



**Drumil Trivedi**  
**Computer Science & Engineering (Hons.)**  
**IIT Bombay**

**UG Fourth Year (B.Tech.)**  
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**DOB: 06/07/1999**

| Examination     | University | Institute                   | Year | CPI / % |
|-----------------|------------|-----------------------------|------|---------|
| Graduation      | IIT Bombay | IIT Bombay                  | 2021 | 9.3     |
| Intermediate/+2 | H.S.C      | Pace Junior Science College | 2017 | 90.46   |
| Matriculation   | I.C.S.E.   | GokulDham High School       | 2015 | 97.20   |

## PUBLICATIONS

**Disfluency Correction using Unsupervised and Semi-supervised Learning** EACL 2021  
*Drumil Trivedi\*, Nikhil Saini\*, Shreya Khare, Tejas Dhamecha, Preethi Jyothi, Samarth Bharadwaj*

## INTERNSHIPS

**Diverse Question Generation to Improve Product Descriptions** [Summer 2020]  
*Massachusetts Institute of Technology (MIT) CSAIL* Guide: Darsh Shah, Prof. Regina Barzilay

- Working on using **data augmentation** to generate multiple questions for a context on the Amazon Dataset.
- Formulating a **clustering** based side-information model to improve context for **diverse** question generation.
- Involved use of multiple variations of the **BERT, BART, GPT-2** model for various aspects of the project.

**Efficient Compression of Deep Neural Networks** *IST Austria* Guide: Prof. Dan Alistrah [Winter 2019]

- Worked on approximate methods to calculate traces of large (second-order) **Hessian matrices**.
- Applied metrics based on **Hessian** matrix traces, OBD/Woodfisher for efficient reintroduction in the **RigL** method.
- Evaluated the metrics on networks like **ResNet** on **CIFAR-10** and matched with **state of the art** results.

**Origin-Destination matrix prediction of Bike Sharing Services** [Summer 2019]  
*Hong Kong Polytechnic University* Guide: Prof. Edward Chung

- Organized the **Capital BikeShare Data** for its visualization as an **OD matrix** of various clusters of stations.
- Extensively applied both **Convolution and Feed-forward Neural Networks** on the data conducting a wide range of experiments, training on custom **loss functions** and achieved an accuracy of **91.1 %** for OD prediction.

**ML Engineer** *Tvarit Solutions UG* [Winter 2018]

- Developed a fast **multiphase hyper-parameter tuning model** for Random Forests using custom **functions**.
- Surveyed various **anomaly detection methods** and bench-marked the appropriate for the data.
- Adapted the **H2O Auto ML** platform for the data and integrated it with the **Amazon Web Services** pipeline.

## MACHINE LEARNING EXPERIENCE

Among the 50 top students selected to attend the **Google AI Summer School** for the NLU track. [August 2020]  
**Long Document/Speech Translation** [Ongoing]

*B.Tech Thesis Project, IIT Bombay* Guide: Prof. Sunita Sarawagi, Prof. Preethi Jyothi

- Working on translating entire documents and speech; efficiently using context to improve results.

**Cognate Detection in Indo-European Languages** [Ongoing]  
*CFILT Lab, CSE IIT Bombay* Guide: Prof. Pushpak Bhattacharya

- Working on Automatic Cognate Detection for Indo-European Languages for improvement of tasks like Machine Translation, Information Retrieval and Computational Phylogenetics.

**Unsupervised Disfluency Removal and Introduction** [Spring-Summer 2020]  
*CSALT Lab, CSE IIT Bombay and IBM Research* Guide: Prof. Preethi Jyothi

- Worked on removing disfluencies from conversational speech and addition to fluent text.
- Augmented **LSTM** based code and Implemented a **Transformer** based **style transfer** code and derived results.
- Familiarized and produced results on a state of the art **BART**, in a semi-supervised manner, for our setting.

**Emotion Conditioned Text to Speech** *Course project* Guide: Prof. Preethi Jyothi [Autumn 2019]

- Implemented the state of the art TTS model **WaveNet** to initially generate speech from text.
- Applied a **Seq2Seq** model that abstracts emotion & context from speech, to generate speech in the input emotion.
- Implemented a Generative Adversarial Network **GAN** to make speech more human-like sounding.

## ACADEMIC PROJECTS AND COMPETITIONS

**Autocomplete for Dr. Racket** *Course project* Guide: Prof. Amitabh Sanyal [Spring 2019]

- Designed a **Autocomplete feature** for DrRacket Editor involving a multi-paradigm approach using **Prefix Tree**.
- Worked on efficient space optimization by pruning and also made a partial spelling **corrector/word-suggester** by incorporating **partial sub-sequence matching traversal** of the word in the trie.
- Implemented operations for **key-press conditions** on the trie to update it dynamically with the work-space.

## Secure Personal Cloud Course project

Guide: Prof. Soumen Chakrabarti [Autumn 2018]

- Designed a “zero-knowledge” cloud-based server-client system with **end-to-end encryption** on files using **AES**, **Blowfish** schemes, and storing keys locally on client system.
- Implemented a system for **multiple client synchronization** with functions to **prevent Race conditions** and **Deadlock**, and back up server data regularly using Linux Daemons as a command line interface and web client.

