

GPS LOCATOR WITH GOOGLE MAP INTERFACE

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA
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I would to dedicate this project to my beloved mother, family and somebody special, whose encouragement and support with a great help in completing it

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ABSTRACT

This project aim is to develop a Global Positioning System (GPS) Locator interface using Google Map. The interface enable user to explore and able to get the information on GPS with the assist from Google Map. The interface will be developed using Visual Basic program (VB), that in combination with Web Google Map application. This interface will be portraying location use Google Map that require by GPS Locator by coordinate input from GSM communication system (Global System for Mobile Communication). GSM modem will be used to accept data from any GPS. This GSM modem will be connected to computer and coordinate data will be processed using Visual Basic and display map to that location according to coordinate .A part from GSM, PIC (Peripheral Interface Circuit) Microcontroller Circuit also been used to send coordinate data, this enable that delivery procedure comparison been made between use GSM and also PIC. However the purpose still similar which is, to display that data location using interface of Google Map.

ABSTRAK

Projek ini bertujuan membangunkan sebuah ruang hubung kait *Global Positioning System (GPS)* Pengesan Tempat menggunakan *Google Map*. Ruang Hubung kait membolehkan pengguna melihat dan mengetahui maklumat mengenai *GPS* dan dibantu oleh paparan dari *Google Map*. Ruang Hubung kait ini akan dibangunkan menggunakan program *Visual Basic (VB)*, yang di kombinasikan dengan aplikasi *Web Google Map*. Ruang hubung kait ini akan memaparkan lokasi menggunakan *Google Map* yang di kehendaki oleh *GPS Pengesan Tempat* dengan memasukkan koordinat dari sistem Modem *GSM (Global System for Mobile Communication)* . Modem *GSM* akan digunakan untuk menerima data dari mana-mana *GPS*. Modem *GSM* ini akan disambungkan ke komputer dan data koordinat akan diproses menggunakan *Visual Basic* dan memaparkan peta untuk lokasi tersebut mengikut koordinat. Selain *GSM*, Litar MikroPengawal *PIC (Peripheral Interface Circuit)* juga turut digunakan untuk menghantar data koordinat, ini membolehkan perbandingan prosedur penghantaran tersebut dibuat antara menggunakan *GSM* dan juga *PIC*. Tujuannya tetap sama untuk memaparkan lokasi data tersebut menggunakan ruang hubung kait dan *Google Map*.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	PROJECT TITLE	I
	DECLARATION	III
	SUPERVISOR AUTHENTICATION	IV
	DEDICATION	V
	ACKNOWLEDGEMENT	VI
	ABSTRACT	VII
	ABSTRAK	VIII
	TABLE OF CONTENTS	IX
	LIST OF TABLES	XII
	LIST OF FIGURES	XIII
	LIST OF ABBREVIATIONS	XV
	LIST OF APPENDICES	XVII
I	INTRODUCTION	
	1.1 BACKGROUND:	1
	1.2 OBJECTIVES:	2
	1.3 SCOPE:	3
	1.4 PROBLEM STATEMENT:	3
	1.5 METHODOLOGY:	4
	1.6 REPORT STRUCTURE:	7

II	LITERATURE REVIEW	9
	2.1 TECHNIQUE 1: C# PROGRAMMING LANGUAGE	9
	2.1.1. BACKGROUND:	10
	2.1.2. COMPARISON:	10
	2.1.4 ADVANTAGES OF BOTH VB AND C#:	11
	2.1.5 DISADVANTAGE:	12
	2.1.6 ELEMENT ANALYSIS:	12
	2.2. TECHNIQUE 2: WEBGIS BASED ON ARCGIS.	14
	2.2.1 BACKGROUND:	14
	2.2.2 COMPARISON:	15
	2.2.3. ADVANTAGES AND DISADVANTAGES:	15
	2.2.4. ELEMENT ANALYSIS:	16
	2.3. TECHNIQUE 3: FLEX APPLICATION	17
	2.3.1 BACKGROUND:	17
	2.3.2. COMPARISON:	18
	2.3.3 ADVANTAGES AND DISADVANTAGES:	18
	2.3.4. ELEMENT ANALYSIS:	21
III	METHODOLOGY	22
	3.1. FLOW CHART:	22
	3.1.1. PROJECT BLOCK DIAGRAM	23
	3.1.2. PHASES OF THE PROJECT:	23
	3.1.3. FLOW CHART	25
	3.2. PROJECT DEVELOPMENT WITH GSM MODEM	29
	3.2.1. HARDWARE	29
	3.2.2. SOFTWARE DESIGN	32

