BHUMIKA CHOPRA

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EDUCATION

Indian Institute of Technology, Delhi — *July 2018 - July 2022*
B.Tech in Mathematics and Computing — **CGPA : 9.35**
Sri Sathya Sai Vidya Vihar, Indore — *April 2016 - March 2018*
Intermediate — **Overall Percentage : 94%**

SCHOLASTIC ACHIEVEMENTS

- JEE Advanced, 2018 : Secured **All India Rank 647**, standing among the **top 2 percentile**
- **JEE Mains, 2018** : Secured **All India Rank 299**, standing among the **top 0.1 percentile**
- **KVPY, 2018** : Awarded the **KVPY Fellowship** for securing **All India Rank 293**
- Awarded **IIT Delhi Merit Scholarship** multiple times for being in the **top 7%** , in a batch of 1000
- Selected for **ML Internship** and participated in **CS REU Lunch Learn** organized by **UIUC** in Summer, 2020
- **National Level Talent Search Examination(NTSE), 2016** scholar

WORK EXPERIENCE

Maven Securities | Software Engineer — *June, 2022 - Present*

- Improved performance by 82% and analytical accuracy by 26% of the event-based **volatility fitting** models using a properly calibrated underlying **Extended Kalman filter**. Refined to error and confidence metrics for better analysis.
- Leveraged **market quotes** to calibrate volatilities with a **Jacobian matrix** comprising of **param vegas**.
- Contributed to a **futures roll fitter** reliant on European options call-put parity equation using least squares regression and Kalman filtering. Enhanced robustness and added submission throttling to downstream applications.
- Implemented low latency pricing methods for **volatility future instruments** in the base c++ library, with method wrappers in c#, python and Julia. Added **performance metrics** and **test templating** to the c++ library.
- Exposed methods for **risk management, portfolio analysis and internal trade transfers** with other trading desks.

APT Portfolio | Data Management and Research Intern — *May, 2021 - July, 2021*

- Achieved 95% reduction in latency & 82% reduction in storage by adding **ClickHouse OLAP database** support to apps
- Designed a C++ application to generate **trading indicators** such as OHLC, VWAP and TWAP from Protobuf data

Unbxd | Data Science Intern — *May, 2020 - July, 2020*

- Devised **synonym generation** algorithms to improve query understanding and return more relevant search results
- Performed **query extraction** on clickstream data with **Sklearn, and NLTK** using linguistic and statistical models

PROJECTS

Automatic seat allocation by minimising fragmentation, Design Innovation Summer Award (DISA)
Prof. Subrat Kar, Electrical Engineering Department

- Designed a UI based system to dynamically allocate seats in the Computer Services Center, to maximise the availability of adjacent seats for groups of students using **python3** and **PyQt5 designer**
- Involved reading and storing dynamic lab layouts, and allocating seats in an orderly fashion while minimizing fragmentation
- Received the best **DISA award** (for being among top 3)

Text extraction, simplification and synopsis generation using reinforcement learning
Prof. Niladri Chatterjee, Mathematics Department

- Aim is to generate a synopsis from a given report using **NLP** and **Reinforcement Learning**, so as to improve upon the traditionally used extractive and abstractive text summarization techniques (implemented research papers)
- Used NLTK, numpy, tensorflow and other python libraries; implemented various **supervised and unsupervised learning algorithms** to generate summaries, **experimented with ANNs, RNNs, GRUs, LSTMs, and CNNs**

Designing virus-like particles as vaccine candidates against nCoV-19*
Prof. Manidipa Banerjee, Biotechnology Department

- Used **ClustalΩ** to find conserved amino acid stretches of various proteins in SARS-CoV-2 which are also conserved in MERS-CoV and SARS-CoV, then performed **epitope prediction using NetMHC4.0 or IEDB T Cell Epitope Server** to try and make a vaccine suitable for a larger group of the population

TECHNICAL SKILLS

Programming languages	**Proficient**: C++, Python | **Familiar**: Julia, c#, Java, C, SQL, MATLAB, Haskell, TypeScript
Software & Tools	PyCharm, VS Code, Rider, Eclipse, Sublime, TensorFlow, Git, JupyterLab, MATLAB

EXTRA-CURRICULAR

- Member of **Girls Who Code**, and **Social Coder** and volunteer at an after-school coding club at the local library
- Elected as the **Sports Secretary** in Nov, 2020 and lead the hostel to winning the General Sports Championship, 2021
- Member of **Athletics Contingent** at IIT Delhi, named **best female athlete** of the month August, 2019
- **Software Development Club, IIT Delhi** : Helped in creating a CTF portal for organising institute level competitions. Active participant in spreading applied computer science culture in the institute