Arthur (Zichuan) Wang

Portfolio: starrynightwzc.github.io
Github: github.com/starrynightwzc

Email: zichuan.wang.92@gmail.com
Address: 42 Charles St E, Toronto
Mobile : 647-704-1656

Work Experience

- **AECOM** Apr, 2020 - Sep. 2020 (expected)
  Software Engineer Intern Mississauga, ON
  - Developed object detection program using TensorFlow and OpenCV to identify waste water sewer pipe defects through analyzing sewer-rover mounted CCTV camera video recordings.
  - Prototyped a Flask-based web application. Integrated the object detection program into the backend which enables the application to generate and display images with annotated defects. Post-processed and saved defect information including defect type, orientation, pipe blockage percentages into MySQL database.
- **Zonfa Electric Co., Ltd.** Jun, 2018 - Aug, 2019
  Software Engineer Shanghai, China
  - Created the frontend application of supply chain and inventory management system using Angular. Implemented input validation, asynchronous http request processing and client side user authentication through JSON Web Token.
  - Developed backend API endpoints accessible from within company intranet. Implemented NoSQL database using MongoDB for better horizontal scalability. Achieved variety of functionalities including user authentication, CRUD operation on order history and inventory information.

Education

- **University of Toronto** Sep, 2019 – Sep. 2020 (expected)
  M.Eng. in Computer Engineering; Emphasis in Data Analytics GPA: 3.88 / 4.00

Programming Skills

- **Languages**: Javascript, Java, Python, Typescript, C++, C, SQL, HTML5, CSS3 | **Version Control**: Git
- **Web Development**: Node.js, Express.js, Angular, MongoDB, Flask, MySQL, React, Bootstrap, jQuery
- **Cloud Computing**: AWS, Firebase, Heroku | **ML ToolKit**: Scikit-learn, TensorFlow, NLTK, OpenCV

Projects

- **Online Shopping Web Application** Demo / Code
  - Prototyped frontend of an online grocery shopping application using Angular. Created features including user authentication, product catalog, shopping cart, order history and product management for admin users. Improved user experience through optimistic updating, error handling and centralized client side http service for asynchronous response.
  - Developed backend routing logic and RESTful API endpoint using Node.js. Designed database schema for effective query using MongoDB. Deployed the application using AWS Elastic Beanstalk and database using MongoDB Atlas.
- **Blog Sharing Web Application** Demo / Code
  - Designed an online blog sharing application using Node.js and Express.js. This site allows users to create customized posts with picture to share their experience. Comment section is also provided for user interaction.
  - Designed database schema and data association using MongoDB for efficient entry query for user credential, blog detail and user comments. Deployed the application using Heroku and database with MongoDB Atlas.
- **Serverless Web Application for Online Forum** Demo / Code
  - Prototyped an online forum that provides a platform for community members to support each other during COVID-19 pandemic. The forum provides help exchange features with filtering functionality based on type of help, availability time window and physical distance between help provider and help requestor.
  - Developed backend framework using Flask. Deployed website through Zappa onto AWS Serverless Lambda Function. Managed persistent user data using S3 and DynamoDB.
- **Android Mobile Application for Photo Sharing** Demo / Code
  - Designed a Instagram clone Android application using Java. Implemented features such as user authentication, photo posting, sharing, commenting and deletion.
  - Developed cloud based backend using Google Firebase to manage user credential, visual & text content. Designed graphical user interface using Android Studio. Implemented Firebase Machine Learning kit for auto hashtagging.

- **Scalable Cloud based Web Application for Image Object Detection** Code
  - Constructed a scalable cloud based user-side application capable of automated object detection with user uploaded photos. Designed corresponding manager-side application for managing user pool and implementing load balancer & auto scaler configurations through AWS Elastic Load Balancer and CloudWatch.
  - Deployed both user-side and manager-side application using AWS EC2 instances. Implemented AWS RDS for storing user credentials and http request history. Managed photos before and after object detection using AWS S3 bucket.
- **Fit-Tune: Music Improve Workout Android Application** Code
  - Prototyped an Android mobile application using Java and Agile approach with the ability to improve user workout experience by providing real time music tempo and style adjustment based on workout intensity.
  - Implemented music tempo adjustment by performing time stretch on audio stream without affecting sound pitch. Developed running cadence detection function using accelerometer readings with low pass filter for noise suppression.
- **COVID19 Symptom Analysis based on Kaggle Open Research Dataset** Code
  - Determined top10 most common coronavirus symptoms based on appearance frequency within related research papers.
  - Implemented hierarchical clustering to investigate the inherent relationship between different symptoms.
  - Derived insights about policy & guidance to tackle the outbreak based on COVID19 symptoms analysis.
- **Sentiment Analysis of 2019 Canada Election Public Opinion on Twitter** Code
  - Utilized natural language preprocessing techniques such as tokenization, lower casing, special character & stop words removal, lemmatization to reduce noise within corpus. Prepared dataset for machine learning model implementation using four different feature engineering techniques including WF, TF-IDF, word embedding and N-grams.
  - Compared the performance of different multi-class classification algorithms (logistic regression, k-NN, Naive Bayes, SVM, decision trees, Random) in predicting the reasons for the negativity in election tweets.
- **Salary Predication based on 2019 Kaggle Data Science Survey** Code
  - Performed data cleaning by removing features with poor correlation, filling missing data with mode of each salary bucket, implementing one-hot encoding for multiple choice questions and combining closely related features.
  - Performed feature engineering using PCA, implemented logistic regression on training set using 10-fold cross validation. Improved prediction accuracy through hyperparameter tuning using grid search.
- **Human Activity Recognition with Smartphones**
  - Performed Principal Components Analysis on data collected from accelerometer and gyroscope readings from waist-worn cellphones of volunteer performing various activities namely, sitting, laying, standing, walking and running.
  - Trained models using 3 different algorithms namely, kNN, logistic regression and SVM with 5000 training and 2000 validation observations. Achieved the lowest misclassification rate of 4% with SVM on 2000 testing observations.
- **Implementation of Self Driving Car Simulation**
  - Built and trained a deep neural network to classify traffic signs and identify lines using TensorFlow.
  - Created a vehicle detection and tracking pipeline with histogram of oriented gradients and SVM using OpenCV.
  - Utilized Kalman Filter to estimate the position and velocity of the vehicle with noisy lidar and radar measurements.
  - Implemented a model predictive controller for vehicle on track line keeping by properly adjusting steering angle.

Relevant Courses

- Web Development, Cloud Computing, Machine learning, Data Structure and Algorithm, Computer Security
- Data Science and Analytics, Creative Mobile Application, Computer Graphics, Computer Architecture

Other Experience

- **Linamar** May, 2017 - May, 2018
  Automation Engineer Guelph, ON
- **University of Alberta** July, 2016 - Apr, 2017
  Research Assistant Edmonton, AB
- **University of Alberta** Sep, 2013 – Jun, 2016
  M.Sc. in Mechanical Engineering; Emphasis in Mechatronics and System Control GPA: 3.54 / 4.00
- **Xi'an Jiaotong University** Sep, 2009 – Aug, 2013
  B.Eng. in Energy and Power Engineering GPA: 89 / 100