EE102 Project Proposal

Voyager: Ball Tracking Robot

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10.03.2024

Abstract:

The aim of the project is to implement the basic knowledges we learned throughout the EE102 course such as the concepts of digital circuit design, VHDL language, Basys3 board. This project is mainly designed to build a game player robot which tracks some objects such as ball and follows them accordingly the command codes I provide it through Basys3.

Design Specifications:

Part List: Basys3, Ultrasonic Distance Sensor HC-SR04, Servo Motor SG90, and some optional additional materials for robot design such as cables, battery, a platform etc.

Main component of the project is ultrasonic distance sensor HC-SR04. This sensor will provide the features for the robot to detect objects. Ultrasonic sensors typically work by calculating the propogation time of sound between target and sensor. Servos will be used to function the robot. Additionally, I may also use a digital IR light sensor, TCRT 5000. This sensor may work on providing the robot to move accordingly a drawn frame with black strip line, such as not leaving this game area. By using these components and some additional materials listed above, the robot will be built.

Methodology

Initially, on the design of this project, which components are needed to acquire optimum features for game player robot will be investigated. The circuit design will be implemented into modular form on VHDL. This design should control components of the robot which are planned.

Phases of the Project

Phase 1: Until the deadline of phase 1, I am planning to work on main function of the system, namely the object detection. On phase 1, I will be working on communication of ultrasonic sensor and servo motor with basys3. I will display sensor data on seven segment display for demonstration.

Phase 2: After writing appropriate VHDL codes for working of robot, I will work on implementation of the system. If any problem occured on initial phase, I will complete them on this phase.