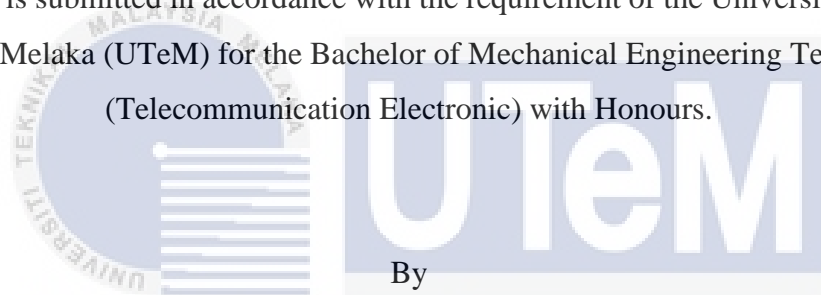




**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**DEVELOPMENT OF LPG LEVEL DETECTION AND  
AUTOMATIC BOOKING USING NODEMCU ESP8266**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Telecommunication Electronic) with Honours.



By

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TECHNOLOGY**

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# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

DEVELOPMENT OF LPG LEVEL DETECTION AND AUTOMATIC BOOKING USING NODEMCU ESP8266

2020/2021 Semester 1

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14 FEB 2021

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## DECLARATION

I hereby, declared this report entitled “Development of LPG Level Detection and Automatic Booking using NodeMCU ESP8266” is the results of my own research except as cited in references.



## APPROVAL

This report is submitted to the Faculty of Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfillment of the requirements for the degree of Bachelor of Engineering Technology (Telecommunication Electronic) with Honours. The member of the supervisory is as follow:



Signature



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Supervisor : MR. MOHD ERDI BIN AYOB  
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## ABSTRAK

Pertumbuhan teknologi yang pesat telah mempengaruhi kehidupan manusia dengan pelbagai cara. Oleh kerana pesatnya pertumbuhan di pelbagai sektor, namun ada cara untuk memasukkan kemahiran ini sehingga kehidupan menjadi lebih mudah bagi manusia. Secara kebanyakan IOT membantu dalam robotisasi usaha, kelebihan IOT dapat disebarkan untuk memperbaiki panduan keselamatan yang ada. Silinder LPG kini menjadi sebahagian daripada perkara penting bagi setiap rumah. Pada masa yang sama, pengesanan tahap gas adalah masalah utama dalam kehidupan seharian. Penyelidikan ini mengenai sistem Pengesanan Tahap Gas LPG dan Pemesanan Automatik menggunakan NodeMCU ESP8266 adalah proses yang menggunakan peranti mudah alih untuk mengesan jumlah gas dan secara automatik menghantar tempahan silinder LPG dari mana saja di dunia melalui internet. Sistem ini akan mengautomatikan keseluruhan sistem tempahan silinder LPG tanpa penglibatan manusia. Semua orang terlibat dalam kehidupan seharian mereka pada masa ini dan sangat sukar untuk menentukan status silinder gas. Oleh itu, ia akan sangat berguna bagi orang yang tinggal bersendirian dan bergantung kepada orang lain.

## ABSTRACT

Rapid technological growth has influenced human life in different ways. Due to this rapid growth in different sectors, yet there is a way to incorporate this skill so that life would be much easier for humans. As much as IOT aids in robotizing undertakings, IOT 's advantages can be spread out to improve the existing safety guidelines. LPG cylinders are now an important part of everyone homes. At the same time the detection of gas levels is a major issue in today's everyday lives. This research on LPG Gas Level Detection and Automatic Booking system using NodeMCU ESP8266 is a process that uses mobile devices to track the gas amount and automatically sends LPG cylinder bookings from anywhere in the world through internet. This system will automate up an entire LPG cylinder booking system without human involvement. Everybody is involved in their everyday life at the moment and it's very hard to determine the status of the gas cylinder. Thus, it will be very useful for people who live alone and depend on others.



## DEDICATION

To my lovely parents.



