

# Sahil Dhull

Senior Undergraduate

Department of Computer Science and Engineering

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📄 [sahildhull.github.io](https://sahildhull.github.io) | in [sahildhull-25](https://sahildhull-25)

## Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2016 - Present	B.Tech in Computer Science and Engineering	Indian Institute of Technology, Kanpur	9.0/10
2016	Class XII (CBSE)	Abhinav Public School, New Delhi	97.4%
2014	Class X (CBSE)	DAV Public School, Kurukshetra	10/10

## Achievements

- Obtained **Pre-Placement Offer** (PPO) from Adobe India Pvt. Ltd. after the internship
- Awarded **A\* grade** for outstanding performance in the courses Formal Methods in Robotics and Topology
- Secured **All India Rank 230** in **JEE Advanced** 2016 among 150,000 shortlisted candidates
- Secured **All India Rank 27** in **JEE Mains** 2016 among 1.5 million candidates
- Qualified for **INPhO** and **INAO** conducted by Indian Association of Physics Teachers in 2016
- Awarded **KVPY 2014** fellowship, securing **AIR 46** conducted by IISc Bangalore
- Awarded **National Talent Search Scholarship 2012** by NCERT (National Council of Educational Research and Training)

## Internship

**Adobe Research** | Bengaluru, India

May'19 - Jul'19

Research Intern | Supervisor: *Dr. Niyati Chhaya*

- Problem Statement: Customizing web experiences using real-time user interaction data
- Integrated the mechanisms to capture user information in real-time from web interactions using JS libraries
- Hosted multiple surveys on Amazon Mechanical Turk for data gathering using multiple websites
- Implemented 2 deep learning based models, first one that predicts the user profile based on the interaction and the second that leverages this information to create a customized experience and currently in the process of filing a patent for the work done
- Built a live PoC using JS and Flask, shows both the final output as well as the inner workings of the models used

## Projects

**Deep Learning Controller for Autonomous Driving**

Jan'20 - Present

Supervisor: Prof. Indranil Saha

[Github](#)

- Conditioned and trained the Nvidia CNN end-to-end model that maps perceptual inputs (camera images) to control commands (steering angle) for executing high level navigation commands like turning left at intersection
- Simulated the urban environment in Webots for collecting dataset and implemented two different kind of models
- A monolithic model is trained on all dataset, and modular type of model consists of separate models for each navigation element

**Emphasis Selection for Written Text in Visual Media**

Jan'20 - Present

Supervisor: Prof. Ashutosh Modi

[Github](#)

- Implemented 2 deep learning based approaches in an end-to-end way where the input is the text and output is probability of each word to be emphasized
- First approach has a BiLSTM/GRU layer on top of word and/or character embeddings, followed by attention and linear layers
- Second approach uses Transformer models like BERT, RoBERTa, XLNet with fully connected layers on top, and their ensembling
- Stood **3rd** in **SemEval 2020** - International Workshop on Semantic Evaluation, and currently writing a **paper**

**GO to MIPS Compiler**

Jan'19 - Apr'19

Supervisor: Prof. Amey Karkare

[Github](#)

- Implemented a compiler in python for a subset of programs in GO language, targeting MIPS; using PLY framework (python)
- Processed input code in 4 stages: lexing, parsing and semantic checks, 3AC generation, and Assembly Code (MIPS) translation
- Incorporated support for dynamic memory allocation, recursion, multi-dimension arrays, complex data types, multi-level pointers, multiple return types, functions with any number of parameters, and short variable declaration

**Probabilistic Control Strategy Synthesis**

Jan'19 - Apr'19

Supervisor: Prof. Indranil Saha

[Chapter](#)

- Studied the problem of designing a control strategy for a robot to maximize the probability of satisfaction of certain specifications formulated as LTL or PCTL formulas
- Surveyed the current state of the art algorithms for this problem in discrete as well as continuous-time dynamic environments and co-authored a book chapter on this topic

