DEVELOPMENT OF 3D IOT MONITORING SYSTEM FOR ROV

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

by

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APPROVAL

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

Signature: ………………………………………………………

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ABSTRAK

Usaha kajian ini akan memperkenalkan pembangunan Sistem Pemantauan 3D IOT untuk ROV dengan menggunakan ESP 32 dan Sensor MPU-6050. Rangka kerja pemeriksaan merangkumi beberapa parameter, misalnya, “Roll”, “Pitch”, “Yaw” dan Heading. Gambar 3D yang direka juga adalah seperti rangka bentuk pemerhatian untuk menunjukkan arah ROV. Pengambilan Magnetik (MPU) adalah sensor kelajuan yang akan mengesan pengembangan dan memberikan hasil tiga maklumat unik iaitu X-pivot, Y-hub dan Z-hub sehingga dapat mencapai arah atau posisi ROV. Maklumat ini akan digunakan untuk membuat pengendalian gambar 3D dalam Processing IDE dan Flutter. Pengendalian gambar 3D disusun setanding dengan prototaip model ROV FTKEE UTEM. Dua peringkat berbeza bekerjasama untuk menyelesaikan kerangka pemeriksaan sehingga dapat membina kerangka campuran untuk penyediaan gambar 3D. Penyelidikan usaha ini adalah untuk menentukan kesesuaian antara ROV asli dan pengendalian gambar 3D. Pengunaan sensor Pengambilan Magnetik (MPU) akan digunakan dan dikaji untuk memperoleh ketidakaktifan dan ketepatan.

ABSTRACT

This undertaking will introduce the Study and Development Of 3D IOT Monitoring System For ROV By using ESP 32 with MPU-6050 Sensor. The checking framework incorporates a few parameters, for example, Roll, Pitch, Yaw and Heading. A 3D picture preparing likewise remembered for the observing framework to show the direction of the ROV. The Magnetic pickups (MPUs) are speed sensors will detect development and give yield of three unique information which are X-pivot, Y-hub and Z-hub so as to accomplish direction of the ROV. This information will be utilized to make 3D picture handling in Processing IDE and Flutter. The 3D picture handling was structured as comparable as the prototype ROV model FTKEE UTEM. Two distinct stages cooperate to accomplish the checking framework as to build up the mix framework for 3D picture preparing. The investigation of this undertaking is to decide the comparability between the genuine ROV and the 3D picture handling. By using Magnetic pickups (MPUs) sensors will be dissected to acquire the inactivity and precision.

DEDICATION

This thesis is dedicated to:

My beloved parent,

Rokiah binti Awang, Ibrahim bin Basar

My supervisor,

IR. TS. Mohammad 'Afif bin Kasno,

And all my friends,

Thank you for their encouragement and unconditionally support.

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LIST OF SYMBOLS

D, d	-	Diameter
F	-	Force
g	-	Gravity = 9.81 m/s
I	-	Moment of inertia
1	-	Length
m	-	Mass
N	-	Rotational velocity
P	-	Pressure
Q	-	Volumetric flow-rate
r	-	Radius
T	-	Torque
Re	-	Reynold number
V	-	Velocity
w	-	Angular velocity
x	-	Displacement
z	-	Height
q	-	Angle

LIST OF ABBREVIATIONS

ROV	– Remoted Operated Vehicle
GPS	– Global Positioning System
UAV	– Unmanned Aerial Vehicle
GIS	– Geospatial Information System
MPUs	– Magnetic Pickups
3D	– Three Dimensional
MEMs	– Micro-Electromechanical System
LiDAR	– Light Detection And Ranging
UAS	– Unmanned Aerial System
PWM	– Pulse Width Modulation
GUI	– Graphical User Interface
RC	– Radio Control
PID	– Proportional, Integral, Derivative

CHAPTER 1

INTRODUCTION

1.1 Background

This venture will incorporate making a framework that screen the direction of the ROV in the water. This task just shows the parameters like move, pitch, yaw and heading of the ROV by utilizing an appropriate and moderate microcontroller and sensors. This venture likewise will present or show the 3D picture preparing of the ROV that may show ongoing activity of the ROV through Flutter. Subsequently, a source coding will be structure or make to understand the sufficiency to decrease the clamor from the sensors and tuning for PID control tuning so the parameters will be drifty. A test will be lead for ongoing activity and do revision or improvement of the framework both coding and equipment. Outline underneath shows a clearer view about this task.

1.2 Objective

- To investigate on how MPU-6050 data can be gathering through IOT platform using Firebase and Flutter.
- To develop a 3D IOT image processing.
- To analyse 3D image IOT which be access through any device in real-time.

1.3 Problem Statement

The use of ROV nowadays is widely used for serving a range of military, commercial and scientific needs. ROV can go deep into the water until 10,000 feet. Above 30 metres depth, ROV is more likely less visible due to the particles in the water and that is why most ROVs are equipped with at least one video camera and lights. The ROV did not include monitoring system that can show the orientation of the ROV in water, as the Bintang Subsea (M) Sdn Bhd, a ROV operational company also facing the similar problem regarding the matter. Without the monitoring system, the user of the ROV have no idea where the ROV is heading to, the roll, yaw, and pitch of the ROV. By using 3D image, the orientation of the ROV is easily to read and see. Also, by through IOT system, the data can be collected anywhere as long there are Internet connection.

1.4 Scope of work

This project will consist of creating a system that monitor the orientation of the ROV in the water. This project only shows the parameters such as roll, pitch, yaw of the ROV 3D IOT image by using a suitable and affordable software, microcontroller and sensors. This project also will present or display the 3D IOT image processing of the ROV that will show real time operation of the ROV.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of 3D image is to help ROV driver to navigate better under the sea. To be ready to develop the 3D image processing, the controller system is required for it to control the mathematical logic, algorithm, PID tuning etc. This project will use the interface by using the ESP 32 and Flutter 3D object platform controller for the measurement of parameter ROV thus the research will comprise these criteria so as to satisfy the objectives.

2.2 History of ROV

ROV represents Remotely Operated Vehicle. Some profound water situations are unreasonably brutal for people to legitimately work in. ROVs are frequently used to find and report destinations in profound water where jumpers can't reach. The first completely created ROV, POODLE, was made by Dimitri Rebikoff in 1953. In any case, it was not until the United States Navy looked into ROVs that the innovation truly took off. In 1961 the US Navy made the Cable-Controlled Underwater Research Vehicle (CURV). Even tough the fact that CURV was utilized to recoup lost indented torpedoes, it made ready for a pristine time in remote ocean investigation. Following the achievement of CURV, the US Navy kept on making progressions in the ROV business. In 1974 just 20 ROVs were accessible, and 17 of them were government claimed. Before the finish of 1982,