Speed Control of Robot Using PID Controller

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Abstract

It is an anti-accident car which automatically turns from its original path when any hurdle comes in front. The sharp UV sensor mounted at the front side of the robotic car for this purpose. The sharp UV sensor is used to detect the obstacles. While moving forward if sensor does not detect any hurdle the Robotic car is going to its normal speed. If sensor any of the three detects any hurdle, then the Robotic car slows down and takes the decision to make a smooth turn left or right with the help of other two sensors. The back motor (dc-motor) speed is controlled by sensor's output while front motor is bidirectional motor and controlled by H-bridge. Sensor output is controlled by PIC16F877A microcontroller. The PIC Controller will be used to perform PID Algorithm control the speed of motor, while PIC16F676 will be used for the movement of the front wheel supported by servo motor. PID Controller has superior performance as compared to conventional controllers. The advantage of using PID closed loop control system is the gain can be controlled in closed loop system. PID algorithms monitor and adjust the gain of robot based on the characteristics, of the feedback to improve robot performance .Whole PIC programming is done in C language.

Dedication

We dedicate this project to our loving parents& our project advisor **Mr. Muhammad Basit Shahab**, who enlightened our minds with knowledge and motivated us to include the spirit of hard work and dedication, so that we could have a bright future in terms of being good human beings and turn out to be competent Engineers with powers to take challenges.

Acknowledgements

First of all we are very thankful to almighty Allah, who has given us enough courage to complete this project in the given time.

This project is a culmination of a long period of work and without the support of many individuals; it would never have been completed. First and foremost, we thank our families, for their care and endless support, both moral and financial, to complete this project.

We have set a light and ever burning flame of gratitude and deep sense of obligation to our honorable advisor **Mr. Muhammad Basit Shahab** for his generous assistance and inspiring attitude during the course of our project. Not only he helped us in our project, but also did his best efforts in familiarizing us with basic concepts of components used which proved to be very helpful while doing our project. We feel great pleasure in thanking our very respectful co-advisor **Mr. Muhammad Ali Murtaza** for their extreme co-operation and encouraging attitude during this project.

We thank Mr. Muhammad Rizwan and Mr. Rauf Ali, who supported us both morally as well as by giving us advices that helped us to complete our project.

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Introduction

1.1: Introduction to Robot

A robot is a mechanical device that can perform tasks automatically. It may but need not be humanoid in appearance. Some robots require some degree of guidance, which may be done using a remote control, or with a computer interface. A robot is usually an electro-mechanical machine that is guided by a program or circuitry.

Robots can be autonomous, semi-autonomous or remotely controlled and range from humanoids such as A SIMO, and industrial robots .The branch of technology that deals with robots is called robotics.

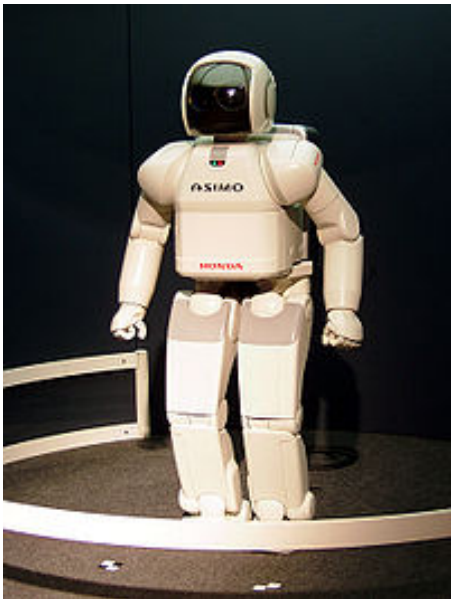

Fig1.1 A Pick and Place robot in an industry Fig 1.2 A SIMO humanoid robot

1.2: History of Robots

The notion of robots or robot-like automates can be traced back to medieval times. Although people of that era didn't have a term to describe what we would eventually call a robot they were nevertheless imagining mechanisms that could perform human-like tasks. In medieval times, automatons, human-like figures run by hidden mechanisms, were used to impress peasant worshippers in church into believing in a higher power. The automatons, like the clock jack pictured here, created the illusion of self-motion.

The clock jack was a mechanical figure that could strike time on a bell with its axe. This technology was virtually unheard of in the 13th century.

