Om Prabhu

📞 **Phone number:** (+91) 9082782130 ✉️ **Email address:** omp3108@gmail.com ✉️ **Email address:** prabhu.om@iitb.ac.in

🌐 **Website:** https://omprabhu31.github.io/

ABOUT ME

I am a fourth-year undergraduate at IIT Bombay, pursuing a dual degree in Mechanical Engineering and minor in Systems & Control Engineering. Naturally, I gravitated towards research topics that involve a bit of both, such as robotics and design of mechatronic systems. I am also interested in optimization and deep learning. I recently completed my internship at SEDEMAC Mechatronics where I worked in research & development. I am currently looking for a research internship that preferably involves some of the above topics - however, I am completely open to working in other research areas as well.

EDUCATION AND TRAINING

BTech in Mechanical Engineering + MTech in Computer Integrated Manufacturing
Indian Institute of Technology Bombay [2019 – Current]

Website: https://www.iitb.ac.in/

Higher Secondary, Maharashtra HSC
Sathaye College of Science, Commerce and Arts [2017 – 2019]

Website: https://sathayecollege.edu.in/

Junior Secondary, Cambridge IGCSE
Ajmera Global School [2017]

Website: http://www.ajmeraglobalschool.com/

WORK EXPERIENCE

Research and Development Intern
SEDEMAC Mechatronics Pvt Ltd [05/2022 – 07/2022]

City: Pune
Country: India

Completed a project on stress analysis and selection criteria of rivets and threaded fasteners. The project involved carrying out a preliminary literature review of standard manufacturing guidelines & material selection criteria and behaviour of fastening joints under eccentric loading conditions. These concepts were later put to use to perform stress analysis of rivets in non-standard part geometries, the results of which were finally presented to the manufacturing team.

Junior C# Programmer Intern
Workplay Inc. [08/2021 – 10/2021]

City: Mumbai
Country: India

Worked with a close-knit group of employees at a game development startup geared towards creating interactive experiences for corporate clients. The role involved programming in C#, modifying input systems & UI elements, code profiling, and managing project releases in GitHub.

PROJECTS

Shoe-stopper: Step Counting using Piezoelectricity
[09/2022 – 11/2022]

For this course project, we brought together our previous learnings of stress analysis, material selection criteria, thermodynamics, etc in order to design a product of our choice. Apart from mechanical knowledge, the design of the piezoelectric shoe prototype also involved several electrical engineering aspects as well as knowledge of Arduino programming. The projects were displayed in an exhibition which was attended by several esteemed professors from the institute.

Links: https://github.com/omprabhu31/me423-project/blob/main/ME 423 Course Project Report.docx.pdf | https://github.com/omprabhu31/me423-project/tree/main/sketch_nov7c

Operations Research in Air Traffic Flow Management Systems
[03/2022 – 05/2022]

In this project, we discussed the problem of air traffic flow management on a high level and analyzed some pre-existing AFTM models in supporting literature. We also formulated our own mathematical model, loosely based on the one presented in Disaggregation Method for an Aggregate Traffic Flow Model, modifying the constraints as required to obtain an objective function, and finally implementing the model in AMPL.

Links: https://github.com/omprabhu31/ME308-Project/blob/main/Project Report/Group-13.pdf | https://github.com/omprabhu31/ME308-Project/blob/main/ME308_PPT_Group13.pdf

Stabilizing Angular Momentum & Attitude Equations of Rigid Bodies using Torques
[04/2022 – 05/2022]

Read *Stabilization of Rigid Body Dynamics by Internal and External Torques* by *Bloch, Krishnaprasad, Marsden, Sanchez de Alvarez* and learnt about rigid bodies with external torques and attitude spin stabilization of dual spin satellites. We also analysed various methods of geometric mechanics such as energy-momentum algorithms & energy-Casimir method, and correcting attitude drift.

