Predictive Maintenance solution enablement at the Edge

For a German truck manufacturing company

ignitarium®
Spark On.

INTRODUCTION

A German truck manufacturing company approached Ignitarium for a solution to reduce unplanned vehicle downtimes for fleet owners.

Predictive Analytics with AI

Industry

Automotive

Scope

- Define a framework with templates and processes to prepare an ML model developed in a user environment to be deployed on an automotive platform
- Develop a playbook to identify appropriate controllers to host the model
- Port and package the ML/DL model to run on selected controller
- Develop pipeline components involving data transformation (signal inputs to raw features, conversion to numeric data) and feature synthesis (process raw data, develop secondary features) as input to the predictive maintenance model, output to data destinations (local disk or telematics controllers to cloud)
- Develop required interfaces – (native and cloud), deploy the model in production

THE CHALLENGE

The customer has developed statistical / deep learning models to address various predictive maintenance use cases.

These models are trained using data collected from trucks and stored offline by the data science team. However, this model must be deployed in vehicle / on cloud and connected as part of a pipeline to be of value to their end customers (fleet owners).

The customer wants to address the following in the new solution:

- Portability – A hardware/software agnostic ML model format

- Packaging – Choice of right libraries, container and runtime stack to deploy ML models

- Deployment – Deterministic / repeatable approach to identification of right controllers, OS, libraries and interfaces

IGNITARIUM'S SOLUTION

Our end-to-end expertise in various embedded automotive platforms coupled with our strength in the digital domain played a key role in solution development.

- The application's hardware needs, dependencies on firmware, software libraries, duration of model loading and inferencing, triggers for model execution, interpretation of results from execution, storage and transmission of results are characterised. **Profiling** is done using software tools to measure CPU cycles, memory footprint and the outcome is an accurate assessment of platform and pipeline component requirements.
- **Packaging environment requirements** were defined considering the technology stacks involved in development and deployment. The automotive platform in use defines the need for kernel libraries, container runtimes (runc / crun), machine / deep learning / data processing libraries (tensorflow / scikit / jax / numpy) to build containers (docker / podman) as pipeline components and the API specifications for interfaces to other middleware components.
- **Deployment environment preparation** factored firmware needs including virtualisation and container stacks on the automotive platforms. Interfaces collect input from data packages and send output to the data sinks (local storage or telematics controller).

BUSINESS IMPACT

Reduce Time to Market by developing a Playbook to move AI models from development to production.

Unlock new revenue streams by enhancing value to the customer - Reduction in unplanned fleet downtime.

Looking to transform your product?

Drop us a line to get in touch with our experts.

Contact Ignitarium at info@ignitarium.com