Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF A VISUAL INFORMATION SYSTEM BASED ON LIQUEFIED PETROLEUM GAS (LPG) BOTTLING CONVEYOR SYSTEM USING VB.NET

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Bachelor of Electronics Engineering Technology with Honours

2022

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A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology with Honours

Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

UNIVERSITI TEKNIKAL MALAYSIA MELAKA
FAKULTI TEKNOLOGI KEJUTERAAN ELEKTRIK DAN ELEKTRONIK

BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek :**DEVELOPMENT OF A VISUAL INFORMATION SYSTEMBASED ON LIQUEFIED PETROLEUM GAS (LPG) BOTTLING CONVEYOR SYSTEM USING VB.NET**

Sesi Pengajian :**2022/23**

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I declare that this project report entitled "**DEVELOPMENT OF A VISUAL INFORMATION SYSTEM BASED ON LIQUEFIED PETROLEUM GAS (LPG) BOTTLING CONVEYOR SYSTEM USING VB.NET**" is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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DEDICATION

I dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of my strength throughout this project and on His wings only have I soared. I am dedicating this thesis to my beloved grandparents who have meant and continue to mean so much to me. Although they are no longer of this world, their memories continue to regulate my life. Their love for me knew no bounds and, who taught me the value of hard work. Thank you so much , I will never forget them.I also dedicate this work to my beloved parents ; Mr Mrs Murali Seetha who has encouraged me all the way and whose encouragement has made sure that I give it all it takes to finish that which I have started. To my family members, classmates and friends who have been affected in every way possible by this quest.

Thank you. My love for you all can never be quantified. God bless you.

ABSTRACT

The Internet of Things (IoT) is a network of 'things' that allows physical objects to interact with each other via sensors, electronics, software, and connections. There is no need for humans to interface with these systems. The Internet of Things aims to make life easier by automating every tiny action that we encounter. In addition to assisting in the automation of jobs, the advantages of IoT may also be used to improve current safety standards. In today's society, safety is very important, and strong safety procedures must beintroduced in places employment. This project updates the current industrial safety paradigm. Traditional Gas Leakage Detector Systems, despite their high accuracy, overlook a few issues in the area of notifying industrial personal to a leak. As a result, we employed IoT technology to create a visual information system in an LPG bottling conveyor system to monitor the process of LPG bottle transporting in conveyor s using VB.NET.

ABSTRAK

Internet of Things (IoT) ialah rangkaian 'benda' yang membolehkan objek fizikal berinteraksi antara satu sama lain melalui penderia, elektronik, perisian dan sambungan. Tidak ada keperluan untuk manusia untuk berinteraksi dengan sistem ini. Internet Perkara bertujuan untuk menjadikan hidup lebih mudah dengan mengautomasikan setiap tindakan kecil yang kita hadapi. Selain membantu dalam automasi pekerjaan, kelebihan IoT juga boleh digunakan untuk meningkatkan standard keselamatan semasa. Dalam masyarakat hari ini, keselamatan adalah sangat penting, dan prosedur keselamatan yang kukuh mesti diperkenalkan di tempat pekerjaan. Projek ini mengemas kini paradigma keselamatan industri semasa. Sistem Pengesan Kebocoran Gas Tradisional, walaupun ketepatannya tinggi, mengabaikan beberapa isu dalam bidang memberitahu peribadi industri tentang kebocoran. Hasilnya, kami menggunakan teknologi IoT untuk mencipta sistem maklumat visual dalam sistem penghantar pembotolan LPG untuk memantau proses pengangkutan botol LPG dalam penghantar menggunakan VB.NET.

ACKNOWLEDGEMENTS

First and foremost I am extremely grateful to my supervisors, Prof. TS. SHAHRUDIN BIN ZAKARIA for his invaluable advice, continuous support, and patience during my FYP study. His immense knowledge and plentiful experience have encouraged me in all the time of my academic research and daily life. I would like to thank all the members in BEEA 2019/2020. It is their kind help and support that have made my study and life in University Teknikal Malaysia Melaka a wonderful time. Finally, I would like to express my gratitude to my parents, my family members, friends and all UTeM staffs. Without their tremendous understanding and encouragement in the past few years, it would be impossible for me to complete my study.

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IoT	-	Internet of Things

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CHAPTER 1

INTRODUCTION

This chapter offers the reader with an overview of the project. Included are the study's background, objective, problem statement, and scope. It explores the origins of this research and the factors that led to its creation.