	3.3. PROJECT DEVELOPMENT USING PIC MICROCONTROLLER	35
	3.3.1. HARDWARE DEVELOPMENT	35
	3.3.2. SOFTWARE DEVELOPMENT	40
IV	RESULT & DISCUSSION	46
	4.1.1. FINDINGS OF METHOD 1: GSM MODEM	47
	4.1.2 FINDINGS METHOD 2: PIC CIRCUIT	53
V	CONCLUSION & SUGGESTION	55
	5.1 CONCLUSION:	55
	5.2 SUGESSTION:	56
	REFERENCES:	57
	APPENDICES:	58

LIST OF TABLES

NO	TITLE	PAGE
2.1	Advantages of VB & C#	11
3.2	AT Command List	33

LIST OF FIGURES

NO	TITLE	PAGE
1.1	Phase of the Project	5
2.1	Interface of the application client	20
3.1	Project Block Diagram	23
3.1.1	Flow Chart of the Project using GSM Mode	25
3.1.2	Flow Chart of the Project using PIC Circuit	26
3.2	GPS Locator Interface Development	29
3.2.1	GSM Modem	30
3.2.2	RS232	30
3.2.3	USB Serial Cable	31
3.2.4	Illustrate of GPS Locator using Google Map Development	32
3.2.5	Visual Basic Development	34
3.2.6	GPS Locator Interface	34
3.3	GPS Locator Interface Development	35
3.3.1	PIC 16F877A	36
3.3.2	RS232 Connection with PC	37
3.3.3	MAX232	38
3.3.4	Crystal Oscillator	38
3.3.5	SMD Resistor	39
3.3.6	Power Supply	39
3.3.7	Compiler Program	40
3.3.8	PIC Burner	41
3.3.9	PIC kit 2 Programmer	42
3.4	Program Success	43

3.4.1	Program Failed	43
3.4.2	PIC Microcontroller Board	44
3.4.3	Illustration of Development	44
3.4.4	DB9 Connector	45
3.4.5	Connection to PIC Circuit	45
4.1	Visual Basic String to Web Browser	47
4.1.1	Visual Basic Program	48
4.1.2	Interface with Google Map	48
4.1.3	SMS Receive to Interface	50
4.1.4	Select the Location	51
4.1.5	AUTO UPDATE Location	52
4.2	Data sending to the Interface	53
4.2.1	Select the Location	54
4.2.2	AUTO UPDATE feature	54

LIST OF ABBREVIATIONS

API	-	Application Programming Interface
AT Command	-	Attention Command
CTS	-	Clear to Send
DCE	-	Data Communication Equipment
DTE	-	Data Transfer Equipment
GIS	-	Geographic Information System
GND	-	Ground
GM	-	Google Map
GPS	-	Global Positioning System
GSM	-	Global System for Mobile
GUI	-	Graphic User Interface
HEX	-	Hexadecimal
IDE	-	Integrated Development Environment
JAVA	-	programming language
LINQ	-	Language-Integrated Query
LOC	-	Location
MXD	-	Map file (ArcInfo)
PC	-	Personal Computer
PIC	-	Peripheral Interface Circuit
RIA	-	Rich Internet Application
RTS	-	Request to Send
RX	-	Receiver
SMD	-	Surface Mount Device
SMS	-	Short Message System

T-SQL	-	Transact Structured Query Language
TX	-	Transmitter
URL	-	Uniform Resource Locator
USB	-	Universal Serial Bus
VB	-	Visual Basic
XML	-	Extensible Markup Language

LIST OF APPENDICES

NO	TITLE	PAGE
A	AT Command	59
B	MOD 9001D RS232 GSM/GPRS Modem	60
C1	Visual Basic Coding	61
C2	PIC Coding	64

CHAPTER I

INTRODUCTION

This chapter explains about the introduction to the project, problem statement, objectives and scope of the work for the project. It also has some explanation about the methodology that is used for this project.

1.1 Background:

This project focused on developing the user interface (window Desktop Application) with coordinate input from GSM Communication or PIC Microcontroller Circuit.. The map of the location can be displayed using graphical interface that will be built using VB application and Goggles Map combination. The main considerations involved in developing the system are to receive or extract processed GPS data from the transmitting module and the GSM modem or PIC Circuit will receive the data and pass the information to PC through RS232 communication. Next, the data from GSM Modem or PIC Circuit will be processed using appropriate AT Command. The GSM module which supported AT commands

is used to transmit these location data between users and the monitoring centre. Thus the PIC also follows this same format. The latitude and longitude information will then be processed and fed into Google Map using Visual Basic. Based on this system and the technology for encapsulating and parsing VB data is utilized for Google Earth to display the detailed geographical information on the screen [6]. The integration between the hardware and software will successfully displayed the user interface for mapping and positioning system.

