Neural Network based ACC for Optimized safety and comfort

Abstract

In recent years many studies on intelligent vehicles have been devoted to solve problem such as accident prevention, traffic flow smoothing. Adaptive Cruise Control (ACC) is used to maintain a constant safe distance between the host vehicle and the leading vehicle to avoid rear end collisions. It is an automotive feature that allows the speed of the vehicle to adapt to the traffic environment. ACC operates in distance control mode and velocity control mode. The method by which the ACC vehicle's speed is controlled is via engine throttle control and limited brake operation. The inter vehicular distance between the vehicle is measured. Desired speed is obtained from the distance measured. Neural Network Controller is trained to produce the desired acceleration and braking. In this paper, ACC is implemented using three types of Neural Network such as Back Propagation Network (BPN), Radial Basis Network (RBN) and Generalized Regression Neural Network (GRNN). Among the three it is observed that during safety conditions BPN tracks the speed better and during comfort conditions RBN acts best.

References

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Index Terms

Computer Science

Artificial Intelligence
Keywords

Adaptive Cruise Control  Back Propagation Network  Radial Basis Network  Generalized Regression Neural Network