1.1 Synopsis

Malaysia generated roughly 2.7 million metric tonnes of liquefied petroleum gas (LPG) in 2021. Since 2013, when 2.53 million metric tonnes were produced, LPG production in Malaysia has been on the rise. Cases of LPG gas cylinders leaking and exploding are rising in frequency as the number of consumers of this fuel grows. According to Wan, who works for OSHDynamics Sdn Bhd, an occupational safety and health consulting firm, as LPG is denser than air, it tends to remain near to the floor rather than float away when there is a leak. When combined with air, the mixture becomes very explosive. Several prior research have previously created gas detecting sensors for use in detecting LPG leaks. This technique is flawed in recognising the precise LPG leakage and is influenced by the presence of adjacent gases. Gas sensors detect certain gases simultaneously and have a shorter lifespan, necessitating more monitoring. In this project, in order to monitor the product of LPG in the LPG bottling plant, a camera is installed on the LPG bottle conveyer as a monitoring the quality of LPG bottle; DHT 11 and MQ2 sensor as leak detector and temperature monitor; Infrared sensor as counting the final qualified product. The Internet of Things (IoT) is used to detect and signal when LPG gas is leaking from an

LPGbottle and temperature changes. It also had the ability to save data and blinking LEDs to signal a leak. Internet of Things is the most advanced technology now used by enterprises since it is more convenient and efficient. This project will detail our IoT-based LPG bottling monitoring system built using VB.NET.

1.2 Problem Statement

In today's industry sector, monitoring and data collection have contributed to a lack of labour force, sluggish production lines, and diminished output. In order to save expenses, industries are automating their processes and employing fewer people. The bottling of liquefied petroleum gas (LPG) grows as the human population increases. Both humans and machines make mistakes in the workplace, but automation is more efficient, quicker, and error-free. At larger production levels, it takes longer forhumans to identify product defects and gather data generated by a programmedautomation system. The output of automated industries will continue "24/7," which implies twenty-four hours a day and seven days a week. Therefore, the firm or industry owner must pay a higher wage in order to have sufficient staff to work effectively in accordance with their output. To address this problem, a project using a VB.Net system to monitor LPG bottle conveyor and monitor the surrounding temperature is being developed. This device may be set with information about LPG's ideal temperature and leakage. This project is low-risk and more secure due to its reliance on IoT and reliable data collection. Consequently, the manufacturing line willbe operating efficiently.

1.3 Project Objective

The objectives of the project are shown as following:

- To create a real-time LPG bottle conveyor monitoring system.
- To detect exact defects on LPG bottle product transporting on conveyor.
- To enable faster recovery and restoration of operations.

1.4 Scope of Project

The scopes of the research areas are:

- Using an IoT platform with the support of VB.Net to monitor LPG bottle transmissiont conveyor.
- Create coding using VB.NET together with arduino UNO to monitor LPG leakage and temperature.
- Ensure the product is in good condition by image detection method before approving it for consumers.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Liquefied petroleum gas (LPG) is a hydrocarbon gas fuel that is derived from crude oil or natural gas. LPG occurs as gases at room temperature, but when moderate pressure is applied, it becomes liquefied, thus the name liquefied petroleum gas. LPG is a combination of mostly butane and propane, two petroleum gases. LPG-possessing nations with varying mixing ratios (Prima Gas, 2011). (Malaysian Standard (MS) 830, 2003) In Malaysia, commercial LPG may comprise a combination of propane, propylene, butane (normal-butane or iso-butane), and butylenes (including isomers).

2.2 Properties of LPG

LPG is a petroleum product composed mostly of propane, propylene, butanes, and butalenes, as well as various mixtures (National Institute of Standards and Technology, 2010). The proportion of LPG blends vary each country dependent on LPG production. Some nations may refer to LPG as 6 propane in commercial contexts. Commercial LPG is a combination of LPG products, with propane accounting for 70% and butane accounting for the remaining 30%. (according to Petronasspecification in Malaysia at 2011). In order to detect odourless LPG in the case of a leak, the odorant ethyl mercaptan is added. LPG is a commonly available, non-toxic, odourless, and clean-burning gas fuel. LPG is now used as a fuel for burners in restaurants, heaters and cooking equipment in homes, and transportation. Under pressure, LPG is a liquid, but at room temperature, it is a gas. The customer received commercial liquid LPG. The liquid-to-gaseous LPG ratio is 270:1. LPG is liquefied at

reasonable temperatures and stored in LPG storage tanks for the safety and convenience of the handler. LPG is kept in liquid form and consumed in gaseous form.Installing a vaporizer is required to convert liquid LPG to gaseous LPG. LPG is a readily liquefied substance (National Institute of Standards and Technology, 2010).

