Abstract
Optimization algorithms, in Autonomous Driving (AD), have been proven to be effective in decision-making on most plausible safety-critical scenarios. However, state-of-art AI systems fail to minimise the loss below the critical safety protocol. Genetic Algorithms (GAs) are state-of-art optimization algorithms to efficiently solve a search problem. In this paper, we discuss and review previous works on applying GAs to AD's optimization problems such as path estimation, collision avoidance, synthesizing test data etc individually. Additionally, we attempt to propose an end-to-end GAs to optimize the whole pipeline of AD research and production at scale. The end-to-end GA optimization of AD, through efficient ensemble technique, would be capable of delivering better results both in simulation and in the field since an end-to-end approach can take advantage of availability of complete data throughout the pipeline. This approach could streamline the individual tasks into an automated process reducing the number of activations between the processes. Earlier, efforts have been made majorly on confined tasks such as path estimation, collision avoidance and etc which are related to a single ultimate problem of learning to drive. Hence, an end-to-end approach enables models to learn the supreme task of safe navigation which includes path estimation, collision avoidance, and efficient applications of sudden break. A novel technique named "real-time reward-based" training of AD cars is proposed to resolve the issue of AD systems trained in lab, failing to generalize upon deployment.