***Implementation of Wireless Data Transmission in Monitoring and Control for
Autonomous Path Following Vehicle***

Martin Fevre

Major advances have been made relevant to automation and robotics since the beginning of the twenty-first century, however, there have been limited improvements in the field of robotics applied to athletic training and the opportunities remain vast. The autonomous line following pace car project, which involves mechanical engineering, electrical engineering, and computer science, was a robot designed to help a runner during athletic training. The robot aims to give a visual representation of the pace set by the runner and act as a training partner for its user.

This multidisciplinary project was a chance for the student, Martin, to explore, design, and implement sensing and control algorithms for groundbreaking improvements on this ongoing robotics project.

Some of the tasks that Martin is expected to achieve during the 8-week research experience include 1) the implementation of an optimal, onboard, built-in controller for trajectory control, 2) the derivation of a cruise control system from the original open-loop system for trajectory control, and 3) the implementation of wireless data transmission, which will hopefully allow a runner to send inputs to the car using any smartphone.

These improvements will be made possible by a continuous interaction between Martin and his advisor, Dr. Estrada, who is a professor of Electrical Engineering with expertise in control systems. The advisor will also give the student access to a variety of online resources relevant to the field of automated systems, control systems, optimization, and wireless data transmission. Martin, who aspires to continue research at the graduate level in the field of control systems, is expected to take a more independent role on the project as the summer progresses. This research strategy was established at the beginning of the summer and will ensure a progressive move from undergraduate to graduate level for the student.

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