MAYANK BHUSHAN | 15CS30019

COMPUTER SCIENCE & ENGG. (M.Tech Dual 5Y)

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2020	M.TECH Dual Degree 5Y	IIT Kharagpur	8.65 / 10
2015	AISSCE	Hansraj Model School, Delhi	96.6%
2013	ICSE	St. Francis School, Deoghar	95.7%

INTERNSHIPS

BlackBuck | Google Maps for trucks   (May, 2019 - July, 2019)

- Designed and implemented a **graph based algorithm** for finding the fastest and cheapest route for trucks between any two geolocations in India
- Developed a self improving **ETA prediction engine** in **Python** which updates itself with the GPS data for all the trucks from the last twenty-four hours
- Integrated **Google Directions API** for turn by turn navigation and created a plugin for **auto mapping** of new tolls, petrol pumps to the edges of graph
- **Scraped** tolls data from the official website of NHAI and performed **vectorization of tolls** for finding their direction vectors and computing cost
- Deployed a web app for navigation by truck drivers; used **Flask**, **PostgreSQL** for the backend and **HTML**, **CSS** and **JavaScript** for the frontend

Zerostack | Go   (May, 2018 - July, 2018)

- Developed a command line tool in **Go** for **network troubleshooting** of virtual machines (VMs) and testing network connectivity in an **OpenStack** cluster
- Integrated an additional feature in the UI to execute the tool on each node in a cluster and return a combined output of the query to the user
- Used **network namespaces**, **OpenStack APIs**, **REST APIs** and **bash scripting** for developing the tool and the UI components

PROJECTS

Kharagpur RoboSoccer Students' Group (KRSSG)   (March, 2016 - Present)

- Aim : Building a team of autonomous soccer playing robots in **Python** and **C++** and participating in international events such as **FIRA** and **RoboCup**
- Developed a multi-threaded **three-tier** software architecture for controlling omni-directional robots in small-sized-league using **Robot Operating System**
- Performed a comparative study on the variations of rapidly exploring random tree (*RRT*); worked on **path simplifier** and **velocity profiling** of the path
- Implemented a randomized probability model for effective passing of the ball using intersection of ellipses and line formed by the robots' velocity vector

Multimedia Content Delivery Network | Distributed Systems | Python

- Created a distributed system to deliver multimedia content from content providers to end users using an **eventually consistent** model
- Load Balancers were used to distribute load based on server load and location of the active edge servers. Edge servers used LRU content caching policy
- Ensured fault tolerance using **heartbeat** mechanism and **three-phase commit;** both load balancer and origin server were **one node crash tolerant**

Heroes Of Aleppo | Intelligent Game Design | PyGame

- Developed a game on Aleppo bombings using Pygame incorporating **movement algorithms**, path-finding (**BFS**, **SSG, RRT**) and **decision making**

Implementing TCP over UDP | Computer Networks | C++

- Implemented a **reliable transport layer** (**TCP Tahoe**) on top of UDP with **flow and congestion control**; used **threads to obtain modularity**

Intelligent Load Balancing System for Docker containers | Go

- Implemented a **heuristic algorithm** in **Go** for self balancing of **Docker** containers in a cluster using **non-live migration** and socket communication

COMPETITION/CONFERENCE

- Represented KRSSG, India at the **21st Robot World Cup (Robocup)** held in **Nagoya, Japan** in July, 2017
- Secured **AIR 34** in the **ACM ICPC** Chennai Regionals 2017-18
- Secured **2nd position** in **Code-O-Soccer (2016), 2nd position** in **Overnite (2017)** and **3rd position** in **Source Code (2018)** event conducted in **Kshitij,** the annual tech-fest of IIT Kharagpur
- Presented a project titled "Fertilizers - A menace in Deoghar" in **18th NCSC** (June, 2013 - December, 2013) at the **national level**

PUBLICATIONS

KgpKubs Team Description Paper 2018, accepted in RoboCup June, 2018

This paper describes the mechanical, electronic and software designs developed by KRSSG team. Software Architecture implemented over ROS, trajectory planning and velocity profiling, embedded circuit designs developed over the previous years have been discussed.

SKILLS AND EXPERTISE

Languages : C, C++, Python, Go, Java, PHP, MySQL, PostgreSQL, HTML, CSS, JavaScript, Flex, Bison
Software and Tools : OpenCV, OMPL, ROS (Kinetic), Git, CMake, Wireshark, NetBeans, VS Code, Docker

POSITIONS OF RESPONSIBILITY

Kharagpur RoboSoccer Students' Group | Team Head   (March, 2017 - May, 2018)

Artificial Intelligence Team Head at Kharagpur RoboSoccer Students' Group

Code-O-Soccer | Organising Head   (April, 2017 - May, 2018)

Headed the team organising Code-O-Soccer, India's first strategic soccer coding competition

IEEE winter workshop | Mentor   (December, 2016)

Mentored a batch of eighty students in a workshop on Image Processing and Computer vision certified by IEEE. Grayscale, Binary images, Trackbars, Filter, Edge Detection, Noise reduction, Blob Detection using DFS and BFS, Hough Transform were taught

Teaching Assistant | Algorithms-I   (July, 2019 - November 2019)

Teaching assistant for the theory and laboratory courses of Algorithms-I (CS21003) during the Autumn Semester 2019 - 2020

COURSEWORK INFORMATION

Distributed Systems | Parallel and Distributed Algorithms | Algorithms-I* | Algorithms-II | Computer Networks* | Intelligent Game Design | Formal Language and Automata Theory | Software Engineering* | Operating Systems | Database Management Systems* | Speech and Natural Language Processing | Machine Learning | High Performance Computer Architecture | Social Computing | Discrete Structures | Image Processing | Cryptography | Cloud Computing | Artificial Intelligence | Symbolic Logic   *(*Coursework had a lab component as well)*

!self declaration by the student