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Aayush Dutta

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Education

University of Michigan *Ann Arbor, MI* ***Expected May 2024***
GPA: 3.95/4.0

- **Master of Science** in Mathematics (pursuing concurrently with the below)
- **Bachelor of Science** in Computer Science and Honors Mathematics (Double Major)
- **Computer Science Coursework**: Graduate Machine Learning, Advanced Algorithms, *Functional Programming*, Data Structures and Algorithms, Discrete Mathematics, Theory of Computation, Computer Organization [1]
- **Mathematics Coursework**: Graduate Probability Theory, *Graduate Algebraic Topology*, Graduate Topology, Single/Multivariate Analysis, Theoretical Linear Algebra, Graduate Differential Geometry, Honors Algebra (Groups, Representations, *Rings & Galois Theory)*
- **Honors and Awards**: Evelyn O. Bychinsky Prize (with a $1200 award), Mathematics Departmental Merit Scholarship, University Honors (x3), William J Branstrom Freshman Prize, James B. Angell Prize

Technical Skills

- **Languages**: Python; C/C++; Java; SQL; Matlab; LaTeX
- **Technologies**: Python ML Stack (Tensorflow Keras, Pytorch, Scikit-Learn, etc); Git; C++ STL; Docker
- **Other**: Fluent in English and Hindi; Limited working proficiency in Spanish

Experience

Gravity AI *NYC/Singapore* **May 2022 - August 2022**
ML Engineer, Intern

- Devised an end-to-end ML Model Pipeline involving Optical Character Recognition (**PaddleOCR**), Tabular Data Extraction (**scikit-learn, Pytorch**) and Text Interrogation to automate data entry from non-standardized shipping invoices to save clients **$80,000** annually
- Assembled and containerized DALL-E (**Docker**), an AI system that creates images from text, for convenient client-side deployment. Used for a front-end feature to allow users to create profile pictures, boosting user engagement
- Architected an ML pipeline to perform Speaker Diaration (**Tensorflow, GMM Clustering**) and Topic Detection to segment videos into contextually split clips. This automation saves clients **16+ hours** in editing per hour long video

The Waterside *Singapore, Singapore* **May 2021 - August 2021**
Software Developer, Intern

- Liaised with the management of The Waterside (a condominium in Singapore with **2000 residents**) to single-handedly create an application to track their water usage and wastage the latter of which cost residents **$43,000 yearly**
- Engineered anomaly detection algorithms in Python (specifically using **Autoencoders**, a form of an unsupervised Neural Network) to recognize leaks that totaled **93000 liters** annually

Projects

ThermoTwin Anomaly Detection **Python**

- Implemented **Long Short-Term Memory** Recurrent Neural Network architecture on time series data of the Rankine Cycle, a thermodynamic cycle used in power plants, to **predict transient graphs** and detect anomalies in a fraction of the time required by simulations (nearly **2 orders of magnitude**)
- Constructed 2 additional DNN pipelines to predict end states and failure time (regression) using **Tensorflow Keras**
- Optimized the 3 models to produce exceptional results (**accuracy/loss values** of 10^{-4}, 98%, 0.86 resp.)

Sentiment Analysis Bot **Python, SQL**

- Performed sentiment analysis (using **Natural Language Processing**) and wrote a bot to execute trades as a member of the Michigan Finance and Mathematics Society (MFAMS) using Twitter APIs to gather data

Travelling Salesman Problem **C++**

- Researched and implemented different heuristics models (e.g. **convex hull insertion**) to solve the Travelling Salesman Problem for large graphs whilst using branch and bound algorithms to find the optimal paths for smaller graphs

[1] Italics indicate current coursework or coursework to be completed prior to Summer 2023