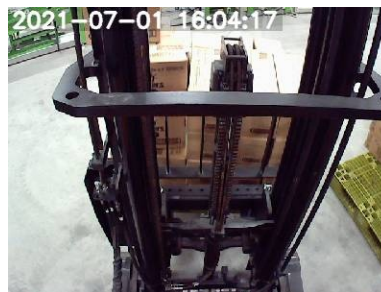# Take home exam

Data

https://drive.google.com/file/d/1ZJkvbjjiW7VZPApHCaih4ORcQCJCfBhK/view?usp=sharing

Background

Motion2AI builds and uses machine learning applications to understand whether the industrial vehicles, such as forklifts or carts, are busy (=products are loaded) or idle (=not loaded), see the example screenshots below.

Loaded

Unloaded

Unfortunately, machine learning (ML) applications are not 100% accurate, the ML-measured values ("loaded" field on the data file) are flickering due to the wrong ML prediction, i.e. "loaded" data are noisy.

Our goal is to make a simple time-wise filtering logic, in python, to remove the noise from the data.

Data Description

The downloaded .csv file is the recorded "loaded" data and the filtered "normalized_loaded" data of 4 forklifts.

1. *vehicle_name* : it shows the vehicle ID from 1 to 4.

2. *datetime* : it is when a data is recorded, saved as 'YYYY-MM-DD hh:mm:ss'.

3. *loaded* : The ML algorithm detects whether the forklift is loaded or not.

4. *normalized_loaded* : it is a post-processed data from *loaded*.

Problem

The ML algorithm for *loaded* data could be noisy and flickering over time. We want to process *loaded* to remove the data. The "outcome" of the python code is expected to be same to the values of the *normalized_loaded (=ground truth)*.

1. *loaded* status is either 1 or 0.

2. If the *loaded* value does not change in 5 seconds or longer, then the *normalized_loaded* values are same with the *loaded* values.

3. If the *loaded* value changes in 4 seconds or less, then it doesn't count, and *normalized_loaded* values are the previous *normalized_loaded* value.

Write a python function to generate *normalized_loaded.*

Constraint

1. Python is a recommended language, and you could choose another one if you want.