1.2 Objectives:

Main objective of this project is to provide user interface on PC for GPS Locator System. Among the task include:

- 1.2.1. To receive and pass the processed GPS data from transmitting module to PC through RS232 communication
- 1.2.2. To extract the data from GSM Modem or PIC Circuit using appropriate AT Command
- 1.2.3. To process and fed the latitude and longitude information into Google Map
- 1.2.4. To integrate Google Map using Visual Basic application

1.3 Scope:

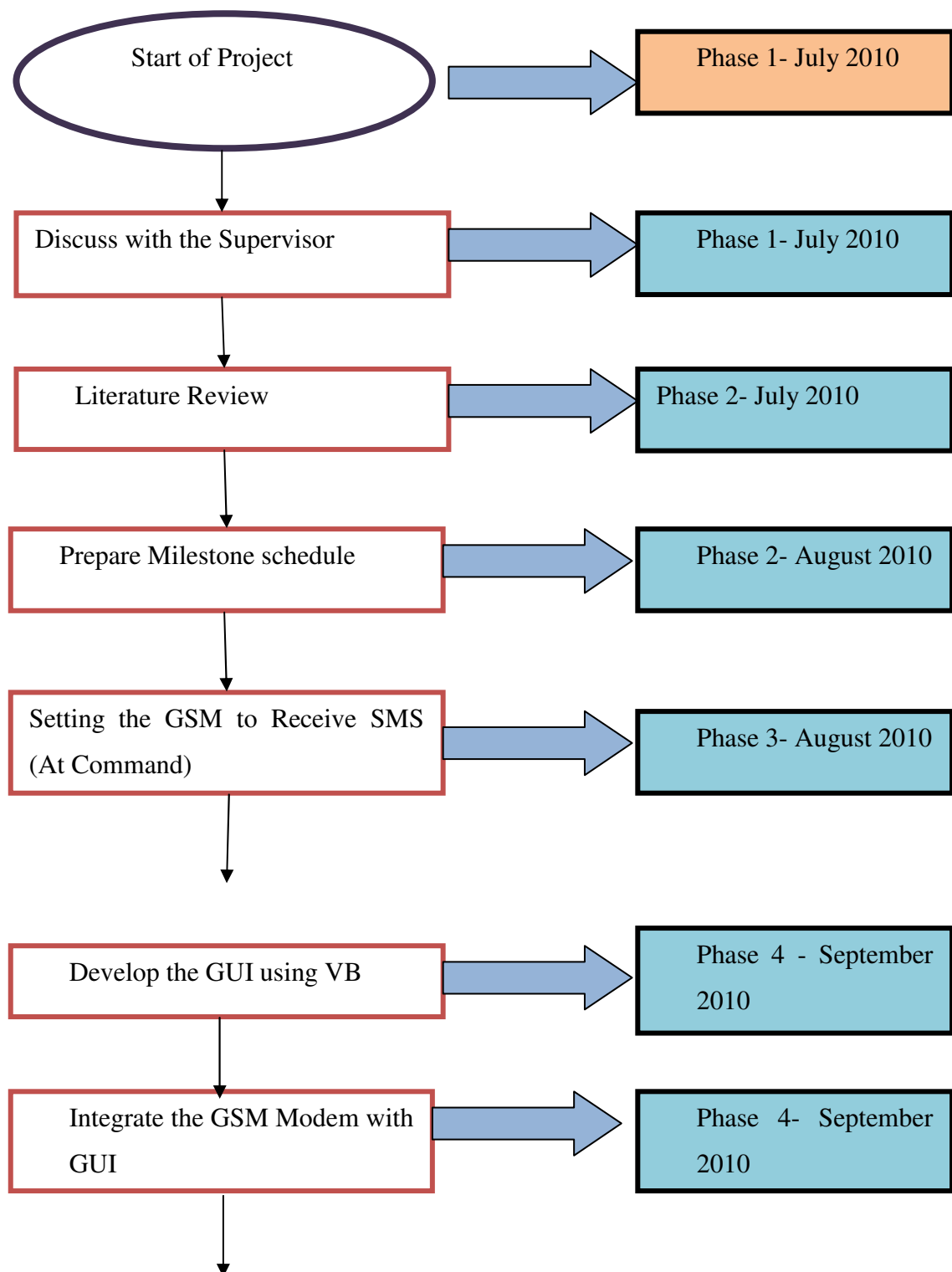
This project required to provide the user interface based on window desktop application to enable the data input from transmitting module to display the map of the location according to the GPS data elsewhere. The GSM modem or PIC Circuit will take responsibility to receive the data and pass the information to PC through RS232 communication. This GSM Modem is supporting AT command and will be set to receive SMS using Hyper Terminal for its Module Connection, while for the PIC Circuit the data of each location will be stored in the PIC program and still use this same command to display the data in the interface. The main function of this command is, to extract the data from GSM Modem or PIC Circuit to the Visual Basic application and display the Google Map. The Visual Basic will establish the interface between PC (Google Map) and the user. In order to implement this task, it is required to add mapping to a windows desktop application (with an available internet connection) using Google Maps as the basis and source for the map. This application contains one form that controls and code necessary to request and display a map from the Google Maps site

