

Autonomous Driving for the Texas Instruments Cup

Mohammed Fareed
Kate Gleason College of Engineering
Department of Computer Engineering
Rochester, NY
mff9108@rit.edu

Trent Wesley
Kate Gleason College of Engineering
Department of Computer Engineering
Rochester, NY
taw8452@rit.edu

Abstract—Autonomous driving is progressing and becoming more prevalent in society as time goes by. A robust autonomous driving system offers the potential for a future where driving safety and efficiency are dramatically increased. The RIT Texas Instruments Car Cup required the application of various autonomous driving techniques and algorithms to race. The objective of this project was to program a miniature battery powered car to autonomously race around a track. The car was controlled by an MSP432 microcontroller board used the input from a linescan camera to control its servo and motors for steering and speed control. This paper documents the theory, code development, and the challenges to race in the fall 2023 RIT Texas Instrument Cup.

I. INTRODUCTION

Introduction stuff.



Fig. 1. Racetrack for TI Cup.

TABLE I BILL OF MATERIALS		
Part	Qty	Cost (USD)
Parallax TSL-1401 Line Scan Camera	1	\$80.00
Servo Steering Arms	1	\$17.99
Motor Driver - RB-WAV-77	1	\$28.9
Car Chassis Kit - ROB0170	1	\$98.75
Brushed DC Motor Kit - KIT0167	1	\$25.00
UCTRONICS Module 12864 SSD1306 OLED	1	\$6.99
Bluetooth Module HM-10	1	\$10.99
Tenergy 7.2V High Capacity 6-Cell Battery Pack	1	\$39.99
Sourcingpower Universal RC Battery Charger	1	\$19.99
Fielect 5Pcs F-F 6Pin Jumper Wire Ribbon Cable	1	\$6.69
5pcs Tamiya Male Power Connector Cable	1	\$8.68
Zip Ties	1	\$18.99
Total		\$363.05



Fig. 2. Car.

II. BACKGROUND

- A. Materials
- B. PID theory

III. PROPOSED METHOD

IV. RESULTS

- A. Race Results

ACKNOWLEDGMENTS

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