human-following-segway-6836c6

Toonification - Computer Vision *Mumbai, India*

Indian Institute of Technology, Bombay *Sep 2018 - Nov 2018*

- Implemented **edge detection** using thresholding, followed by reconnection of broken segments through flow-based techniques.
- Achieved **Toonification** of images by smoothing color gradients within regions outlined by detected edges.

Autonomous Drone - Controls and Computer Vision *Mumbai, India*

Indian Institute of Technology, Bombay *May 2018 - Feb 2020*

- Manufacture and control of fixed wing **autonomous drone** using Pixhawk and **ROS** for search and relief missions
- Used **CNN** to detect humans and objects in the survey region and feed it back to home base for further rescue instructions
- Experimented with relief package drop using parachute from the drone at desired location using trajectory optimization

Skills

Programming Skills	Python(Tensorflow, OpenCV, Transformers, Matplotlib), SystemC, C++, Matlab
Product Management	Professional Scrum Master 1, Certified Agile Practitioner, Product Owner for Virtual Prototyping
Technical Skills	LLMs, AWS, ROS, Pixhawk, Kuka and Doosan Robots, RPi, LabView, Synopsys Virtualizer, QEMU