1.4 Problem Statement:

The project aim is an extension of previous final year project carried out by senior Final Year Project. The previous project has presented the GPS Locator using SMS Based which provide the integration of GPS receiver, PIC and GSM Modem (transmitter) to identify the coordinate and passes the data in SMS form. The task of this project is to extract data from GSM modem (receiver) and also using PIC to send data and processed it until it is able to display the Google Map for given coordinate. In order to complete the whole project, the GPS Locator using Google Map interface will be developed and the final target would be the display the location coordinate extracted from the GSM Modem or PIC Microcontroller Circuit on Google Map. The display includes the graphical user interface to enable the user to select or instruct the system to perform certain task or to get information from GSM Modem or PIC Circuit.

1.5 Methodology:

In order to achieve the objectives of this project, it will go through the several phases, which are:



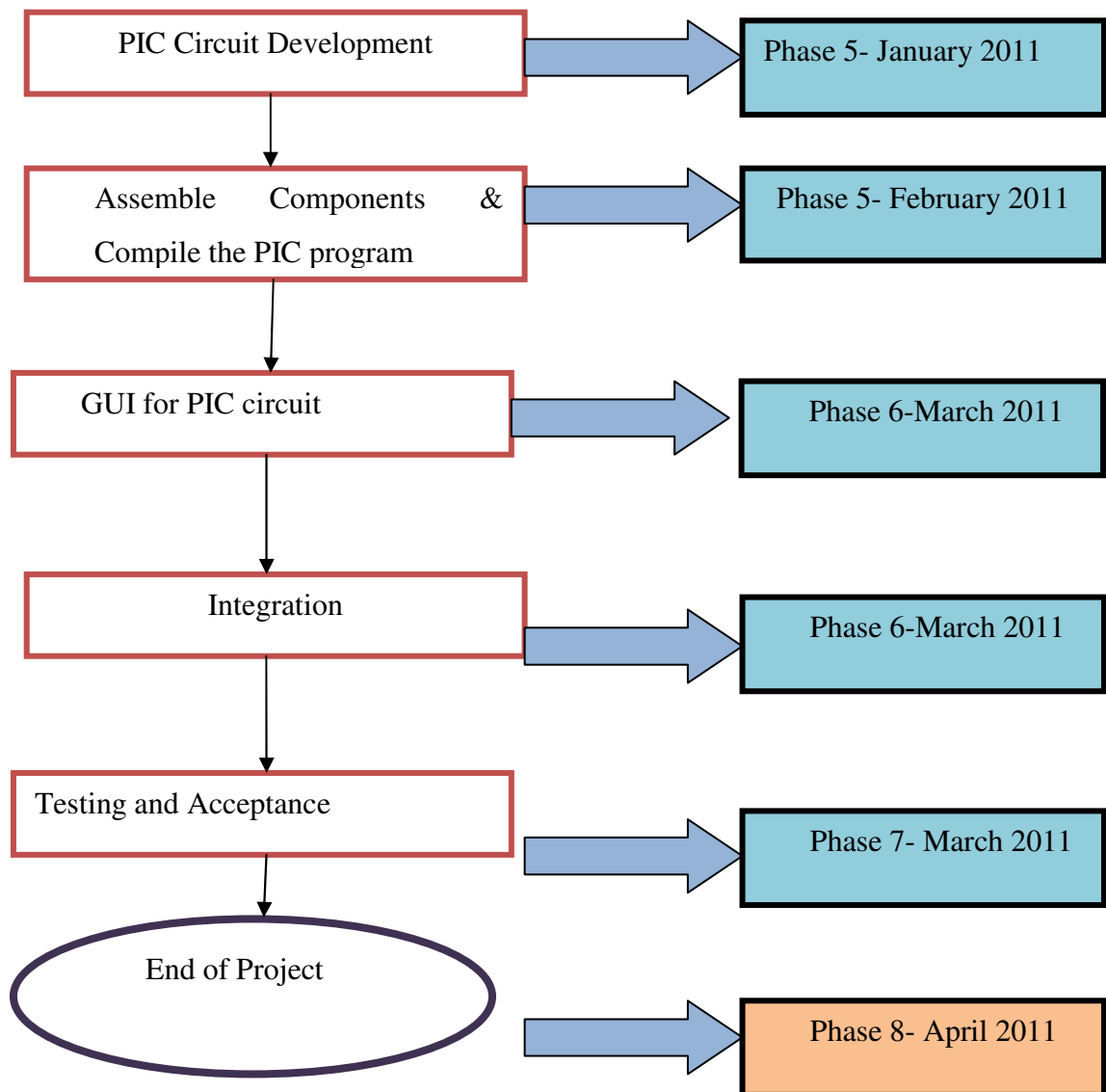


Figure 1.1 Phase of the Project

Phase1:- Discuss with supervisor Mr Mazran Esro and present the project progress or finding. Then, research further information about the title of the project, collect the information about GSM modem, GUI that will be used (Visual Basic Express Edition) from supervisor, retrieved from website, books, IEEE journal, thesis, and so on. Try to understand the concept & desired result for this project. After that, obtain the datasheet of component involved such as GSM Modem, PIC microcontroller, voltage regulator, Oscillator and other

Phase2:- For this phase, survey of the entire previous GPS Locator project is done to find the best method and approach for the project. Literature survey from journal and internet is carried out. The comparison method of GUI is performed in order to enlist the best technique to be implementing in this project.

Phase3:- For this phase, the information about the GSM that will be used is collected. Studied on how to receive SMS using AT command (Hayes command set (also called the **AT** commands: "AT" meaning *attention*)).

Phase4:- In this phase, the GUI using Visual Basic Express Edition is prepared to interface Google Maps. Next, the GSM Modem is integrated with the VB, to interpret the data from SMS to the VB and display the map using Google Maps

Phase5:- The PIC circuit is developed, to implement the different method to send data using PIC circuit and interface using Google Maps. The circuit design that prepared by supervisor is used, next the component is assembled and alteration on program that been given is implemented to meet the requirement of the project. It is exactly the same function as sending SMS, but for this time, the PIC circuit to is used to generate the data.

