Sabyasachi Purkayastha

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EDUCATION

The University of Hong Kong | *Bachelor of Engineering* ***Sep 2020-May 2024***

- Awards: **Full Scholarship**
- **Major:** Computer Science | **Minor:** Finance
- **Roles**: Co-President UNICEF HKU | HKU Student Ambassador | HKU Equal Opportunity Ambassador.

PROFESSIONAL EXPERIENCE

THALES Group | ***Software Engineer*** ***Jun 2022 –Present***

- **Single handedly developed and released a big-data analytics platform** that constructs passenger journey in MTR stations with high accuracy rates and predictions on specific variables. Transformed transit data to mobility insights using Grafana Docker Container, TypeScript, React, Open Layers, Turf.js, Apache Echarts, Moment.js, Chakra UI, thus significantly improving passenger satisfaction, and enabling urban rate to operate more efficiently.
- **Created a Grafana architecture consisting of Isochrone, Platform Level System Map, Platform crowding station KPI System map.** Integrated Multilevel Dijkstra's, Contraction Hierarchies and Chaikin's Algorithm to identify friction points in the MTR network from the data from the ticketing machines and tap-in tap-out barriers in the MTR to recreate a single customer journey on the network.
- **Implemented a "Marey Diagram" to visualize train schedules, passenger demographics, station occupancy and route utilization** by capitalizing D3, Bootstrap, Glyphicons, Underscore.js, D3-tip thus enabling MTR operators to take proactive decisions before problems become critical and to optimize station facilities.
- **Managed and maintained clickhouse database consisting of several thousand** data points on MTR Trips and locations and capitalized SQL using DBeaver to retrieve data on waiting time, platform occupancy and train occupancy to prevent future platform crowding.
- **Nominated by Head of Research and Technology division to lead the data visualization mentorship program** organized annually by THALES in collaboration with ESEO Engineering School, France.

GrinBean Limited | ***Full Stack Developer*** ***Dec 2021 – Jan 2022***

- **Recreated legacy UI system using Vue** and redesigned the dashboard using Apache Echarts, providing powerful data insights and customizable visualization.
- **Seamlessly developed data pipeline for IoT device and server** using Express and wrote tests for authentication, authorization and output using jest.
- **Contributed to the text-based data mining and information extraction** to train and modify the data driven AI model to achieve greater efficiency.

HKU Business School | ***Research Assistant*** ***Nov 2021 – Dec 2021***

- **Forecasted the stock prices of S&P 500 companies using time series analysis, univariate ARIMA models** and derived visualized market segments of those firms using data from CrunchBase by creating custom data pipelines using the tf.data.datasets API.
- **Applied empirical analysis and computer simulation on EV Stocks to** examine the correlation and causality between the value of the stock and company-wide reports.
- **Tripled the speed of data extraction by implementing an algorithm** that recognized required data type, instantly providing it to the project, saving countless hours of manual labour.

HIGHLIGHT PROJECTS **See more at shoh4g.github.io**

IdentifyMe | *An Image Caption Generator for Images using CNN and LSTM.* Github

- **Developed and trained a Caption Generator for images that brings together CNNs, LSTM and Keras**. Applied Transfer Learning using Xception Model which has been trained on imagenet dataset that had 1000 different classes to classify.
- **Performed data cleaning using Pandas and utilized the tokenizer function** from the Keras Library to create tokens of the vocabulary.
- **Applied the Keras Model from Functional API** which consists of Feature Extractor to reduce the dimension of the images to 256 nodes. A Sequence Processor where an embedding layer handles the textual input, followed by the LSTM layer. Finally, the decoder where we merge the output from the above two layers, and process by the dense layer to make the final prediction.

GOD's Eye | *A Brain Tumour Classifier to detect cancer from MRI Image.* Github

- **Integrated multilayer perceptron (MLP) for image identification.** Prevented curse of dimensionality and overfitting by utilizing the CNN model's template matching technique and convolution filters.
- **Utilized pooling layers (max pool) to reduce the dimension of the feature map** as well as numbers of parameters to learn and the amount of computation performed in the network. Added a padding layer to enable the convolutional filter for capture all features from the image.
- **Implemented flattening operation to flatten the output of the convolutional layers** to create a single long feature vector and connected it to the final classification model. Applied transfer learning via Mobile net modeling architecture to increase the accuracy of the model as well as avoid latency.

Exit-Finder | *A text-to-speech app that guides the visually impaired (VIs) to their chosen exits in MTR Stations.* Visualize

- **Architected a mapping platform, by leveraging BFS, DFS, Dijkstra's algorithm, and A* search algorithm**, to provide personalized directions to VIs based on their step size, mode of preference (stairs, elevators, escalators), and existing facilities (tactile paths), to lead them from the elevator in the station concourse to their preferred exit.
- **Capitalized React Native Paper material design library** to make the UI more user-friendly for the VIs as well as integrated expo-speech to allow text-to-speech functionality in the app.

NOTABLE ACHIEVEMENTS AND HACKATHONS

- **JP Morgan Finance for Non-Finance Program** | Selected among 45 individuals from the entire APAC region to complete a 2-week Finance training program under the guidance of JP Morgan associates.
- **IEEE Web 3 Dev Hackathon 2022** | Top 4 among 250+ participants + Award for Best Team.
- **Easy-View and HKU Master's Program Hackathon 2022**| Top 4 Finalist + Award for most positive social impact.
- **HKU 3rd Engineering InnoShow 2020** | Runner-Up | Demo.
- **Recognition from the Ministry of the People's Republic of Bangladesh** | Led multiple campaigns nationwide regarding climate change.

SKILLS

- **Core:** Python, Java, JavaScript, Typescript, C/C++, Shell (Scripting), Linux/Unix.
- **Machine Learning:** Regression, Classification, ARIMA, Ensemble Learning, CNNs, RNNs, Transfer Learning for NLP, Computer Vision.
- **Web, App and Database:** Grafana, React, Vue.JS, React Native, D3.JS | NodeJS and Express | SQL, MongoDB, ClickHouse, DBeaver.