Coordinated Adaptive Cruise Control System With Lane-Change Assistance

Abstract

To address the problem caused by a conventional adaptive cruise control (ACC) system, which hinders drivers from changing lanes, in this study we propose a novel coordinated ACC system with a lane-change assistance function, which enables dual-target tracking, safe lane change, and longitudinal ride comfort. We first analyze lane-change risk by calculating minimum safety spacing between the host vehicle and surrounding vehicles and then develop a coordinated control algorithm using model predictive control theory. Tracking performance is designed on the basis of tracking errors of the host car and two leading vehicles, safety performance is realized by considering the safe distance between the host car and surrounding vehicles, and ride comfort performance is realized by limiting the vehicle’s longitudinal acceleration. Driver-in-the-loop tests performed on a driving simulator confirm that the proposed ACC system can overcome the disadvantages of conventional ACC and achieves multi objective coordination in the lane-change process.
EXISTING SYSTEM
Conventional adaptive cruise control (ACC) system, which delay drivers from changing lanes in existing system.

DRAWBACK OF EXISTING SYSTEM
- Automatic lane changes may not be the ideal solution
- Achieves multi objective coordination in the lane-change process.

PROPOSED SYSTEM
Novel coordinated ACC system with a lane-change assistance function, which enables dual-target tracking, safe lane change, and longitudinal ride comfort.

Calculating minimum safety spacing between the host vehicle and surrounding vehicles and then develop a coordinated control algorithm using model predictive control theory Tracking performance is tracking the error, safety performance is used for safe distance ACC system can overcome the disadvantages of conventional ACC and achieves multi objective coordination in the lane-change process

ADVANTAGE OF PROPOSED SYSTEM
- Vehicle safety, smoothen traffic flow, and reduce a driver’s workload.
➢ Increase the driver’s intervention frequency, and reduce its applicability.
➢ ACC to avoid unexpected deceleration.

SYSTEM SPECIFICATION

Hardware Requirements

- System: Pentium IV 2.4 GHz
- Hard Disk: 40 GB
- Floppy Drive: 1.44 Mb
- Monitor: 15 VGA Colour
- Mouse: Logitech
- Ram: 512 Mb

Software Requirements

- Operating system: Windows Family
- Tools: eclipse
- Technology Used: Java
- Backend Used: SQLITE