Phase6:- In this phase, the VB is prepared to accept the data from PIC. The same process as use in the previous method (SMS) been implemented. Next, the both development are integrated and the performance been tested.

Phase7:- For this phase, the software part is combined with hardware part to get the final result and carried out the comparison between the two approaches. After

that the functionality, ability & weakness of circuit design and software test are studied, next the conclusion based on the findings is prepared.

Phase 8:- Lastly, to complete and fulfill the procedure for the PSM, complete the report for this project. This report will explain about the project in details.

1.6 Report Structure:

The report structure is about the flow of the project. This report is having five chapters which included introduction, literature review, research methodology, result and discussion, conclusion and suggestion.

First chapter will discuss about the GPS Locator using Google map interface overview and introduction. Next the objective, problem statement, scope of work, and project methodology are discussed briefly which purposely to provide the reader an understanding of the project. The introduction of the project starts with the explanation about the significance of the project and from perspectives of previous researches that been done.

Chapter II is embracing the literature review of the project which includes the concept, theory, perspective and the method of the Visual Basic and C# that is used in order to provide the Graphic User Interface (GUI) any hypothesis that related with the developing of methodology. The overall literature review will produce the conceptual framework to present the relationship between project research with theory and concept through figures or corresponding model.

Chapter III will explain about the project methodology. This chapter will discuss the method or approach that has been used in project development and problem solving, including in hardware and software aspect such as, GSM Modem Communication and PIC Microcontroller Board.

Chapter IV presents the findings and discussion of the project. It also discusses briefly on the observation, results and the analysis of the project that gain during the development of project. This chapter also consists of the recorded data analysis and the result of the project.

Chapter V is about the conclusion and state the summary to the project. The contents include the suggestion and improvement that will be