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DEPARTMENT OF COMPUTER ENGINEERING

DIPLOMA IN COMPUTER ENGINEERING

AUTOMATIC FUEL LEVEL DETCTION SYSTEM

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Declaration

BISIWO TIMOTHY and **OUMA REMILARS MUGENI** hereby declare that this project report is our original work except where explicit citation has been made and it has not been presented to any institution of higher learning for any academic award.

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Sign…… Sign……

Date: …….. Date…….

Approval

I certify that the project report entitled "**AUTOMATIC FUEL LEVEL DETECTION SYSTEM"** has been drafted under my supervision and is submitted to the board of examiners with my approval.

Supervisor: Mr. Ocen Gilbert

Sign…….

Date……..……...

List of Acronyms

US- ultrasonic sensors

IO- input output

KHz- kilo hertz

m/s- Meters per second

GPS- global positioning system

GSM- global system for mobile communication

PLC- programmable logic controller

Kg- kilogram

h- Height of the fluid

Qty- quantity

LCD- liquid crystal display

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ABSTRACT

Most petrol stations store their fuel in underground tanks and they don't always know the level of fuel available. Currently measuring the volume of fuel in the underground tanks is done by use of the dipstick. However, a continuous measurement and representation of the fuel levels is not possible, that's the level is known only at the time measurement is taken. This makes it tiresome, time consuming and inconvenient because a person performing the measurement must be physically present at the tank. This method of measurement puts the lives of the operators at risk due to the noxious fumes given off by the fuels. These fumes are dangerous when exposed to human beings, and greatly affect our environment. The measuring equipment (Dip stick) damages the bottom of the tank whenever measurement is taken; this leads to leakage of the tank in the long run. This project aims at solving the problems by providing an automatic method of checking the level of fuel. This was achieved using ultrasonic sensor for detecting the level, the Arduino Uno microcontroller for computation and the LCD for displaying the volume of fuel in the tank continuously. The Arduino Uno microcontroller was programmed using C++ language in an Arduino environment.

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CHAPTER ONE:

INTRODUCTION

1.0 INTRODUCTION

This chapter presents the background, problem statement, objectives both main and specific, justification and scope of our project.

1.1 BACKGROUND

In Uganda today, fuel is used in a wide variety of commercial applications which include car refueling as the major application, motor cycle refueling, generators and many others. There are around 2000 fuel stations all over the country which compete to satisfy this great need [1]. At most of these stations, fuel is stored in underground concrete tanks. Because of the great need, it is necessary to measure the level of fuel in the tank. Level is a vertical measurement taken from the surface, or interface to a fixed reference point. Normally, the reference point is the bottom of the vessel holding the substance (fuel) [2].

Currently, determining the level of fuel in the underground storage tank requires an operator to visually look inside the tank to estimate the level of quantity of fuel left in the tank. A more accurate method involves lowering a measuring device, called a dip stick, vertically into the fuel tank until it reaches a reference point. Usually the bottom of the tank is used to ensure that the dip stick is inserted to the correct depth [3].

The dip stick contains calibrated marks, usually in millimeters (mm), which are used to measure the depth of the fuel in the tank [4]. It is then withdrawn from the tank and the level is read by determining where the interface last made contact with it. The measured millimeters of fuel is then converted into gallons via a conversion table supplied by the manufacturer of the tank. The depth of the fuel remaining in the tank is determined. However, a continuous level measurement is not possible and in absence of the person responsible for measuring fuel left in the tank, the level is not known to anybody, this leads to improper daily data recording [5].

Thus there requires a digital system that will always monitor the fuel level and record it on an LCD

1.2 Problem Statement

Fuel level in the tank is manually measured and monitored, a continuous measurement and representation of the fuel levels is not possible, that's the level is known only at the time measurement is taken. This makes it tiresome, time consuming and inconvenient because a person performing the measurement must be physically present at the tank. This method of measurement puts the lives of the operators at risk due to the noxious fumes given off by the fuels. These fumes are dangerous when exposed to human beings, and greatly affect our environment. The measuring equipment (Dip stick) damages the bottom of the tank whenever measurement is taken; this leads to leakage of the tank in the long run. Therefore a system is required that will monitor fuel level instantly without a dip stick.

1.3 Main Objectives

To design and implement an automatic fuel level detection system for fuel station underground tanks that will continuously measure the volume in the tank.

1.3.1 Specific Objectives

i. To study and investigate the current systems used by different fuel stations to measure the level of fuel in the tank.
ii. To gather and analyze the required data for automatic fuel level detection system
iii. To design a system for measuring the fuel levels and volumes.
iv. To implement a digital fuel level meter and monitoring system that conforms to the design specification
v. To test and validate the developed system.

1.4 Justification

Due to the need to continuously measure and monitor the levels and volume of fuel left in the underground tanks at any time, a system that would automatically do that was required

1.5 Scope

1.5.1 Technical Scope

The system will only be able to detect the fuel level left in the reservoir in real time but will not be able to refill the fuel in case the reservoir runs low or goes down. It will comprise of an ultrasonic sensor to detect the fuel level and send the value detected to the microcontroller (Arduino) for computation. The computed value is then sent to the LCD for display. Depending on the computed value which is now the level of fuel in the tank at that particular moment, the LEDS, red and green will glow accordingly as stipulated in the micro controller. But when the fuel level goes below the minimum stipulated value and requires refilling, the buzzer automatically goes.

1.5.2 Geographical scope

The system will be used in Uganda by all petro-stations

1.5.3 Time scope

The development of the system is scheduled from August 2015 to May 2016

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