## ACKNOWLEDGEMENT

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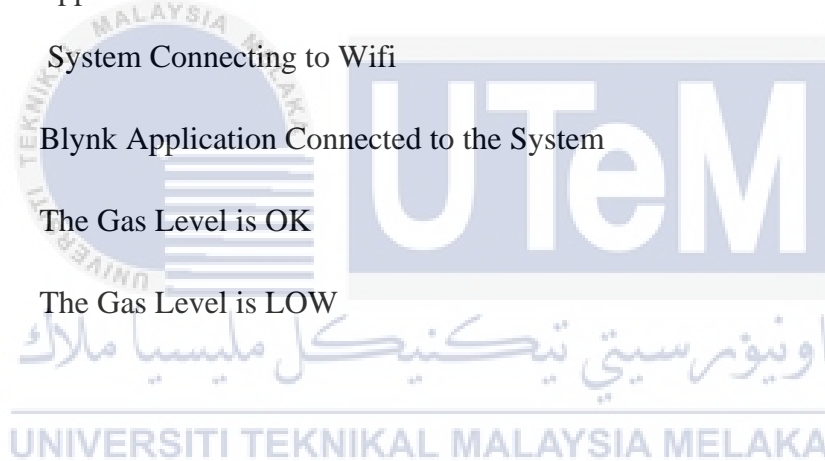
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## LIST OF ABBREVIATIONS

<b>UTeM</b>	Universiti Teknikal Malaysia Melaka
<b>RX</b>	Receiver
<b>TX</b>	Transmitter





# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

The main concepts and development of LPG Gas Level Detection and Automatic Booking using NodeMCU ESP8266 are the use of the Internet of Things (IoT). Liquefied Petroleum Gas (LPG) has been used as an industrial fuel for decades and for domestic purposes. Everyone uses LPG cylinder for cooking purposes. There are no protection efforts are being made against the LPG chamber in most of our homes. This strategy is extremely dangerous and needs to be changed. Oil companies have provided a customer - friendly service known as the IVRS method for customers. It is therefore important to require an effective device to measure and show the quantity of LPG. By this project, the amount of gas will be measured and notified when the gas is about to be completed and the gas supplier will be automatically booked. In this chapter, the background of the project, the problem statement, the objective and the scope of the project will be divided into a few parts.

## 1.1 Research Background

With the advent of the Internet, people have become closely connected to a point that has never been before. The process of gathering, exchanging and generating data will involve a sequence of interactions between computers with or without human involvement. These tools are different kinds of technologies with integrated communication and intelligence capabilities. The Internet of Things, or IoT, is a group of interlinked operating systems, mechanical and digital computers equipped with unique identifiers (UIDs) and the capability to acquire information through a network without interruption of humans and computers.

An IoT ecosystem consists of web-enabled connected systems that uses integrated technology such as processors, sensors, and networks equipment to capture, transmit, and work with data obtained from the environment. The monitoring, authentication, and interaction protocols used by these internet-enabled systems rely predominantly on specific deployed IoT applications.

Currently LPG is the most used fuel for cooking needs in our household. Liquefied Petroleum Gas (LPG) is a mixture of light hydrocarbon compounds. It generally contains butane ( $C_4H_{10}$ ) or propane ( $C_3H_8$ ), or a mix of both. Both gases are colourless and odourless at room temperature. The LPG gas liquefies under high pressures and vaporizes at pressure discharge. Thus, the LPG is stored in (concentrated) liquid form LPG is a flammable gas that when leakage occurs it will cause serious harm to property and life. The significant characteristics of LPG are that it is thicker than air so it does not spread quickly and when inhaled will induce suffocation. Therefore, to avoid the hazards from this, monitoring and detecting the level of LPG is carried out through this thesis.

With the development of automation technologies, life is turning simpler and easier in every field. Automatic systems are selected over manual system in today's world. For example, this research has been using IoT as a system that uses mobile device application to detect the gas level and an automatic LPG cylinder booking when the gas level is below the requirement. This project aims to save time when booking the gas. Sometimes the call request for the gas cylinder agent may not be recorded or the call is not connected. This brings upon wastage of time. The gas level will be tracked at all times through this initiative, and get notification when gas is about to complete.

In every present system, different gas sensing technologies are used and LPG cylinder could be reserved whether through SMS or IVRS. LPG cylinder usually comes in a metal cylinder and thus the fuel efficiency volume could not be detected. As a result, user will not be able to identify how much gas is available. This project provides booking of LPG cylinder and to overcome all the problem of detecting the level of gas cylinder. The gas agent receives the order for a new cylinder and the user receives a message about the level of gas cylinder and all the details about the booking proceedings.

## **1.2 Problem Statement**

LPG cylinders are now an important part of our kitchens. Due to its high energy content, LPG can cook more quicker than any other flammable material. At about the same time, evaluating the level of gas is a major issue in our everyday lives. The big issue that consumers faced is that they could not identify the level of LPG cylinder gas. This leads in even more interruption in booking the cylinder which is inconvenient mostly of the time. In order to overcome with these problems, IVRS system is introduced where

customer needs to go through several phases with the automated voice which also contains options for selecting. Despite this cause, most of the illiterate people are not able to complete the reservation because of these problems and these phone line devices are all either busy due to overloaded calls or phones that does not function.

