UMESH THILLAIVASAN

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EDUCATION

Master of Engineering (MEng) in Industrial Engineering and Operations Research - University of California, Berkeley May 2018

Focus on operations research applications using data science, and machine learning

Bachelor of Applied Science (BASc) in Mechanical Engineering - University of Waterloo April 2013

Graduated from mechanical engineering with biomechanics option with honours

DATA SCIENCE PROJECTS

Predicting criminal convictions and exploring racial justice February 2018 – Present

- Analysis of criminal case court data (270000+ records) for a California county Public Defender.
- Modeling, in both R and Python, includes linear regression, CART, random forest, boosting, clustering, and visualizations (in D3).
- Analysis includes general county statistics, the breakdowns for particular offenses, such as simple drug possession, gang activity, and resisting arrest. How does the race of the person charged correlate with conviction rate and sentence length? How do prosecution filing rates relate to police arrest rates by race?

Predicting in-hospital cardiac arrests by suppressing false PVC alarms September 2017 – Present

- Predict in-hospital code blue arrests by identifying and suppressing false-positive premature ventricular contraction (PVC) alarms.
- Use a GUI built in Node.js to annotate UCSF's data set into labelled training and validation data sets for model creation.
- Process 10-second electrocardiogram (ECG) signals, perform feature engineering using down-sampling and signal processing, then building various classifiers in Python, such as training a 1D CNN using ECG plots, and exploring LSTM RNN applicability.

RecycleAI, materials recycling using machine learning September 2017 –December 2017

- Built self-supervised computer vision system using a Pi Camera deployed on a Raspberry Pi running Python, and then trained a convolutional neural network (CNN) using Keras and TensorFlow to identify and classify objects into appropriate material waste streams then store objects on Amazon Web Services (AWS) in an S3 bucket, achieving 86% validation accuracy.
- Final classification model was achieved by fine-tuning the Inception-v3 pre-trained model by first training top model (fully connected layer) separately on training data set, then fine-tuned intermediate weights of the model with the same training data.

PROFESSIONAL EXPERIENCE

Operations Engineer - Johnson Matthey Inc., Operational Excellence - West Deptford, NJ September 2015 – August 2016

- Automated global supply chain predictive model with live data using Python, reducing forecasting time from 3 days to 15 minutes.
- Authored internal white paper assessing cooling tower risks, and cooling technology alternatives leading to new corporate policy.

Manufacturing Engineer - Johnson Matthey Inc., Nitinol Products - San Jose, CA September 2014 – September 2015

- Built an automatic Nitinol thickness measurement system using Python for 100% quality inspection with +/- 0.4 micron tolerance.
- Invented and built tube drawing equipment ($90K). Production upgrades resulted in improved quality, output, and user safety.

Project Engineer - Johnson Matthey Ltd., Gold & Silver Refinery - Brampton, ON September 2013 – September 2014

- Project manager for precious metal induction furnace process installation ($430K). Process upgrade increased production 220%.
- Designed tooling for safer material handling, a LEAN optimized workflow, new production molds (40% lighter, 65$/unit cheaper).
- Planned and carried out acid tank design (33,000L) and installation ($148K). Tank design increased operational capacity 13%.
- Spearheaded refinery PLC 5 migration ($130K). Hardware and software upgrades connected discrete information systems.

SKILLS PROFILE

Professional Engineer - License 100 204 825 - Professional Engineers Ontario, Canada June 2017 – Present

Graduate Courses - Optimization analytics; Risk modeling, simulation, and data analysis; Applied data science; Applications in data analysis

Mechanical Design - SolidWorks (CSWA), Inventor, Fusion 360, AutoCAD, GD&T, Machine shop experience

Data Science - Python and Jupyter Notebooks with Pandas, NumPy, Scikit-Learn, Matplotlib, SQL, Keras, TensorFlow. R and RStudio.

Software - MATLAB, Tableau, Microsoft Office, Adobe Create Suite, TeXstudio (LaTeX), Asana