Link: https://docs.google.com/presentation/d/1F-dVJU2rSCg1RYgRYlfTw-YpA1kyaYnklpZFBchI6VM/edit?usp=sharing

Humor Detection using BERT Sentence Embedding
[09/2021 – 11/2021]

Read *ColBERT: Using BERT Sentence Embedding for Humor Detection* and analyzed pre-existing models discussed in supporting literature. We initially replicated these models and verified their accuracy against extensive online datasets. We then modeled own version using convolutional layers instead of dense layers followed by testing & comparison against existing models.

Measuring Seismic Movement using Accelerometers
[04/2021 – 05/2021]

This project involved studying the working principles of a seismic accelerometer sensor and formulating a model to obtain its characteristic equation. Following this, we derived the output of the system and carried out error analysis for step and sinusoidal inputs. Finally, we used the resulting equations to calculate the natural frequency of the system and its associated phase error corresponding to a given operating frequency and amplitude error.

Link: https://github.com/omprabhu31/ME226-project/blob/main/me226_project.pdf

LU Decomposition: A Timing Study using OpenMP and CUDA
[03/2021 – 05/2021]

In this project, we studied three methods of LU decomposition of matrices - gaussian elimination, Doolittle algorithm and Crout's method. We then parallelized the three algorithms using OpenMP & CUDA and carried out a timing study varying the matrix order and number of CPU threads (for OpenMP implementation only).

Links: https://github.com/omprabhu31/ME766-Project/blob/main/Project Report.pdf | https://github.com/omprabhu31/ME766-Project/blob/main/Project Presentation.pdf

Extended Kalman Filter on Lie Groups
[02/2021 – 04/2021]

Read *Intrinsic Extended Kalman Filter on Lie Groups* by *D. H. S. Maithripala, Ravi N. Banavar* and learnt about discretization of the Kalman Filter on lie groups and its application to rigid body motion. We also implemented a basic Kalman Filter algorithm for a toy problem to calculate the angular velocity for a simple pendulum without differentiating its angular displacement.

Link: https://colab.research.google.com/drive/1qyFkr0tTRn6F3Oo_brKC4NQrGXn933UD?usp=sharing

HONOURS AND AWARDS

Change of Branch
Indian Institute of Technology Bombay [07/2020]

Secured a change of branch (awarded to the top 11% students) from Energy Science & Engineering to Mechanical Engineering due to exemplary academic performance in freshman year.

JEE (Advanced) 2019

[07/2019]

Achieved All-India Rank 1670 out of 169,000 students in JEE (Advanced) 2019 and secured admission to IIT Bombay. Also scored 99.63 percentile among 1,000,000 students in JEE (Mains) 2019. The JEE is an all-India standardized test for admission to various highly coveted technical undergraduate programs.

IGCSE World Topper (Mathematics)

Cambridge Assessment International Education [05/2017]

Awarded the World Topper certificate for scoring 100% in Extended Mathematics in the March 2017 session of Cambridge IGCSE examinations.

LANGUAGE SKILLS

Mother tongue(s): **Marathi**

Other language(s):

Hindi

LISTENING C1 **READING** B2 **WRITING** B2

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

English

LISTENING C1 **READING** C2 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

DIGITAL SKILLS

LaTeX / Python / C++ / C# / R / Sage / Git / TensorFlow / OpenMP / CUDA

Tools/Software

AutoCAD / ANSYS Fluent / Solidworks / MATLAB

VOLUNTEERING

Educational Outreach Volunteer

[07/2019 – 03/2020]

Completed 80 hours of community service by teaching underprivileged students in NGOs through personal interaction and creation of educational videos as a volunteer of the National Service Scheme, IIT Bombay.

ICAER Volunteer

[12/2019]

Volunteered in the Travel & Transport department of the 2019 International Conference on Energy Advances and Research at IIT Bombay and handled responsibilities involving transport arrangements & formalities for esteemed research delegates from all over the world.