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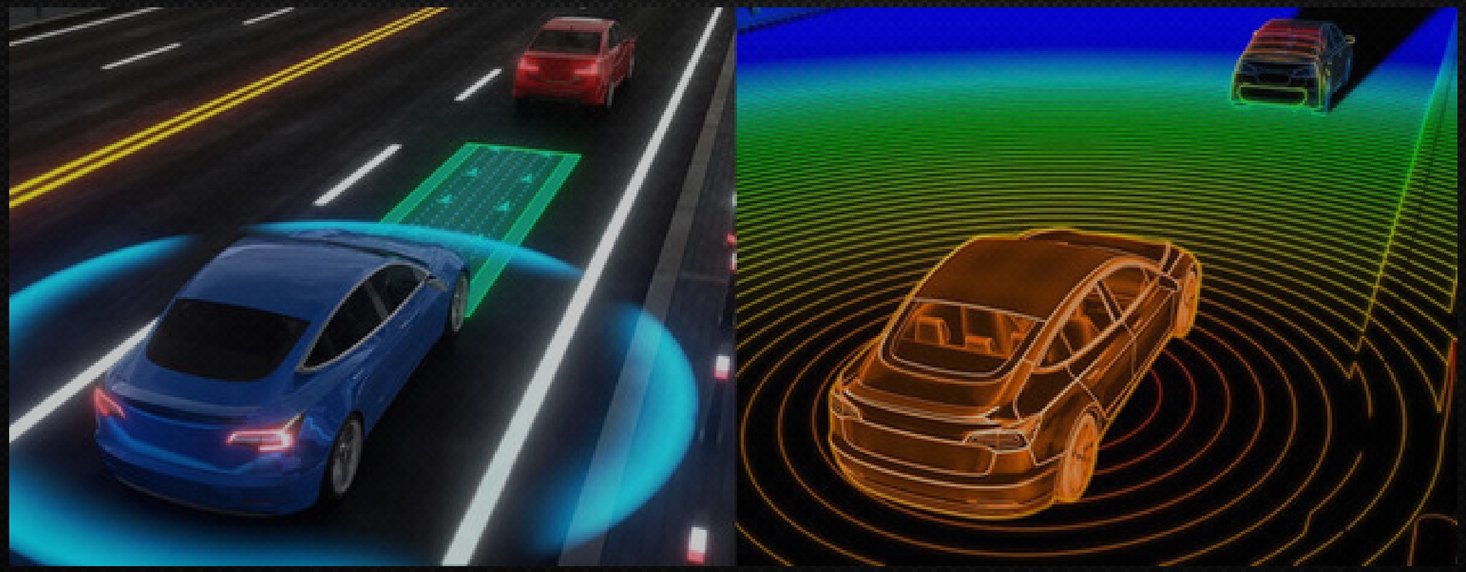
ONE API HACKATHON

Team Name: ggbois

Problem Statement: Object Detection For Autonomous Vehicles

Brief about the Idea

Autonomous Vehicles implement SLAM(Simulataneous Localization and Mapping) in order to implement autopilot/self driving features, however such SLAM implementations can be slow due to lack of parallelization and slow libraries.



Opportunity :

How will it be able to solve the problem?

By leveraging the oneAPI's DPC++ platform and acceleration API's , we aim to create a SLAM implementation that is not only fast but accurate and production ready.

Opportunity :

How different is it from any other existing ideas out there?

Existing SLAM implementations are single threaded and unoptimized, detecting, categorizing and also plotting the points in the same thread causing the execution to be blocked while either of the tasks happen. Our implementation seperates these tasks to run seperately in the CPU and GPU, allowing for an asynchronous process flow.

