

Elevator Anomaly Detection System

Description:

Have you ever ride a shaking elevator, been trapped in an elevator, been tripped by the non-level elevator floors or had experience in a falling car? We ride elevators every day in schools , condo buildings, office buildings etc. Elevator safety is important to everyone. Technical Safety BC performs periodic inspections on elevators in B.C. to make sure they are safe to use. An opportunity and challenge to make the process efficient and accurate is to harness the modern technology which is IOT(Internet Of Things). IOT is a hot topic. It's used in many industries and is the main area the machine learning and AI algorithm can apply. The sensors are installed on elevators to collect different aspects of the elevator when it's in operation. The data is analyzed by machine learning or deep learning models to extract abnormal behaviors. The model is then embedded into a real-time system to provide a visual aid to users about aggregated information, anomaly alert and other information you want users to know. With IOT, we can do a good predictive maintenance on elevators.

In this project, we encourage innovation and welcome any expansion around this idea. The project can have but is not limited to:

- Data Analysis: Many information can be extracted from sensor data, ie, distances and floors travelled, speed, usage frequency, etc. Leveling issue is one of our main concern. Any method that can well predict the leveling distance will be given extra points.
- Algorithm development: Develop machine learning or deep learning model to detect any anomalies from sensor data. The challenge here is you may find different elevators have a slightly different values from sensors, ie, elevator for high rise buildings vs low rise, old elevators vs new elevators. You will need an algorithm that can generalize well for all elevators. Don't focus on only 1 elevator.
- System development: Develop a real-time streaming system to simulate the sensor data coming in and visualize any information from your analysis. You can take advantage of cloud services ie AWS, Azure, Google Cloud.
- Any ideas you can use to make this project successful.

The skills you will gain from this project and make you a competitive candidate in the job market:

- Awareness of public safety in Elevator
- Gain experience in IOT
- Gain experience in Cloud Services
- Master data analysis and machine learning in real big data
- Gain ability to build popular streaming system

Datasets:

- We have used accelerometer to collect acceleration data. It covers 15 elevators for a month. It's about 75GB. You will be requested to sign on a NDA(Non-Disclosure Agreement) to get access to the data.

Contact Person:

yuyi.zhou@technicalafetybc.ca

Contributor of the Project Idea:

Yuyi Zhou

Data Scientist

Technical Safety BC

Who We Are and What We Do

Technical Safety BC is an independent, self-funded organization that oversees the safe installation and operation of technical systems and equipment across the province. In addition to issuing permits, licences and certificates, we work with industry to reduce safety risks through assessment, education and outreach, enforcement, and research.

Our Vision

Safe technical systems. Everywhere.