

Implementing a Neural Network on a Low-Power and Mobile Cluster to Aide Drivers with Predictive AI for Traffic Behavior

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Abstract : New technologies like Tesla's Dojo have made high-performance embedded computing more available. Although automobile computing has developed and benefited enormously from these more recent technologies, the costs are still high, prohibitively high in some cases for broader adaptation, particularly for the after-market and enthusiast markets. This project aims to implement a Raspberry Pi-based low-power (under one hundred Watts) highly mobile computing cluster for a neural network. The computing cluster built from off-the-shelf components is more affordable and, therefore, makes wider adoption possible. The paper describes the design of the neural network, Raspberry Pi-based cluster, and applications the cluster will run. The neural network will use input data from sensors and cameras to project a live view of the road state as the user drives. The neural network will be trained to predict traffic behavior and generate warnings when potentially dangerous situations are predicted. The significant outcomes of this study will be two folds, firstly, to implement and test the low-cost cluster, and secondly, to ascertain the effectiveness of the predictive AI implemented on the cluster.

Keywords : CS pedagogy, student research, cluster computing, machine learning

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