List of oneAPI Ai Analytics Toolkits, its libraries and the SYCL/DPC++ Libraries used :

Intel oneAPI Base toolkit
- oneAPI Deep Neural Networks Library: Developing the algorithm for detecting nearby datapoints
- oneAPI DPC++/C++ Compiler: Compiling DPC++ code
- oneAPI DPC++ Library: Writing a parallelized program to seperate tasks for the CPU and the GPU
- oneAPI Threading Building Blocks: Building a threaded system for localization and mapping of detected points

Intel oneAPI AI Analytics Toolkit
- Intel Optimization for Tensorflow: Building a model for object detection

List of features offered by the solution

- **Asynchronous SLAM implementation**
- **Low CPU/GPU resource usage**
- **Accurate detection due to accompanying object detection**
- **Ability to use hardware acceleration instead of being cpu-bound**

Technologies Used:

LANGUAGES

-SYCL

-C++

-Python

FRAMEWORKS

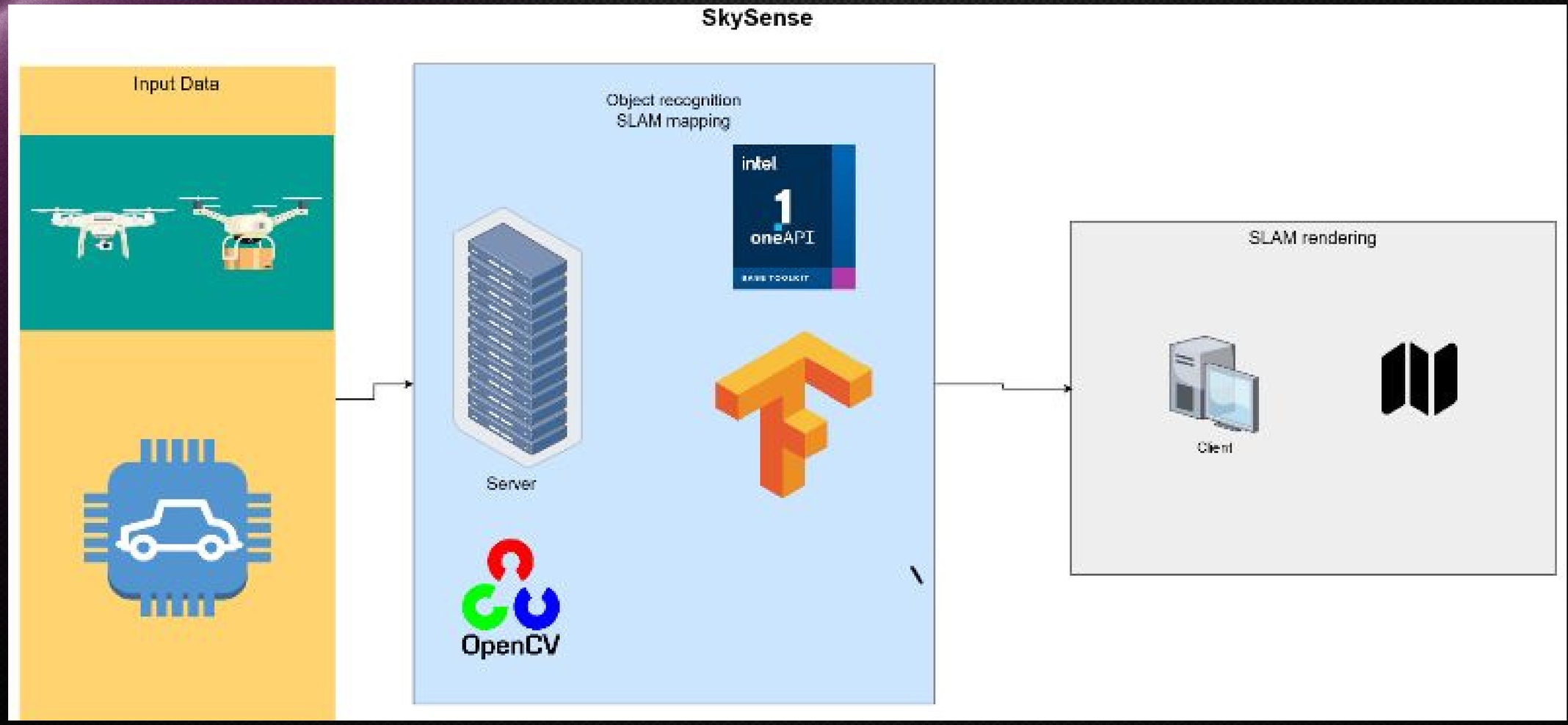
-OpenCV

-TensorFlow

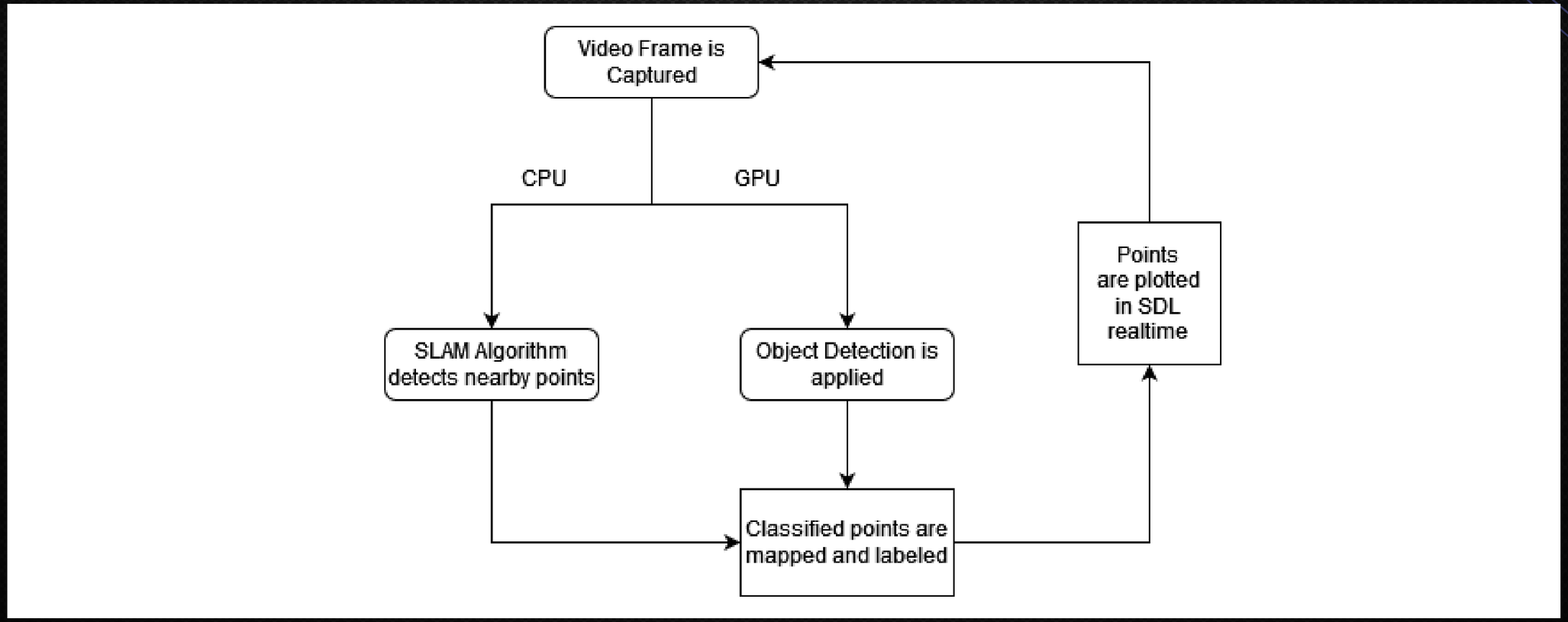
COST :

Components :	PRICE:
--Raspberry Pi 4 Model B 8GB RAM	₹8,599.00
--DDPAI Mini Car Dash Camera	**₹3,499.00**
TOTAL:	**₹12,098.00**

Architectural Diagram :



Process Flow Diagram :



Thank You

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(a first year team)

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