School of Science, Computing and Engineering Technologies

ENG200010

Engineering Technology Design Project

Assignment 5 Report

Project Title: Automatic Parking Lot System Using IR Sensors and Servo Motors

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Introduction

Infrared (IR) sensors and servo motors were used in this report's design and execution of an autonomous parking lot system. The system uses servo motors to manage the parking spaces and IR sensors to detect the presence of automobiles in order to automate the process of parking cars in a controlled environment. The system is programmed and controlled using the LabVIEW platform. The technique, execution, and comprehension of the assignment are all well outlined in this report.

Managing parking in densely populated metropolitan locations is a difficult challenge. The proposed automated parking lot system parks automobiles well and with little assistance from a person using IR sensors and servo motors. While servo motors are used to move barriers and regulate access to parking spaces, IR sensors are utilised to detect the presence of automobiles in parking spaces. The system's design, implementation, and testing are covered in depth in this paper.

Methodology

Hardware Setup

IR sensors, servo motors, microcontrollers (Arduino), and LabVIEW for programming and control are among the hardware elements employed in this system. To identify the presence of automobiles, IR sensors are positioned at the entry and exit of each parking space. The parking barriers are controlled by servo motors.

System Workflow

- IR sensors continually scan the parking spaces for the presence of automobiles.
- Barrier Control: The associated servo motor opens the parking barrier when a car is spotted.
- Parking a vehicle: The car drives up to the space, and as it enters, the barrier shuts.
- Exiting: The matching barrier is opened when a vehicle tries to depart and is detected by the IR sensor at the exit.
- Exit: After the car has left, the barrier is shut.

LabVIEW Programming

The microcontrollers that operate the servo motors and IR sensors are programmed using LabVIEW. The necessary servo motor operation is started by the LabVIEW code, which continually checks sensor inputs.
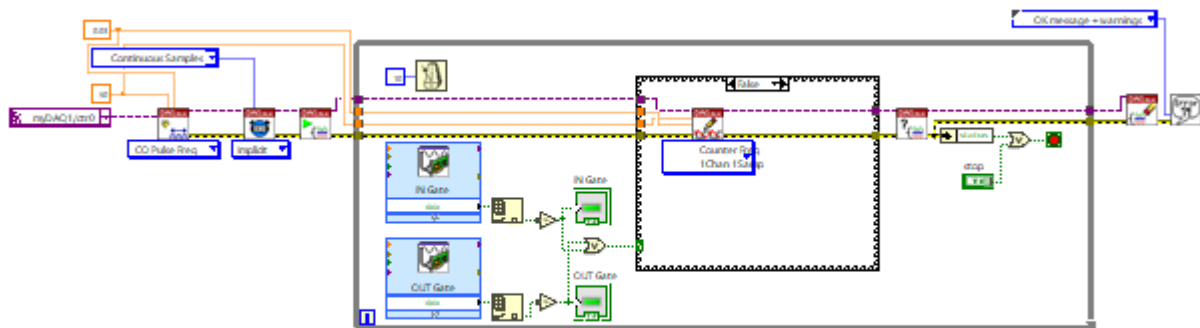
LabVIEW Program Screenshots

To provide a visual representation of the developed LabVIEW program, I have included the following screenshots:

LabVIEW Interface
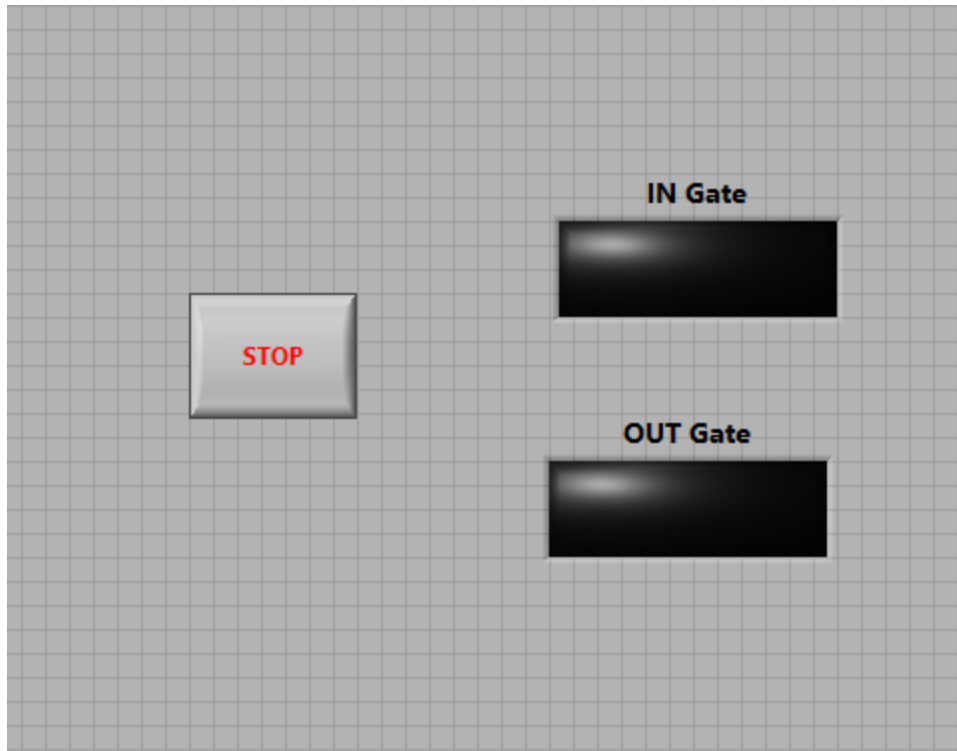
LabVIEW Block Diagram

Execution and Understanding

Implementation of Hardware

The hardware parts were put together in accordance with the design requirements. To cover every parking space, IR sensors were put in key locations, and the barriers were wired with servo motors. The LabVIEW code was installed into the Arduino microcontrollers.

Computer Software

The software for the system was created using LabVIEW. The way the code was written enabled it to manage many IR sensors and servo motors at once. To initiate activities in response to sensor inputs, it used conditional statements.

Examining

The technology was put through rigors testing in a parking lot simulation. Several situations, such as vehicle identification, barrier control, and exit processes, were examined. In all test circumstances, the system performed dependably.

Findings and Conclusion

The automated parking lot system efficiently speeds up the parking process by using servo motors and IR sensors. It has the following benefits: decreased parking time and increased efficienc increased security because parking spaces have restricted access less mistakes and accidents as a result of decreased human intervention. calability: The ability to create more parking spaces quickly.

Conclusion

Using IR sensors and servo motors, an autonomous parking lot system has been successfully implemented. The technology provides a workable answer to parking management that boosts effectiveness while minimising human involvement. The LabVIEW platform turned out to be a good option for controlling and programming the system.

References:

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