Devansh Chandak | **180110027**
Computer Science & Engineering | **UG Third Year (B.Tech.)**
Indian Institute of Technology Bombay | **Male**
DOB: 20/11/1999

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	9.52
Intermediate/+2	CBSE	Birla High School, Kolkata	2018	99.00
Matriculation	ICSE	La Martiniere For Boys, Kolkata	2016	98.67

Scholastic Achievements

- Secured **All India Rank 4**, State Rank 2 in the Grade 10 **ICSE** Examination out of **170,000** students *(2016)*
- Achieved **All India Rank 5** in the **CBSE** Board Examinations (Grade 12) out of **1.2 million** candidates (**Overall** *East Zone Topper* and *All India Rank 3* in the Science Stream) *(2018)*
- Only student to receive the **Advanced Performance**(AP) grade in **Computer Programming** & **Utilization** and amongst the **top 3** in the **Biology** course*(Molecular, Physical and Biomedical modules) out of **500+** students (2018-19)*
- Awarded **AP grade** in **Advanced Calculus** (*top* **12** *out of* **1000+** students) for *exemplary* performance *(2018)*
- Attained a Semester Performance Index (**SPI**) of **perfect 10** in the First Semester *(2018)*
- Among the **top 12** students to be granted **Change of Branch**/Major to Computer Science *(2019)*
- Offered **Computer Science** at the National University of Singapore (**NUS**) with **100 %** scholarship *(2018)*

Scholarships and Recognition

- Bagged the **Institute Academic Award**, given to the **Top 25** out of a batch of 1000+ students for *exceptional* academic performance in the first year of Undergraduate Study at IIT Bombay *(2018-19)*
- Bestowed with the **KVPY** (Kishore Vaigyanik Protsahan Yojna) Fellowship, given to the talented young minds in the field of Science and Technology, by Department of Science and Technology, Govt. of India *(2018)*
- Felicitated by **The Governor of West Bengal**, with the *Mamraj Agarwal Rashtriya Puraskar* for exemplary performance in the ICSE and by *Mr. S.K.Birla*, industrialist & trustee of Birla High School with a **Gold** medal *(2016, 2018)*
- Received a **Letter of Appreciation** from Ms. Mamata Banerjee, Chief Minister of West Bengal for *exemplary* performance in the CBSE Examinations along with the *Swami Vivekananda Scholarship* for *Undergraduate Study* *(2018)*
- Granted the *Ramawatar Gupt Pratibha Puraskar* and a cash award by **Sanmarg Foundation** for securing **99**% in Hindi in the ICSE, the **Times of India EduShine** for stupendous performance in the Grade 12 Board *(2016, 2018)*
- Recipient of the **Udbhav Poddar Memorial** Prize and the Dr. **RS Pandey Proficiency** *Silver Medal* for securing the **highest marks** in the country in Mathematics and Hindi respectively, in the ICSE Examinations *(2016)*

Internship and Research Experience

Research Intern — Cryptography *(April - May '20)*
Guide(s): Prof. Steve Kremer and Jannik Dreier INRIA, Nancy, France

- Formal **Verification** of *security protocols*:
  - Studied operational semantics, equivalence properties (in the *applied pi calculus* and the **Tamarin** prover) and the **SAPIC** plugin (tool translating high level protocols to multiset rewrite rules, *analyzable* by Tamarin)
  - Introduced the notion of biprocesses (*semantics and translation*) and **diff equivalence** in SAPIC, and worked on the **soundness proof** of the translation after the addition

Quantitative Research Analyst *(Dec '19 - Jan '20)*
Guide(s): Prof. Prasanna Tantri, Prof. Nitin Kumar and Ravi Ranjan Indian School of Business, Hyderabad