With the exponential growth in the number of internet users throughout the past decade, internet is becoming a part of life and IoT is the new and emerging internet technology. In this project, “LPG Gas Level Detection and Automatic Booking using NodeMCU ESP8266” has been designed that will overcomes the shortcomings of existing system. This concept aims to provide functionalities such as detecting the level of gas cylinder and telling users if the level is below the minimum threshold. The user gets a notification of gas cylinder level through Blynk application and sends an automatic booking to the gas agency for the booking of gas cylinder.

### 1.3 Objectives

The aim of this study is:

1. □ To develop a model of LPG gas level detection and automatic booking that integrated with IoT platform.
2. □ To detect the level of LPG cylinder gas by using weight sensor.
3. □ To notify the user and gas agency when gas cylinder level is below the minimum threshold using Blynk application.

## 1.4 Scope

The scope of this project is made to inform the features and components used in this project. Among the applicability of this project is to use the microcontroller NodeMCU ESP8266 as a brain to monitor all elements used in this project. Every advanced system's functionality depends primarily on the microcontroller which regulates the overall operation of the system. It uses LCD to show the status of gas cylinder. At the very same time, NodeMCU ESP8266 uses Blynk application to send notification to the user's mobile phone via WIFI. A sensor (load cell) is used to continuously track the amount of gas left in the cylinder and sends a notification to the user's mobile phone if it is below minimum threshold value. The sensor senses this condition and sends a booking to the gas agency to automatically book an LPG using the Blynk application. This program will be widely applicable in manufacturing and housing.

## 1.5 Thesis Organization

This thesis is separated into five parts. The first chapter provides the introductory section which presents history details such as basic concepts, background, and development of this LPG gas level detection and automatic booking using NodeMCU ESP8266 to identify different aspects of device performance mentioned in this thesis. The following chapter 2 describes the relationship with the theoretical and an outline of this project between the previous study. Thus, the chapter 3 gives an overview of the research process, research design and research organization which includes procedures, equipment and tools and materials that being used in throughout this project. It also describes about long term performance system regardless on the new methodology such as program

flowchart, software and hardware stimulations. Chapter 4 explains the details of results and discussion regarding the project. It provides final part of the new performance analysis method as outlines and different processes which focused on making up the new method. Finally, chapter 5 concludes the results of overall project by stimulations and offers recommendations as an improvement to this system.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter generally includes, some reports, journals and conferences dedicated to a brief description and those related to the project to be carried out. This study focuses on Development of LPG Level Detection and Automatic Booking Using NodeMCU ESP8266.

By using the android application in our proposed system, customers will get to know about the weight and use of this load cell to measure the weight of the gas tank. The volume of gas in the chamber is measured continuously by using the load cell that is connected with NodeMCU ESP8266 in this process.

Long term degree of IOT is greater and its usage is rapidly growing assumes a main job of monitoring everything by using the sensors. Customer will revive each day by arranging NodeMCU ESP8266 with android program.

In addition to successfully accomplishing these suggested highlights, one of the key points of quality competence or standardization was also the issue from which additional focus is gained in the course of building this system.

## **2.2 Overview of Development of LPG Gas Level Detection and Automatic Booking Using Arduino**

In our modern scenario, the use of LPG gas has increased more. In this era of technology, as there are many solutions to this problem, a highly advanced system known as the Internet of Things (Iot) has been introduced. It is used in a wide range of applications in today's society and has a broad scope for the future. This research focuses more on the case study and development of the gas sensor and weight sensor project. The idea focuses on alerting the user to the status of the automatic cylinder booking. The system implemented overcomes the weaknesses of the existing system.

## **2.3 Past Related Project Research**

### **2.3.1 Arduino Based LPG Gas Monitoring & Automatic Cylinder Booking With Alert System**

(R.Naresh Naik, 2016) has proposed to design a system for LPG gas cylinder booking approach automated without human interference. The purpose of the present system is to determine the amount of gas remaining in the cylinder and, as soon as it crosses the requirement, it will immediately send an SMS message to both the user and the registered LPG agent so that they can act accordingly. The main target of this project is to track for the leakage of liquid petroleum gas (LPG) to prevent massive fire accidents and also to facilitate safety precautions where safety had been an important issue and automatic booking of cylinder without human involvement. In this system, Arduino Mega act as a controller.