

CENG 6533 Robotics

Homework Project Report Spring 2015 Due April 15

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The project will consist of a design with documentation for a complete robotic system serving some useful purpose. The presentation will consist of a brief lecture and report on the project at the end of the semester. Since the class has so many students you may only have time to introduce your project.

1st Brief Report - I expect only one or two pages here. Keep it SHORT and to the point!

Write a short report on your project to hand in and discuss with the class next week. This should follow the general form of the final report described below. Use your own words!

The report should give an outline of your project and what you intend include for the final report. Describe the Robotic application in detail and give the specifications of the robot in terms of its physical configuration.

The report should include the engineering and computer properties of the robotic system you are studying. Include a description of the software for the robot including the basic architecture of the software in block diagram form.

Please refer to the descriptions of the Specification of Robots and robotic elements for the form of the technical content. Give as much detail as you can. Obviously, you may not know all of the technical details but do your best.

NOTE: List all references - the web URL, books, etc. Give a brief summary of the references.

**SUMMARY OF DOCUMENTATION for Project
PROJECT REPORTS - OUTLINE AND REQUIREMENTS**

To hand in during the semester:

Brief Write-up and Discussion of the project –

Preliminary report on project – Description of the Requirements and operation of the system.

(Due April 9, 2014)

Final Presentation, demonstration, etc. and Final Report (Due Night of Final)

(Reports to be typed and spellchecked)

Outline of Report: Please Limit Report to 10 pages.

Cover page – Title, Course, date, and your name

Table of Contents

Abstract (10 Points) – Brief summary of project and main results in your OWN words!

Introduction (10 Points) – Brief summary of the chapters or sections of the report

(50 Points)

Chapter 1 -Literature Search- Summary of previous work in the area including references (If applicable).

Chapter 2 – Define the Requirements including the USER Interface

Chapter 3 – Functional Design – Block Diagrams and description of Modules

Chapter 4 to N-1 Include details to describe how the system meets the requirements. This is the Detailed Design!

Chapter N – Conclusions and results (Final Report) In your OWN words!

Appendix – Code or Circuit Diagrams and similar details of the software or hardware.

Glossary (10 Points) – Definition of special terms and all acronyms.

References (10 Points) –List of all sources for the report and briefly describe their content – These may be tied to reference numbers in the report. If you copy material from the WEB, etc. Give the Reference! Give a brief description of the reference.

Index – Listing and page number of major items in the report.

To be included in final project report (if applicable):

Cost Analysis

Trade offs analysis – Alternative ways of accomplishing the result – and the reasons for choosing your method

Safety and Certifications - Description and references for safety requirements and any standards that may apply – i.e. UL listing may be necessary

Grading: 90% Final Report format and readability following this Outline

10% Originality and interest of topic to the class and the instructor

SUMMARY OF DOCUMENTATION for Robotics Project

General Requirements

Describe the general specifications of the operation of the robot. These specifications should define the characteristics of the robot as experienced by the end user. First, describe what the robot is intended to do in some detail. Is it used for factory automation, medical applications, mobile operation, etc? Details might include such topics as number of degrees of freedom, lifting capacity, speed, and type of end effectors. How is it programmed and controlled by the user? Numerical values should be assigned to a requirement whenever possible.

Detailed Requirements

1. Description of purpose and general operation including a physical description. Describe the sensors required – vision, collision avoidance sensors, sensors for position, velocity, etc.

2. In normal operation for input and output

What can the user specify? For example, the path, speed, etc. of the robot.

For outputs, what will the user see (or hear)? How does the user control the robot-teaching by moving the robot, programming, touch screen, visual model, etc.

3. Details of the User interface with the robot. Is the operation automatic or does it require user inputs as the robots completes its task?

4. Other conditions

Safety and Alarm conditions (if necessary)

5. Special Requirements

Power and environmental considerations

Functional Specifications

1. Block diagram and description of software (SW) and hardware (HW) modules used to meet the Detailed Requirements

2. Description of the interfaces between modules – type of data exchanged, data rates, error conditions, etc.

Detailed Design (Hardware and Software)

1. Flow charts, circuit diagrams, etc that describe the various parts of the robot if you are actually building a robot.