Table 1 :Typical LPG data characteristics

Typical Liquefied Petroleum Gas (LPG) Data Characteristics		
Description	Unit	Specification
Density @ 15ºC	Kg/l	Minimum 0.547
Composition (Propane + Butane)	% vol	Minimum 97
Copper Corrosion, (1hr @ 37.8ºC)	A	Maximum 1
Vapour Pressure @ 37.8ºC	kPa	380 ~ 830
Free Water	% vol	Nil
Total Sulphur (Stenched)	mg/kg	Maximum 100
Volatility @ 95% evaporation	ºC	Maximum 2.2

2.3 LPG cylinder

According to Prima Gas (1998-2009), distributors provide four different kinds of LPG cylinders based on their sizes and functions, as shown below.

i. C10 (10 kilogramme LPG cylinder) (10 kg LPG cylinder)

ii. C14 (14 kg LPG cylinder)

iii. C50 (50 kg LPG cylinder)

iv. F14 (14 kg LPG cylinder for forklift)

The selection of LPG cylinders is determined by the types of appliances. C14 is the most popular gas cylinder used in residences. The LPG cylinder is constructed of steel that can withstand the internal pressure of LPG. F14 differs from other kinds

in that it is used to fuel forklifts and in the fuel withdrawal mechanism. F14 has been modified by adding tubes to the valve to maximise the use of LPG in liquid form.

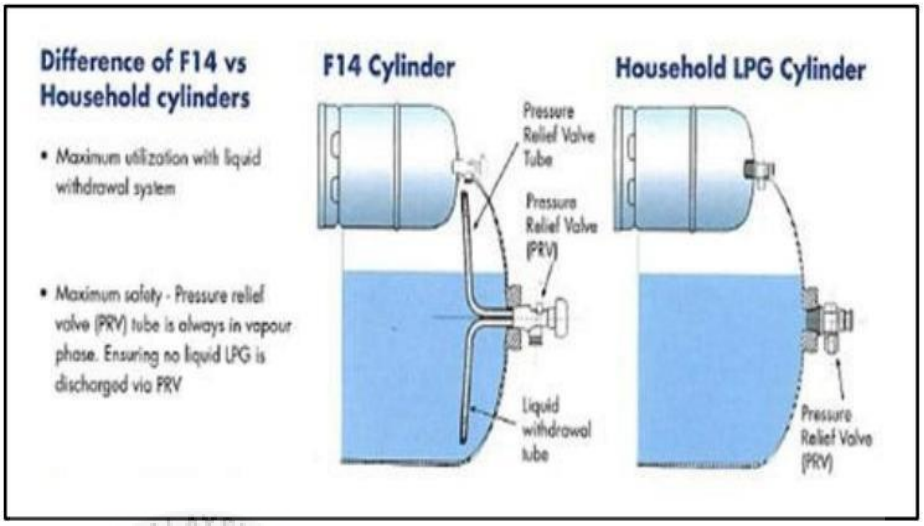

Figure 1: Difference of F14 LPG cylinder and household cylinder

2.4 Usage of Visual Basics.NET

Visual Basic.NET is a commonly used application development tool that has recently been enhanced. Visual Basic.NET is difficult to refer to as the next edition of Visual Basic since both the development environment and the programming language have undergone a practically full redesign, requiring millions of programmers to adapt to a new programming paradigm. Visual Basic.NET is a considerable improvement on an ageing programming language. This programming language has grown over over three decades to become one of the most widely used languages in the world. Visual Basic.NET has enhanced a number of Visual Basic's features and added intriguing new capabilities to the language.

Visual Basic.NET is settling into its new position as a top five programming language on the TIOBE index, which assesses popularity based on search engine data, according to David Ramel (2019). After reaching an index high, VB.NET is prominent in the February 2019 edition. In fact, among the top 20 languages monitored by TIOBE, VB.NET saw the most gain from the previous year's ranking, a 3.02 percent increase. VB.NET is a GUI-based development tool that provides Rapid Application Development (RAD) that is quicker than the majority of other programming languages. Additionally, VB has a simpler syntax than other programming languages, an intuitive visual interface, and excellent database connection. Table 2 compares the VB.NET and C# programming languages.

Table 2 : Difference between VB.NET and C# programming language

Basis	VB.NET	C#
Pronunciation	It is pronounced as Visual Basic .NET.	It is pronounced as C-Sharp.
Belonging	It is an updated version of Classic Visual Basic 6.0.	It belongs to the C family and it is evolved from C.
Variable Declaration	Variables are declared using keywords such as Private, Protected, Friend and Static, etc.	Variables are declared using declarations.