Kaustav Ghosh

Academic Description

Manipal Institute of Technology
2018 − 2022 (ongoing)
B. Tech in Computer Science and Engineering
Number of completed semesters: 4
Amity International School
12th CBSE Percentage: 91% (2015 - 2017)
Suncity World School
10th CBSE CGPA: 9.8 (2013 - 2015)

Contact Details:

Phone: +91-8800441954
Email: *teetangh@gmail.com*
GitHub: *https://github.com/teetangh*

Interests

Artificial Intelligence, Machine Learning, Deep Learning, Reinforcement Learning, Computer Vision, Robot Operating System

Internships

- **Microsoft Student Partners-Machine Learning Internship**
  ML Certificate : Certificate1.   **Python Foundations Certificate :** Certificate2.
  Team Repository : Repository.
  - Guided a team of 10 individuals to collaborate and accomplish a Regression task of price prediction of used cars
  - Performed Feature Engineering to detect the most important attributes of the dataset using Univariate and Multivarte Filtering techinuqes, Mutual Entropy Gain Filtering and also feature selection using RMSE Regression and ANOVA Test
  - Performed basic Data wrangling and precessing using numpy and pandas and visualized it using matplotlib and seaborn and finally buit the machine learning model using an XGboost Regressor
  - Also completed a Mini Project on extensive Data Visualization and Analysis using Matplotlib and Seaborn to gather useful insights of the data
  Mini Project: Notebook.
  Feature Engineering: Notebook.   **Model:** Notebook.   **EDA:** Notebook.

- **Qbotics Labs - Robot Operating System Internship**
  CEO and Mentor : Lentin Joseph, author of 8 ROS books.
  Internship Repository : Repository.
  - Constructed a Differential Drive with caster wheel from scratch using URDF and XACRO files and mounted the same with laser scanner , Inertial Measurement Unit and Velodyne Puck VLP-16 Lidar.
  - Simulated the differential drive in Gazebo and wrote ROS Subscriber script to get laser scan reading from sensor messages for obstacle range detection
  - Intefaced the differntial drive with Google Cartographer with localisation and mapping of the robot using lua config files.
  - Modelled a 4 wheeled drive and also an environment for experimation of various controllers for the vehicle in Webots 3D Robot Simulator
  - Wrote individual C++ controllers for the teleoperation using keyboard,laser scanner,GPS,IMU and Linear Actuator
  - Wrote Markdown documentation for the entirity of the Internship for beginners to understand concpets and replicate results

- **Ineuron Deep Learning with Computer Vision and Natural Language Processing Internship**
  - *Currently learning CNNs and RNNs*

Academic Projects

- **Food Labs Robotics Startup Interview - ROS Engineer Role**.
  Models and Simulations : Repository & videos. **Final Project Report:** Final Report.
  - *Designed, modelled, constructed and Assembled a plethora of sensors and Robots across multiple software platforms like freeCad, Blender, Gazebo and also fabricated a hotel from floorplan using Gazebo World Editor*
  - *Created an SDF model of the Velodyne HDL-32 sensor,improved the model's appearance and data output,added Mass/Inertia to the model,used freeCad software to acquire Meshes, Blendr software to refine the metric system and Gazebo model editor to model the Velodyne Lidar structure.*
  - *Implemented Hokuyo Fake Laser Scanner and Noisy Camera in Gazebo, tweaked the mean and standard deviation of the Gaussian Noise Distribution in the scan and image samples for higher fidelity outputs.*
  - *Simulated the ROBOTIS waffle-pi or burger TurtleBot3 and constructed a vehicle in Gazebo using Model editor and loaded it with a Depth Camera Sensor for survelliance*
  - *Implemented existing functionality of Clearpath Husky Robot which uses ROS TF for mapping, Adaptive Monte-Carlo Localisation package based on a prticle filter for state estimation and subsequent Localisation and A*/Dijkstra for global planning and Dynamic Window approach/Timed Elastic Band local planner for local planning to publish velocity commands to base-controller*
  - ***Sidenote:*** *Original Project was Forked by Blender 3D computer graphics software*

- **Analysis of Selective Compliance Assembly Robot Arm and Modelling of T3R Robot**
  - *Computed Denavit–Hartenberg parameters for the SCARA robot and used it to formulate the Forward and Inverse Kinematics of the robot arm*
  - *Used Lagrange Euler Formulation to compute the torque/dynamics of the robot and further also planned an arbitrary trajectory for the manipulator*
  - *Using Solidworks modelled a T3R robot (1 twisting joint and 3 revolute joints) and as bonus task i am trying to interface the Soliworks model with Matlab Simscape*
  Link to SCARA : SCARA Analysis.
  Link to T3R : Solidworks Model. **Link to T3R animation :** mp4 video.

