Chapter one:

Introduction and Preface

1.1 Introduction.

1.2 Preface.

1.3 Project Objectives.

1.4 Robot Background.

1.1 Introduction

In this chapter we try to let you understand the main ideas of the whole chapters of the work, and to let you recognize the robot background and their history.

In first chapter we are talking about the objective of our robot and the planning schedule then we start a preface of robots and their some backgrounds, the needs which lead the engineers to invent the robots, history of robots…etc.

In “chapter two” we show the theoretical components and the subsystems of robots which they are commonly used in building them, such that the types of actuators used, the motors, the sensors, the power sources, the encoders, controlling the robots, the method of programming…etc

In chapter three we start our project design we talking about the frame and the body of the robot, the gears used, the sensors, the pulleys, the motors that fitting our robot and their controlling method, starting, braking, speed control, the wheels, we talking about the balance, because it is a great issue should be taken into consideration in the design.

1.2 Preface

Robotics has achieved its greatest success to date in the world of industrial manufacturing. Robot arms, or *manipulators*, comprise a 2 billion dollar industry. Bolted at its shoulder to a specific position in the assembly line, the robot arm can move with great speed and accuracy to perform repetitive tasks such as spot welding and painting (figure 1.1). In the electronics industry, manipulators place surface-mounted components with superhuman precision, making the portable telephone and laptop computer possible.

Yet, for all of their successes, these commercial robots suffer from a fundamental disadvantage: lack of mobility. A fixed manipulator has a limited range of motion that depends on where it is bolted down. In contrast, a mobile robot would be able to travel throughout the manufacturing plant, flexibly applying its talents wherever it is most effective.

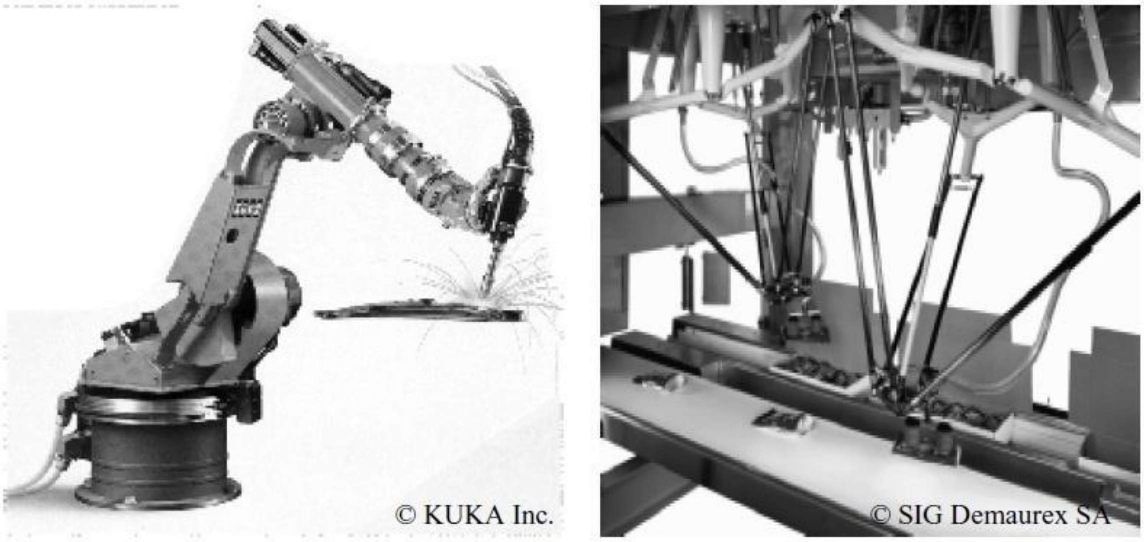

Figure 1.1 View of welding robot and parallel with robot of packaging chocolates

This project focuses on technology of mobility: how can a mobile robot move unsupervised through real-world environments to fulfill its tasks? The first challenge is locomotion itself. How should a mobile robot move and what is it about a particular locomotion mechanism that makes it superior to alternative locomotion mechanisms?

Other commercial robots operate not where humans *cannot* go but rather share space with humans in human environments. These robots are compelling not for reasons of mobility but because of their *autonomy*, and so their ability to maintain a sense of position and to navigate without human intervention is paramount.

Although mobile robots have a broad set of applications, there is one fact that is true of virtually every successful mobile robot: its design involves the integration of many different bodies of knowledge.