Fig 1.3 Clock jack

In the 18th century, miniature automatons became popular as toys for the very rich. They were made to look and move like humans or small animals. In literature, humankind's vivid imagination has often reflected our fascination with the idea of creating artificial life.

1.3: Autonomous robots

1.3.1 What is Autonomy?

- A self-operating machine or mechanism, especially a robot.
- A fully autonomous robot has the ability to Gain information about the environment.
- Work for an extended period without human intervention.
- Avoid situations that are harmful to people, property, or itself.
- An autonomous robot may also learn or gain new capabilities like adjusting strategies for accomplishing its task(s) or adapting to changing surroundings.

1.3.2 Brief History of Autonomous Robots

- Mechanical automata have been popular in many cultures throughout the ages
- Hero of Alexandria designed a number of water- and air-powered automata
- Leonardo da Vinci designed and built a number of lifelike automata, including a walking lion with Fleur deLis in his chest for a state visit by King Louis XII and an automated knight that could sit up, raise his arm, and move his head and jaw.

Fig 1.4 Leonardo's Knight (reproduction)

1.3.3: Current State of the Art for Autonomous Robots

- NASA's Deep Space 1 was the first space probe to demonstrate fully autonomous navigation
- The European Robot Arm, scheduled for delivery to the ISS in 2009, is capable of repositioning itself and of carrying out a number of tasks autonomously
- The Mars Science Laboratory, planned for launch in 2009, will be much larger than the current rovers and will traverse much more terrain – which will require a higher degree of autonomy

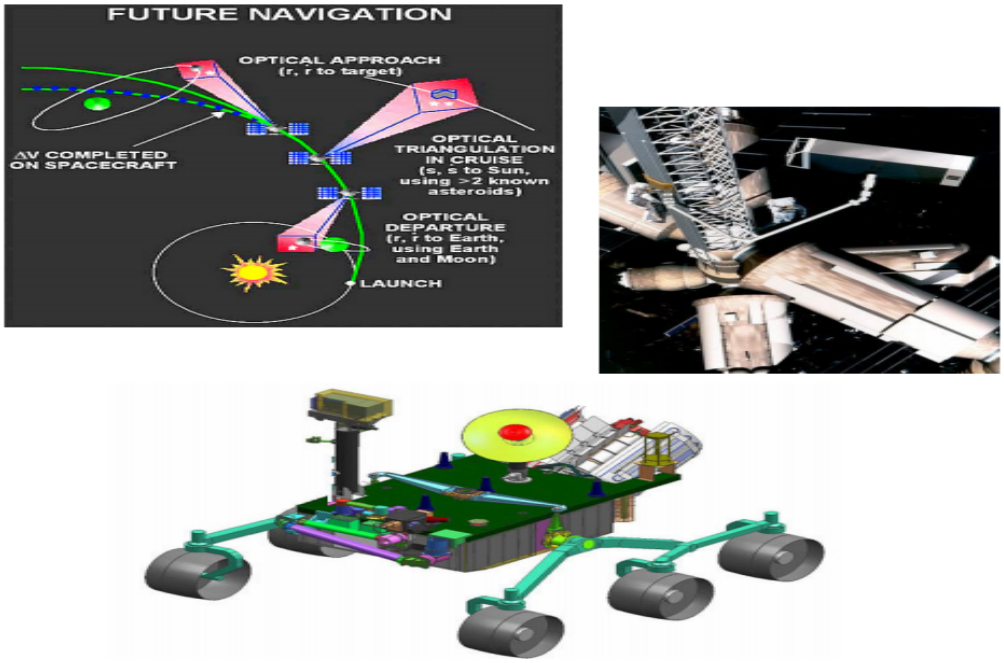

Fig 1.5 Autonomous Robots

1.4 Basic Idea

Nothing is more important than Human lives. Accidents are increasing day by day on the road in our daily life. Many accidents cause human damage or till death. So the basic idea is from this point that we should minimize accidents electronically.

Fig 1.6 Basic Ideas

1.5: About Project

The most important and worthy thing in this world is human lives. Thousands of humans are affected by accident. Many are lost lives in accidents. .After completing this project, accidents will definitely minimize.

Fig 1.7Our Robotic Car