- **Deep Learning:** *Applying **NLP** techniques to **Time Series Analysis** for Stock Futures :*
  - Designed and implemented an intuitive approach for storing the history of a stock in the form of a vector using a Ticker **Embedding Model**, similar to a Word Embedding model. Incorporated technical indicators such as Momentum, Trailing Volatility, Asset Class and average return per asset class along with the embeddings
  - Designed, trained and tested an **LSTM** classifier (using **PyTorch**) trained on a time series of multiple stock tickers to predict returns and study non linearity & inter asset class correlation.
  - Expanded the LSTM to incorporate **attention**, and **retrain** over latest data *while testing*
  - Optimized the hyperparameters using libraries: Ray for **Grid Search** and Hyperopt for **Bayesian** optimization
- **Trading Algorithms:** Implemented the **Pairs**, **Betting against β** and **Momentum** trading algorithms in **Python**
  - Calculated β by regression on the **CAPM** equation with a 6 month rolling window: Experimented with daily, weekly and monthly *rebalancing* of the portfolio, and anaylzed the output on equally weighted and value weighted portfolios
  - Modified the Pairs strategy on a 1 year rolling window with 12% CAGR and 0.71 overall Sharpe and researched the intricacies involved in the **strategies**: Pitroski's F-Score, Mohanram's G-Score, Accruals, PEAD and Momentum crashes
- Awarded a **Letter of Recommendation** for *exceptional* performance shown throughout the internship

Data Analytics Intern *(June - July '19)*
Guide: Mr. Amit Ambekar (Vice President, Marketing) Spencer's Retail Ltd.- RPSG group

- *Analysis of underperforming stores given all KPIs and SKU (Stock Keeping Units) level data*: **Statistical Analysis** of transactional & brick level data to attribute reasons for de-growth in the *MGF Gurgaon* and *Vizag* hyper stores
- Given all category **KPIs**, *deep dived* into SKU level performance to come up with solutions to **counter degrowth**

Machine Learning Intern *(May - June '19)*
Guide: Prof. Vipul Arora INDIAN INSTITUTE OF TECHNOLOGY, KANPUR
- *Analysis of ML Algorithms for Spam Email Classification in Python*: Anaylzed SVMs and Neural Networks before implementing **Naive Bayes** and **KNN** on numerous data sets using *Keras*, Pandas, Numpy and *Scikit-learn*
- Compared accuracies for various data sets and **categorised the best method** for each data set

Software Engineering Intern *(Nov - Dec '18)*
Guide: Mr. Mohsin Ali (Project Manager) CITYTECH SOFTWARE PVT. LTD.
- Configured and enhanced a **chatbot** for Employee Leave Applications using **Microsoft LUIS** after a *comparative study* with *Google Dialog Flow*. Helped in introducing *Voice to Text feature* (using Bing API) from Microsoft Azure
- Researched on **Human Resource Automation** and developments in *Google Assistant, IBM Watson, Alexa and Cortana*

PROJECTS & KEY ASSIGNMENTS

Textgraphs-14 — COLING 2020 NLP CONFERENCE WORKSHOP | *(July '20 - Present)*
- Shared Task on **Multi-Hop Inference** for **Explanation Regeneration**:
  - Optimizing the *tf.idf* baseline to construct gold *explanations* for elementary science questions, using the WorldTree corpus
  - Used **tensorflow_hub** to *embed* facts directly as sentences, ranked them by lexical overlap with questions and answers
  - Linking facts based on **lexical overlap** to build a *knowledge graph* to select *next-hop* facts and using **BERT** for reranking

Scholary Document Processing — EMNLP 2020 NLP CONFERENCE WORKSHOP | *(Apr '20 - Present)*
- LONGSUMM: Shared Task on *Generating long summaries of scientific documents:*
  - Parsed PDFs to extract individual sections of scientific papers using GROBID and *Beautiful Soup*, in **Python**
  - Combining *abstractive* & *extractive* **summarization** and exploring *Reinforcement Learning* techniques
  - Building models based on **PreSumm** (**SciBERT** with pretrained encoders), to summarize each section seperately

Google Forms and Survey Management *(Sept - Nov '19)*
Guide: Prof. Amitabha Sanyal — Software Systems COURSE PROJECT
- Designed own Form and Survey Management system like Google Forms with **user authentication**
- Allowed *modular* question design (paragraph, file upload, dropdown, checkbox, radio button), form validation (constraints on answers like alphanumeric, range, email-ID, .pdf only), adding **collaborators** and shareable forms (surveys & quizzes)
- Data analyzable by plotting of numerics (**Matplotlib**), learning dependencies in responses and summarized presentation of subjective answers. Used **Django** for backend, **Sqlite3** for database structure, **Bootstrap** for responsiveness