Workshops Attended

Link to Repository : Repository.

- *Attended Introductory Python Workshop conducted by IE-E&C and got 3 days of hands-on practical Python programming at the workshop.*

- *Attended several Competitive Programming Workshops conducted by IECSE and implemented several data structures and algorithms in C++ with and without the use of STL Library.*

- *Attended Image Processing and Computer Vision Workshop by ISTE and implemented basic OpenCV programs* **Link to Certificate :** Certificate.

- *Attended the Cloud Computing Workshop held by DSC Manipal in collaboration with Google Developers Student Club where we used Google's Qwik Labs to implement Machine Learning algorithms, Natural Language Processing Algorithms, Speech Recognition.*

- *Attended Machine Learning and Deep Learning Workshops given by DSC Manipal and implemented several machine learning algorithms using Keras and Tensorflow.*

- *Attended a 2-day Machine Learning and Deep Learning Workshop conducted by IIT Kharagpur and implemented some basic artificial Neural Networks, Convolutional neural networks and Recurrent Neural Networks in Python*

- *Attended a 6-day Robot Operating System Bootcamp and learnt how to use ROS framework to interface Robotics components and later used Gazebo and Rviz to simulate artificial/real robots in a virtual environment.*

- *Attended a 3-day Web Development Workshop and implemented the tutorials in HTML, CSS,JavaScript and several of its libraries* **Link to Certificate :** Certificate

Courses Taken

College Curriculum

Engineering Mathematics, Data Structures, Object Oriented Programming with Java, Digital System Design with Verilog, Computer Organization and Architecture, Database Systems, Theory of Computation, Embedded Systems, Algorithms, Robotics

Off-Campus Academies and Online Courses

Coding Ninjas-Did C++ programming along with Data Structures and won Top Performer Certificate of Excellence in C++
Link to Completion Certificate : Certificate
Link to Top Performer Certificate : Certificate
Link to Cpp and Data strucutres Repository : Repository
NPTEL-Basic Electronics,Switching Circuits & Logic Design,Computer Organization & Architecture,Object Oriented Programming with Java

Positions of Resposibility

- Local Committee Member of IOSD (International Organization of Software Developers)

Technical Section

Software Familiarity:
Anaconda,AutoCAD,Matlab,Keil,Altera MaxPlus 2,VirtualBox,Vm Ware,Oracle SQL,VS Code
and Sublime Text
Programming Languages:
Fluent in C/C++,Familiar with Java and Python,Verilog,LaTeX,Linux Shell Scripting, fair acquaintance
with ARM assembly programming*(NXP LPC 1768)*
Libraries and Frameworks:
Python-Numpy, Pandas, SciPy,Scikit-Learn,Matplotlib, Keras, Tensorflow
C++-Standard Template Library(STL)
Java-JavaFX GUI
Robotics Libraries and Frameworks:
ROS middleware, Gazebo, Ignition, MoveIt!, Point Cloud Library
Web Developement Languages,Libraries and Frameworks:
HTML, CSS, JavaScript and familiarity with MERN stack
Operating Systems Used:
Windows-XP,Vista,7,10 **Linux**-Ubuntu

Early Years

- Pulled an all nigther in 7th grade to construct a LEGO Mindstorms ev2 Humanoid Robot and programmed it using the NXT-G GUI interface that could walk,talk and identify colors in its environment and showcased it it in a Science exhibition.

- Won Gold medal for 200m sprint and 2 bronze medals fro 100m and 400m in 8th grade.

- Won 1st Prize Trophy at state Level Abacus Competition in 5th grade

- Won 2nd Prize Trophy at state Level Abacus Competition in 4th grade

- Won some gold, silver and bronze medals at the **School Level** Science and Maths Olypaids conducted by **Science Olympiad Foundation**