

AKSHIT SRIVASTAVA



EDUCATION

- **Indian Institute of Technology, Bombay**

B. Tech., Metallurgical Engineering and Material Science

2018 – 2022

EXPERIENCE

- **Mars Rover Team**

Software Engineer

IIT Bombay

Sept '18 - Mar '20

- **Obstacle Detection:** Detected obstacles in the trajectory via **clustering** of points in laser-scan map generated by Kinect v2, YDLidar sensor. Worked on UTM cost-grid based **path update** algorithms, involving satellite data parsing for altitude profile and increasing cost of terrain where the obstacle is detected.
- **Path Planning:** Investigated path planning algorithms like A*, Dijkstras for autonomous operation of rover over the cost maps generated. Simulated an algorithm for **obstacle avoidance** based on cost profiles and gradients.

- **RSalesArm**

NLP Intern

Mumbai

Dec '19 - Jan '20

- Deployed a **seq2seq** model based chatbot by developing a backend using **Flask** connected to **MySQL** database
- Involved in **Recurrent Neural Network** architecture design, data pre-processing, training and implementation
- Devised a combination of **GloVe**, **fastText** and word2vec word embeddings to extract intents & entities

KEY PROJECTS

- **Rare-Earth Free Magnets for Brushless Electric motors**

Guide: Prof. N. Venkataramani

IIT Bombay

Autumn '20

- Undertook a rigorous literary review on the forementioned topic for research purposes, the link to which is [here](#).
- Drafted a 20-page report after analysing over **25 research papers** to compare 5 non-RE materials on basis of the Density of States, crystal structures, X-Ray Diffraction Spectra for usage as Permanent Magnets

- **Intelligent Feedback System**

Guide: Prof. Chandan Dasgupta

IIT Bombay

Summer '20

- Implemented **Improvable models** as scaffolds for promoting productive engagement in an engineering design activity
- Ideated and designed the **working and architecture** of the complete system to be deployed on **Heroku**
- Developed the backend using Django **Channels** for asynchronous socket communication using a **Redis** layer
- Developed the frontend using **ReactJS**, used Django **REST API** for integration with backend

- **GradUmate**

Entrepreneurship Cell

IIT Bombay

Autumn '19

- Conceptualized a location-based **social networking app** as a deliverable for a Business Model Competition
- Developed the backend in **Flask** with a **PostgreSQL** DB, frontend in **Angular**, used Google **API** to fetch location
- Deployed the application on Amazon Web Services using Docker containers on a **Kubernetes** cluster

- **Predominance Area Diagram Generator**

Course Project - Prof. Nurni N. Viswanathan

IIT Bombay

Autumn '20

- Created a **program** to generate the P-A-D for Zn-S-O system at any temperature input by user
 - Derived equilibrium constant taking **5 reactions** into account, determining stable phase at specific partial pressure
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- **High Temperature Applications of SuperAlloys** IIT Bombay
Course Project - Prof. Nagamani Jaya Balila Autumn'20
 - Completed a literature survey to draft a report on High Temperature applications of Nickel-based superalloys
 - Evaluated their properties for applications in **Turbochargers**, **Cryogenic Engines**, and **Turbines**
- **Unreasonable Effectiveness of RNNs** IIT Bombay
Seasons of Code - Web and Coding Club Summer '19
 - Used **Tensorflow** to implement **Bi-directional LSTM** architecture trained on song lyrics for **text generation**
 - Used **PyTorch** to implement a Vanilla RNN model that **rates movie reviews** from worst to excellent
 - Used **Keras** to build a **CNN** based **OCR** trained on **MNIST dataset** to identify digits with **99%** test accuracy
 - Experimented with Random Forest, SVM, Decision Tree among other ML models to solve the **Titanic problem**
- **Analysis of Thermo Couples** IIT Bombay
Course Project - Prof. Parag Bhargava Mar'19
 - Successfully built a functioning thermocouple with the constraint of using only easily available materials.
 - Measured the **Voltage** generated as a result of application of heat to the thermocouple.
 - Investigated the relationship between the performance of the thermocouple and material used, by repeating the experiment with a multitude of different materials and in the process of doing so, improved the model each time.

HOBBY PROJECTS

- **Text-to-Image Synthesiser** Spring '20
 - Implemented **StackGAN** architecture in PyTorch which learns to map semantic text space to RGB image space
 - Applied various **data augmentation** techniques including distortions, random noise, and random rotations
- **Sudoku Solver** Spring '19
 - Developed using the **OpenCV** Python library to extract, solve, and print the solution on any captured image
 - Experimented with **Harris Corner detection**, probabilistic **Hough Line transformation**, for detecting the bounding boxes. Identified digits using the **Tesseract OCR** and solved the puzzle using **Backtracking**.
- **Facial Emotion Detection** Autumn '19
 - Used OpenCV and **Tkinter** to implement **Voila Jones Algorithm** to detect bounding box of human face
 - Used **PCA** for dimensionality reduction with a **CNN** based model for detecting seven human facial expressions

TECHNICAL SKILLS

- **Programming:** Python, C++, Javascript, Java, ROS, Bash, MATLAB/Octave
- **Development:** Django, Flask, Angular, ReactJS, Docker, Kubernetes, Flutter, Android Studio
- **Softwares/Tools:** Vim, Tensorflow, PyTorch, Git, Matplotlib, L^AT_EX, Jupyter, Arduino, OpenCV

ACHIEVEMENTS

- Awarded **Silver** medal in **Coding Hackathon** in 8th **Inter-IIT Tech Meet** (2019)
 - Awarded **Institute Technical Special Mention** for contribution to tech activities in the institute (2020)
 - Mars Rover Team stood **First** in the system review stage of **Indian Rover Challenge** (2019)
 - Secured **99.8** percentile among **1.05 million** candidates in **Joint Entrance Examination (Main)** (2018)
 - Awarded the **National Talent Search Examination** scholarship by **NCERT**, Government of India (2015)
 - Awarded the **Kishore Vaigyanik Protsahan Yojana** scholarship, aimed at encouraging students to take up research careers, funded by Government of India (2016)
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POSITIONS OF RESPONSIBILITY

- **Manager** IIT Bombay
Web and Coding Club *Apr '20 - Present*
 - Leading a team of **9 sophomores** to cultivate and sustain a hobbyist coding culture in the institute
 - Planned and executed **Online Courses** on Python, Web Development & Machine Learning engaging **1000+** learners during the coronavirus pandemic. Oversaw the logistics for doubt solving and assignment evaluation.
 - Reorganised and supervising **DevCom** for steady progress of institute-level projects affecting **10,000+** students
- **Project Guide** IIT Bombay
Reading Projects on GANs *Apr'20 - Jun'20*
 - Mentored **10+** students under an initiative by Web and Coding club for a project to understand **GANs**
 - Introduced **PyTorch**, **CovNets**, helped attempt **Kaggle** competitions, implemented GANs using PyTorch

RELEVANT COURSES

- **Material Science:** Material & Technology, Thermodynamics, Structure of Materials, Mechanics of Materials, Transport Phenomena, Kinetics of Processes, Phase Transformations, Mechanical Behaviour of Materials
 - **Computer Science:** Computer Programming & Utilization, Algorithms & Complexity
 - **Mathematics:** Calculus, Linear Algebra, Differential Equations, Numerical Analysis
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