UNIVERSITÀ DI BOLOGNA

School of Engineering

Master Degree in Automation Engineering

Industrial Robotics

Laboratory Report

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Chapter 1

Arnold

Introduction

Arnold is the mobile robot that we have designed and build to perform the Industrial Robotics Laboratory Race. The mechanical structure is based on LEGO parts and uses electric motors and some sensors to move and receive informations whitin the environment. The control is performed by a NXT board. The race basically consists in two parts:

- ***Line Following:*** *the goal is to follow a path starting from a square box*;
- ***Obstacle Avoidance:*** *the goal is to move toward an arena containg obstacles*;

1.1 Structure and Hardware

1.1.1 Mechanical assembling

1.1.2 Sensors

Arnold uses the following sensors:

- ***Gyroscope:*** ;
- ***Light Sensor:*** ;
- ***Sonar:*** ;

1.2 Algorithms

1.2.1 Threads

1.2.2 Line Following

The Line Following part is basically performed by using a PID control.

1.2.3 Obstacle Avoidance

The basic idea of the obstacle avoidance algorithm that we have implemented is the potential gradient method.

1.3 Performances

Chapter 2

Matlab Simulations

2.1 Section title

2.1.1 Subsection title

Bibliography