**Building GemOS**

Aug'18 - Nov'18

Supervisor: Prof. Debadatta Mishra

- Extended various functionalities of GemOS operating system, like implementing 4 level page table radix tree, for a new context
- Implemented system calls (like expand, shrink, write, clone, sleep) and exception handlers like Floating point and Page fault
- Added signal handlers for SIGSEGV, SIGFPE, and SIGALRM and implemented scheduling using a round-robin scheme
- Implemented Object Store functionalities for a basic filesystem with and without caching, using FUSE APIs

## Painter and Genre Classification

Aug'18 - Nov'18

Supervisor: Prof. Piyush Rai

Report

- Used two approaches: Self-designed Convolutional Neural Network (CNN) based model and Feature extraction with Classification
- First model consists of Convolution layers, ReLU activation, max pooling, dropout and batch normalization layers
- Second model used VGG16 and ResNet50 for feature extraction and used logistic regression, SVM and KNN for classification
- Gained a maximum test accuracy of 50% with the first and 75.2% with the second model

## Teaching Experience

**Teaching Assistant**, Data Structures and Algorithms

Jan'20 - Present

Under Prof. Raghunath Tewari

- Developed a programming assignment including designing questions, making test-cases, hosting it on a platform and checking for plagiarism and assisted in checking of the papers and quiz copies of the students taking the course

## Other Projects

**English Premier League**

Jan'19 - Apr'19

Supervisor: Prof. Arnab Bhattacharya

Report, Github

- Implemented a database management system for a miniature scale model of EPL using LAMP stack with 20+ triggers

**Deliver It App**

Aug'18 - Nov'18

Supervisor: Prof. Nisheeth Srivastava

Github

- Designed a community-based delivery app on IONIC Framework using Firebase Authentication Service for login, Firebase Real-time Database for backend and Leaflet Maps for geolocation services

**Fusion of Inertial Sensing IoT Devices**

May'18 - Jul'18

Supervisor: Prof. Amey Karkare

Report

- Implemented a fusion algorithm on Dual Foot-mounted Inertial Sensors' data to reduce Systematic Heading Drift resulting in a more precise navigation system and plotted real time graphs showing raw and corrected trajectories to find drift errors

**SAE IIT Kanpur | Team Member**

Jan'17 - Feb'18

Faculty Advisor: Prof. Shantanu De

Webpage

- Designed and fabricated a Formula race car (F-18) for Formula Bharat 2018, a national collegiate design challenge
- Secured 9<sup>th</sup> position in Design Event, 6<sup>th</sup> in Business Plan and 15<sup>th</sup> position among 55 teams from all over India
- As a part of Powertrain subsystem, designed the sprocket on Solidworks and simulated (and optimized) the design on ANSYS

## Technical Skills

- **Programming:** C, C++, Python, Bash, SQL, Mips  
Familiar: MongoDB, Verilog, Javascript, PHP
- **Utilities/Frameworks:** Git, Vim, Docker, Flask, IONIC
- **Machine Learning:** PyTorch, Keras, Scikit-Learn
- **Robotics:** Promela, Spin, UPPAAL, NuSMV, Z3, LTLMoP
- **Mechanical:** ANSYS (Structural), AutoCAD Fusion, Solidworks

## Relevant Coursework

Natural Language Processing	Machine Learning	Networks	Compiler Design
Operating System	Database Management	Computer-Aided Verification	Formal Methods in Robotics
Data Structure and Algorithms	Advanced Algorithms	Theory of Computation	Computer Organisation

## Extra-Curricular Activities

**Technical:**

- Bagged 3rd position in a Robotics event (Robotricks) in Takneek16 (Inter-hostel Technical Competition):  
Built a robot to preform simple tasks like lifting blocks and detecting colored strips
- Participated in CBSE Regional Exhibition 2012 and North-Indian Science Fair 2012 at National Science Center, New Delhi
- Participation and podium position in numerous quizzes and exhibitions held at Kurukshetra Panorama and Science Center
- Secured 1st position in State level Essay Writing Competition by Govt. of Haryana in 2010

**Sports:**

- Played Lawn Tennis as Compulsory Physical Activity from July 2016 to April 2017
- Participation at State Level Swimming Competition in Haryana in 'Under 14 Boys' category

**Cultural:**

- Took part in Dance Competition in Galaxy (Inter-hostel Cultural Event) held in Jan 2017