

AUTONOMOUS DISPLAY ROBOT

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**BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II**

Tajuk Projek : AUTONOMOUS DISPLAY ROBOT.....
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For my beloved parent,
You helped me through a time when nobody else could have.

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ABSTRACT

This Project will design and developed an Autonomous display robot that can move according to the voice recorded with the specific time. These projects included design and build attractive display with mechanical robot structure. PIC will use in design control movement for the robot. Autonomous display robots are robots which can perform desired tasks in unstructured environments without continuous human guidance. In this project, an autonomous display robot is a robot that can be controlled by software using PIC programming that can perform the movement of robot to cope with variation of music. Therefore the robot can dance according to the chosen music within a specific time frame. PIC will be used as software to interfacing the robot. Design and developing the hardware (mechanical robot structure) and software (PIC programming) is needed in this project.

ABSTRAK

Projek ini akan mereka bentuk dan menghasilkan sebuah robot paparan berautonomi yang boleh bergerak mengikut rakaman suara dengan jangka masa yang telah ditentukan. Projek ini termasuk mereka dan membangunkan seni paparan dengan struktur mekanikal robot. PIC akan digunakan sebagai pengawal litar kepada robot ini. Paparan robot berautonomi ialah robot yang boleh melakukan pelbagai pergerakan pada struktur keadaan yang berbeza tanpa kawalan manusia. Di dalam projek ini paparan robot berautonomi ialah robot boleh dikawal melalui perisian menggunakan aturcara PIC yang akan melakukan pergerakan pada setiap musik yang dihasilkan. Selain itu robot juga boleh menari mengikut pilihan musik yang dikehendaki dengan tempoh masa yang telah ditentukan. PIC akan digunakan sebagai perisian antaramuka robot. Mereka bentuk dan membangunkan perkakasan (struktur mekanikal robot) dan perisian (aturcara PIC) diperlukan dalam project ini.

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LIST OF ABBREVIATION

PIC	Programmable Interface Controller.
PLC	Programmable Logic Controller
CPU	Central Processing Unit
RAM	Random Access Memory
ROM	Read Only Memory
A/D	Analog To Digital
D/A	Digital to Analog
I/O	Input Output
PWM	Pulse width modulated signal
IC	Integrated circuit
MCLR	Master Clear Reset

CHAPTER I

INTRODUCTION

1.1 Background Project

Robotics are becoming widely used in the automation, medical, manufacturing industries, also in many science fiction films and many others fields. Building and programming a robot is a combination of mechanics, electronics, programming and also problem solving skills. Nowadays, robots are constructed tended to be human-like.

This project must be completed within 6 months. The project will design and develop an Autonomous display robot that can move according to the voice recorded within a specific time. These projects included design and build attractive displays with mechanical robot structure are robots which can perform desired tasks in unstructured environments without continuous human guidance. According to plan, this robot will dance with specific time around 2 minutes. In this project, an autonomous display robot is a robot that can be controlled by software using PIC programming that can perform the movement of robot to cope with variation of setup. PIC Microchip 16F877A has been used in this because of speed and output selected need. PIC will be used as software to interfacing the robot. Design and developing the hardware (mechanical robot structure) using use item and software (PIC programming) is needed.

1.2 Objectives of the Project

The project is aimed to meet the following objectives:

- a) To design and develop an autonomous display robot by using software and mechanical robot structure.
- b) To learn the functionality of servo motor.
- c) To learn the PIC programming using PIC 16F877 concept.
- d) To learn troubleshooting and analyzing the real model.
- e) To study the differences between simulation and real constructed circuit.

1.3 Problem Statements

Autonomous means that freedom when doing some thing movement without human guided. As we can see, there are many type entertainment was produce for marketing planning are sold in very expensive prize. Therefore lower cost and recycle material are used to design and development this robot. Focus of this project is to change the perspective of visitor when they visit the FKEKK whereby they are welcome with this kind of robot and provide robot for faculty as a warm welcome for the visitor during their visit to our faculty. The features of robot were design right now in order to demand the costumer. Need of this project more focusing on the entertainment robot for change the mind outside and citizen when come to visit in faculty of engineering electronic and engineering computer.

Imagine if someone provide autonomous robot that display in the main hall of faculty. The robot can provide entertainment and display the capability when entertain the every of visitor and own citizen of faculty. The faculty can be proud with this robot that can boost the faculty in to compete into other faculty. The robot can also be device that can give information and idea for student to relate in their studies.

Concept of entertainment that produces by autonomous display robot, they produce movement like dance and show the movement detection a voice recorded that can attract people. Compared to the other entertainment device for example radio, this device only provide sound to attract people. However television is a device that can provide 3D movement with sound only. But an autonomous display robot can operate depend on the setting or movement required nevertheless with or without sound or music.

The benefit for this autonomous display robot its can be program to specific task that imagine if this device that program for welcome guest that come to our faculty. So we can substitute people that taken jobs for entertain the guest with robot for that task.

1.4 Scope of the Project

All projects have their own scope or limitation as a guideline throughout the completion of the project. The project scope for implementation this project is:

- a) Design and develop the complete Autonomous display robot that can move with voice recorded in term of hardware and software development.
- b) The hardware development and implementation consist of dc servo motor system, PIC programming and music for entertainment. The PIC will be the main controller for the system.
- c) The programming or software development and implementation consists of Proteus software for microchip PIC.