## Autonomous Underwater Vehicle

[Autumn 2017 - Spring 2019]

### Technical team

Prof. Leena Vacchani, Prof. Hemendra Arya, IIT Bombay

- Contributed in the designing of the electrical subsystem of the Matsya 5.0 (AUV) helping it reach the semifinals in **RoboSub 2018**, a global competition held each year in San Diego, California.
- As an Electrical Sub-Division Trainee
  - Implemented **CAN(Controller Area Network)** micro-controller communication protocol and worked with a higher level protocol for the same, integrating the various sensor and boards on the same line.
- As an Electronics Designer for the team :
  - Designed and implemented a **Back Plane**, a board that inter & intra-connects the Commercial-off-the-shelf sensors and the in-house populated boards in the AUV and other devices like the pneumatic and motors.
  - Designed a **Battery Management System** for the efficient use of battery by the electrical subsystem.
  - Designed a robust **water seepage sensor** to prevent any damage to the electronics in case of a leakage.

## OTHER PROJECTS

**Milk Life Extender** : Conceptualized the implementation of a **thermo coupling module** in a thermos flask for pasteurization of the contained milk, extending the time span for which it can be consumed.

**Vertical Hydroponic Farming** : Theorized and showed a small scale implementation of a multi-layer hydroponic farm, with efficient distribution of light and water rotation .

## TECHNICAL STRENGTHS

|                           |  |
|---------------------------|--|
| <b>Strong</b>             | C/C++, Bash, Python (with Tensorflow and Pytorch)                        |
| <b>Familiar</b>           | HTML, CSS, Java, Javascript, Django, Racket, Arduino, VHDL               |
| <b>Tools and Software</b> | Git, MATLAB, Wireshark, L <sup>A</sup> T <sub>E</sub> X, AutoCAD , Eagle |

## POSITIONS OF RESPONSIBILITY

- Teaching Assistant, IIT Bombay**
  - Computer Programming & Utilization for **Bodhitree** - Prof. Varsha A., Prof. Kameshwari C. [Spring 2018]
  - Programming for Data Science for **C-MINDS** - Prof Manjesh Hanawal, Prof Amit Sethi [Autumn 2020]
- Chief Electrical Engineer- AUV-IITB Team** [Spring 2018]
  - Interviewed, recruited and mentored** first year students to electrical sub-division.
  - Represented the team in **Tech & RnD Exposition** and **Techfest Tech Exhibition** in explaining the working and capabilities of the Matsya 4 and 5 to visitors, researchers and members of press.

## MAJOR COURSES UNDERTAKEN

|                                   |  |
|-----------------------------------|--|
| <b>Machine Learning</b>           | <b>Foundations of Intelligent &amp; Learning Agents*, Information Retrieval &amp; Mining*, Natural Language Processing†, Advanced Machine Learning, Advanced Topics in Deep Learning, AI &amp; ML, Automatic Speech Recognition, Database Systems, Discrete Structures, Data Structures &amp; Algorithms, Data Analysis &amp; Interpretation</b> |
| <b>Mathematics and Statistics</b> | <b>Linear Algebra, Differential Equations, Calculus, Numerical Analysis, Probability Theory, Derivative Pricing, Statistical Inference, Regression Analysis</b>  |

## ACHIEVEMENTS AND SCHOLARSHIPS

\*to be completed by Nov 2020 ; †online course

- Awarded **Institute Academic Prize** for exceptional academic performance among all freshman. 2017-18
- Awarded **Advanced Performer's (AP)**(awarded to top 1 % of the class) in the courses **Advanced Topics in Deep Learning, Computer Programming, Engineering Graphics and Chemistry Lab.**2017-18
- Scored a perfect **10 SPI** in the second semester. 2018
- Ranked in the top **0.7%** of 0.2 million in **JEE-Advanced** and **466** in **JEE-Mains** of 1.2 million applicants. 2017
- Received **KVPY Fellowship** with a national rank of **288** for exceptional scientific aptitude by Govt. of India.2015
- Cleared **Regional Mathematics Olympiad** and appeared for National Mathematics Olympiad (**INMO**). 2014
- Scored **99<sup>th</sup> + percentile** in **Mensa IQ Test** and hence became a part of the Mensa High IQ Society. 2016

## EXTRACURRICULAR ACHIEVEMENTS

- Successfully completed a 15-day **Mountain Adventure Course** conducted by JIM & WS in Sanasar, Jammu.
- Awarded **All Round Excellence Award** by GokulDham High School, in 2014, for multiple achievements.
- A member of **Seeds Of Peace**, a New-York based NGO that brings together leaders of the future around the globe and educates them in conflict resolution. I have been an **Ambassador of Peace** (member of the contingent of 10 students from India selected to attend the Seeds Of Peace International Camp in Maine, USA), in 2013 and completed **Paradigm Shifter(PS)** Advanced Leadership Program (2016) at Cyprus.
- Second** position in Stage 1 and selected in Stage 2 of Frank Anthony All India Inter-School Debate, 2014.
- Won the **Robot Game Challenge** on the District Level, in the FLL Food Factor Challenge 2012.
- Invited to attend the **Duke Tip Summer Studies Program**, conducted by Dukes University in 2012.