Sentiment Analysis by BERT SELF PROJECT | *(July '20)*
- Achieved **91 %** accuracy in predicting positive/negative sentiments on the **IMDB** reviews dataset
- Used BERT from the Hugging Face *transformers* library and **Pytorch** for preprocessing and funetuning the model

Spanning Tree Protocol | *Prof. Varsha Apte — Computer Networks* COURSE PROJECT | *(Feb - Mar '20)*
- Simulated the network bridge topology as a *distributed system* of nodes, communicating via messages, in **C++**
- Configured nodes to run the protocol and agree upon a *loop-less* logical **topology** to prevent a *broadcast storm*

SAT Solver | *Prof. Ashutosh Gupta — Logic for CS* COURSE PROJECT | *(Jan - Feb '20)*
- Designed a SAT Solver using **z3 in Python**, to check satisfiability in CNF (Conjunctive Normal Form)
- Solved the *NQueens, Sudoku* and *Graph Colouring* problems with the solver, using **DPLL** (a backtracking algorithm)

Efficient Memory Allocator | *Data Structures & Algorithms* COURSE PROJECT | *(Aug - Sept '19)*
- Designed a simulator in **C++** for efficient dynamic memory allocation of processes using the **first-fit strategy**
- Handled allocation, deallocation and termination requests for upto 10^6 process requests simultaneously

PCA for Fruit Image Generation and MNIST *(Oct - Nov '19)*
Guide: Prof. Suyash Awate — Data Analysis COURSE PROJECT
- Plotted closest representations of RGB fruit images, using *Principal Component Analysis*, fitting a *MultiVariate Gaussian*. Generated new images by random sampling (representative of the dataset), using the closest representations, in **MATLAB**
- Performed *Principal Component Analysis* on the MNIST dataset to visualize principal modes of variation (*MultiVariate Gaussian* fitting), in **MATLAB**, decided on number of *degrees of freedom* of digits and inferred handwriting tendencies.

Non Parametric Estimation & Cross Validation *(Sept - Oct '19)*
Guide: Prof. Ajit Rajwade — Data Analysis COURSE PROJECT
- Compared non parametric estimation methods (histograms & Kernel Density Estimation), anaylzed the *rate of convergence*
- Implemented Cross Validation in **MATLAB** (*bandwidth selection* giving maximum joint likelihood & minimum deviation)

POSITIONS OF RESPONSIBILITY

Teaching Assistant | *CS 101 - Computer Programming & Utilization* | *Prof. Purushottam Kulkarni* *(July - Nov '19)*
- **Only sophomore** to be selected for TA-Ship on the basis of **academic prowess** in the subject. Involved in teaching and assisting students within and outside lab hours, with problems and conceptual doubts on a **one-to-one basis**

Interact Coordinator — Community Service | *Rotary Club of Calcutta Visionaries* *(2017-18)*
- Coordinated **blood camps, health camps**, eye camps, newspaper collection drives, **organised sports** for *village children* in the Sunderbans. Conducted free **computer classes** for *underpriveleged* children of Sambhu Sadan Vidayala, Kolkata

Events Coordinator, Techfest | *Asia's largest Science and Technology Festival* IIT BOMBAY | *(2019-20)*
- Spearheaded a team of **15+** in conceptualizing and organizing **Technoholix**, featuring *International* performances. Organized **PAN India** workshops on investment education with *NISM, NSE & SEBI*, under the *Financial Literacy Initiative*

TECHNICAL SKILLS

Languages	C++, PYTHON, JAVA, BASH, MATLAB, VHDL
ML Libraries	PYTORCH, KERAS, TENSORFLOW, SCIKIT-LEARN, RAY, HYPEROPT, ROUGE, GROBID
Web Tools	HTML5, CSS3, JAVASCRIPT, BOOTSTRAP, DJANGO, SQLITE3, MARKDOWN
Software Tools	GIT, LaTeX, SED, AWK, MAKEFILES, SCIPY, NS3, WIRESHARK, PROVERIF