1.5 Methodology

a) Start

First is choosing the project title. This project were introduce by supervisor that more designing in software and hardware. The proposal for this project must be submitted to supervisor. Only the approved project title from supervisor will be continues for PSM1 and PSM2.

b) Project research

Perform research for the background studies for autonomous display robot that collect the information from supervisor and internet.

c) Literature review.

After doing research, collected data must be decided into the specific method that must be used in this project. When project still on progress should take consideration the possibility can happen during handling project. Select the circuit, types of controlled motor, software programming and others.

d) Design structure robot

Build the body structure for the robot for the basic movement forward and reverse. By using recycle material for exterior body for this robot was suggestion by supervisor.

e) Circuit design & program design

Design the Circuit for simulation using software. Process simulation must archive the objective specification.

f) Buy component

Buy the component that has been listed for another process. The component that probability easy damages for example PIC 16F877 must buy for spare item in critical situation.

g) Circuit constructed

Construct the circuit like circuit design using the PCB board. The process must use breadboard first to sure all the component used progress in good condition. If simulate the circuit using breadboard succeed the etching process for PCB board will implement.

h) Modification to Robot

The circuit must place inside the body robot. Modification in designing model robot structure without disturbs another mechanical joint that control movement of robot.

i) Installation program

The item PIC 16F877A must install the program architecture for main controlling circuit. This process has the main problem for his project. Process debugging the Circuit and software for the output display tolerance with objective.

j) Attach to robot structure

All the circuit and mechanical structure must attach together to make good looking robot. Autonomous display robot must perform in good condition.

1.6 Project Structure

This report consists 5 chapters where each chapter filled with detail of scope and description.

1.6.1 Chapter 1

Review about Autonomous Display robot such as introduction, objectives, problem statement and scope of project.

1.6.2 Chapter 2

This chapter discuss about the literature review, theory of component using and project comparison between pervious projects.

1.6.3 Chapter 3

Describe about project methodology used in this project, project process flow and project layout.

1.6.4 Chapter 4

These chapters describe about result such as preliminary result and expected result. On this chapter also write about discussion about this project.

1.1.5 Chapter 5

This chapter was clarifying about recommendation and conclusion about this project.

CHAPTER II

LITERITURE REVIEW

This chapter will explain and discuss about source or article that related to the project. It is consist of the products that have been appeared in the market today. The main perspective of this chapter is discussed the method that has been used in the past project and survey how far this project were related to the theory that already used. To understanding in this project about theory that studies about project were important for guidance this project. This chapter is also contained the theory of the components, equipments and programming languages that is used in the project.

2.1 The controller to drive the robot

There are several methods that are used as the controller system. However, for this section the focus will be revolving only two methods which are:

- a) Programmable Logic Controller (PLC).
- b) Programmable Interface Controller (PIC).

2.1.1 Programmable Interface Controller (PIC).

A Programmable Interface Controller (PIC) is a complete microcontroller built into an integrated circuit. The PIC also used to conducts the logical data that process the input signal and produce the output signal. Many applications can be used by it where control is required. PIC are popular among user due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability. Generally, any PIC based system must have some standard elements. [1][2].

A standard PIC is consist of Input/Output, Timing, CPU, Interrupt Circuitry, and Memory where this entire element was communicate via system bus. All microcontrollers have the same flow of operation. The operation flows start as soon as the reset signal is received. Followed by that, the operation will cycle to its three elements which are Fetch, Decode and Execute. During the fetch cycle, the processor loads an instruction from memory into its internal instruction register. Then, followed by the decode cycle, the microprocessor will determines what type of instruction has been fetched. Finally, the execute cycle will complete the instruction by either read more data from memory or write the results to memory. [2].

There is some method that is widely used to make program for the microcontroller. Most of the programmers prefer to use like C, C++, Pascal , CCS or Assembly language as their programming method for the microcontroller. The developed coding was then will be compiled with program compiler such as MPLab, PICC, Keil, PIC Basic and Source Boost compiler before it can be implemented to the microprocessor.

2.1.2 Programmable Logic Controller

A Programmable Logic Controller (PLC) is a control system that conducts the logical data to process the input signal and produce the output signal. Most it widely used in industrial process such as control of machinery on factory assembly lines. Unlike other control system, PLC was designed to overcome the severe condition such as dust, moisture, heat and cold and have the enhancement ability for having the extended input and output port. PLC has been gaining popularity on the factory floor and will probably remain predominant for some time to come [3]. Most of this is because of the advantages it is:

- Cost effective for controlling complex systems.
- Flexible that can be reapplied to control other systems quickly and easily.
- Computational abilities allow more sophisticated control.
- Trouble shooting aids make programming easier and reduce downtime.
- Reliable components make these likely to operate for years before failure.

Since that PLC was conducted with high voltage for input and output signal. Its application was suited to be used for high load application such as electric motor, pneumatic or magnetic relays and hydraulic cylinder.

There are many ways to write a program to the PLC controller. However, in easier when designer express the PLC decision making logic in the ladder logic which strongly resembles a schematic diagram of relay logic. Another method is State Logic, a Very High Level Programming Language designed to program PLC based on State Transition Diagrams.

Ladder logic is the main programming method used for PLC. As mentioned before, ladder logic has been developed to mimic relay logic. The decision to use the relay logic diagrams was a strategic one. By selecting ladder logic as the main programming method, the amount of retraining needed for engineers and trades people