Data Challenge – Volvo Group Live

For the chance to participate in the VIP Lounge on May 21st at 09:00

Background

Freight-X is a fictitious customer of Volvo Trucks. They want to "go green" and are wondering if they can use electric vehicles to run their existing operations. This raises a lot of questions – can they fulfill their existing missions? Where should they invest in charging infrastructure? How much will it cost in total? What does legislation say about driving at night? Using data analysis, Volvo Group's data scientists have already confirmed that, yes, Freight-X can electrify 10 vehicles in the Gothenburg region. Now they wonder – can they electrify their overall fleet in Sweden that comprises more than 100 trucks?

To answer this question, we could benefit from an AI solution, one that could also help other fleets with the same question!

The model

One of the most important questions to answer when attempting to electrify a truck fleet of that scale is **"How many chargers do we need to invest in, and where should they be placed?"** You will take part in the very initial phase of creating a model to address this – calculating fuel consumption.

One modeling approach to tackle the problem is to build a reinforcement learning model that places *n* charging stations at depots in an optimal way to maximize successful transport missions while keeping costs low. Among other things, such a model must take into account public charging locations with associated charging costs, and balance those with the cost of investment in chargers at depots.

A first step to building such a reinforcement learning model is to be able to figure out if a transport mission using electric energy instead of diesel is successful. For that we need the fuel consumption, **and here is where we would like your support**.

The data

You have been provided with a small extract of the fictitious Freight-X dataset. The data contains reports from a number of trucks spanning many days, with multiple entries per day. *Note that this is synthetic data, so there are significant differences between this data and real truck data.*

The columns, separated by a comma, are

- vehicle_id – unique vehicle identifier
- timestamp – date and time for the datapoint
- latitude – latitude position in WGS84
- longitude – longitude position in WGS84
- heading – angle in degrees of the truck's heading
- odometer_km – accumulated distance, in km, travelled by the truck during its lifetime
- acc_fuel_use_litres – accumulated fuel, in litres, used by the truck during its lifetime

Task

Your task is to look at the data and calculate the **average fuel used per day (in litres) for each truck.** The answer you submit should be the **sum of each truck's average fuel used per day, with one decimal place.**

A small example with 2 trucks: *Truck 1 is active 2 days and truck 2 is active 3 days. Truck 1 consumed 23.1 litres day 1 and 12.6 litres day 2; the average would be 17.9. Truck 2 consumed 47.3 L on day 1, 51.2 L on day 2 and 39.1 L on day 3 giving an average of 45.9 L.* ***Your answer should in this case be 17.9 + 45.9 = 63.8 litres***