1.3 Project objectives

1- To achieve tasks in the factories, which facility the manufacturing process.
2- Design robot that be able to response to the request without supervising.
3- To use this robot in dangerous area to do tasks that the Human being can’t do it.

Table 1.1: Planning time for the Project Introduction

Step/weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Choosing the title	/	/												
Gathering the information			/	/	/	/	/	/	/	/				
system design										/	/	/	/	
Ending the project														/

Table 1.2: Planning time for the Project.

Step/Weeks	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Purchasing the devices	/	/	/	/	/											
Building the System				/	/	/	/	/	/	/						
Test system and Modifying									/	/	/	/				
Modifying final report											/	/	/	/	/	
The Surrender																/

1.4 Robots background

1.4.1 The history of robotics

The history of robotics is one that is highlighted by a fantasy world that has provided the inspiration to convert fantasy into reality. It is a history rich with cinematic creativity, scientific ingenuity, and entrepreneurial vision. Quite surprisingly, the definition of a robot is controversial, even among robotics. At one end of the spectrum is the science fiction version of a robot, typically one of a human form-an android or humanoid-with anthropomorphic features. At the other end of the spectrum is the repetitive, efficient robot of industrial automation. In ISO 8373, the

International Organization for Standardization defines a robot as “an automatically controlled, reprogrammable, multipurpose manipulator with three or more axes.” The Robot Institute of America designates a robot as “a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks.” A more inspiring definition is offered by Merriam Webster, stating that a robot is “a machine that looks like a human being and performs various complex acts (as walking or talking) of a human being.”

1.4.2 Inventions Leading to Robotics

The field of robotics has evolved over several millennia, without reference to the word *robot* until the early 20th Century. In 270 B.C., ancient Greek physicist and inventor Ctesibus of Alexandria created a water clock, called the clepsydra, or “water-thief,” as it translates. Powered by rising water, the clepsydra employed a cord attached to a float and stretched across a pulley to track time. Apparently, the contraption entertained many who watched it passing away the time, or stealing their time, thus earning its namesake. Born in Lyon, France, Joseph Jacquard (1752–1834) inherited his father’s small weaving business but eventually went bankrupt. Following this failure, he worked to restore a loom and in the process developed a strong interest in mechanizing the manufacture of silk. After a hiatus in which he served for the Republicans in the French Revolution, Jacquard returned to his experimentation and in 1801 invented a loom that used a series of punched cards to control the repetition of patterns used to weave cloths and carpets. Jacquard’s card system was later adapted by Charles Babbage in early 19th Century Britain to create an automatic calculator, the principles of which later led to the development of computers and computer programming. The inventor of the automatic rifle, Christopher Miner Spencer (1833–1922) of Manchester, Connecticut, is also credited with giving birth to the screw machine industry. In 1873, Spencer was granted a patent for the lathe that he developed, which included a camshaft and a self-advancing turret. Spencer’s turret lathe took the manufacture of screws to a higher level of sophistication by automating the process. In 1892, Seward Babbitt introduced a motorized crane that used a mechanical gripper to remove ingots from a furnace, 70 years prior to General Motors’ first industrial robot used for a similar purpose. In the 1890s Nikola Tesla—

known for his discoveries in AC electric power, the radio, induction motors, and more-invented the first remote-controlled vehicle, a radio-controlled boat. Tesla was issued Patent #613.809 on November 8, 1898, for this discovery.

1.4.3 The Birth of the Industrial Robot

Following World War II, America experienced a strong industrial push, reinvigorating the economy. Rapid advancement in technology drove this industrial wave—servos, digital logic, solid state electronics, etc. The merger of this technology and the world of science fiction came in the form of the vision of Joseph Engelberger, the ingenuity of George Devol, and their chance meeting in 1956. Joseph F. Engelberger was born on July 26, 1925, in New York City. Growing up, Engelberger developed a fascination for science fiction, especially that written by Isaac Asimov. Of particular interest in the science fiction world was the robot, which led him to pursue physics at Columbia University, where he earned both his bachelor’s and master’s degrees. Engelberger served in the U.S. Navy and later worked as a nuclear physicist in the aerospace industry.

Table 1.3: Project Balance Sheet.

Devices	**Price**
NXT Microcontroller	350$
3-Servo motors,10V	300$
5-Sensors	250$
Building frame bodies	100$
Table design and mat	350$
Rechargeable battery,6 AA	60$
Computer usage	20$
Over heads	100$
Total	1530$