UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ANALYSIS SYSTEM FOR BADMINTON PLAYER RACQUET MOVEMENT

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

by

SITI AISHAH BINTI MOHD RAMZAN

B071510890

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FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING TECHNOLOGY

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Tajuk: Analysis System For Badminton Player Racquet Movement

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Alamat Tetap:

No.14, Lrg Chengal Lempong Baru 1,

Taman Balok Jaya 2,

26100 Kuantan, Pahang.

Tarikh:

Disahkan oleh penyelia:

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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 Electronic Engineering Technology (Electronic Industry) with Honours. The member of the supervisory is as follow:

Signature: …….

Supervisor : MUHAMMAD IZZAT ZAKWAN BIN MOHD ZABIDI

Signature: …….

Co-supervisor: TS. SHAHRIZAL BIN SAAT

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ABSTRAK

Sistem Analisis Pergerakan Pemain Badminton ialah sistem yang mengumpul data setiap pergerakan raket badminton. Idea untuk mencipta sistem ini telah dicetuskan oleh Institut Sukan Negara Malaysia untuk membantu mereka menganalisis data pergerakan pemain badminton mereka. Projek ini diciptakan untuk menerangkan ciri-ciri setiap pergerakan raket badminton. Sistem ini boleh digunakan sebagai alat untuk membantu jurulatih pemain badminton untuk membuat analisa mengenai corak permainan yang selalu digunakan oleh pemain badminton. Projek ini diciptakan dengan menggunakan sensor IMU untuk menghasilkan data dari pergerakan raket dan Arduino MEGA digunakan sebagai pengawal. Perisian PLX DAQ telah digunakan sebagai alat untuk mendapatkan data dari sensor dan memasukkan data secara automatik ke *spreadsheet* Excel. Melalui sistem analisis ini, kita akan dapat melihat perbezaan diantara kelajuan dan arah bagi setiap corak pergerakan raket badminton.

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ABSTRACT

Analysis System for Badminton Player Movement is a system that collects the data of every movement for the racquet badminton. The idea to create this system is from National Sports Institute of Malaysia to help them to analyze the data of their badminton player movement. This project was created to describe the character of each badminton racquet movement. It can be used as a tool to help badminton coach analyze the game pattern that usually used by their trainees. This project was created by using the IMU sensor to generate the data of the racquet movement and Arduino MEGA was used as a controller. PLX DAQ software was used as a tool to obtain data from the sensor and insert the data automatically into Excel spreadsheet. Through this analysis system, we can see the difference of speed and direction of the racquet badminton movement for each pattern.

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DEDICATION

This report was dedicated to my beloved parents, Mr. Mohd Ramzan Bin Mat Yunan and Mrs. Wan Faizah Binti Wan Bakar for always supporting me during my study in UTeM. I am very grateful to my parents because they always give me advice and encouragement throughout the process of doing this project.

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LIST OF SYMBOLS

º	-	D
g	-	Gravity = 9.81 m/s
I	-	Moment of inertia
s	-	Second
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

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LIST OF ABBREVIATIONS

IMU	Inertial Measurement Unit
PLX DAQ	Parallax Data Acquisition
DOF	Degree of Freedom
OTH	Over The Head
FYP	Final Year Project

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CHAPTER 1

INTRODUCTION

1.1 Background

The idea to create Analysis System for Badminton Player Movement is from the National Sports Institute of Malaysia. Badminton is a popular sports game which played using the racquet to hit a shuttlecock across the net. Badminton was developed in British India and Badminton actually known as a game called battledore and shuttlecock in Greece and Egypt and it was played by two players at a time which will be played by hitting the shuttlecock back and forth using tiny racquet. Nowadays, Badminton is one of the most popular racquet sports in Malaysia.

There are two types of common forms of the game. The first one is called "singles" which have been played by a single player per side and the second one is called "doubles" which have two players per side. Another type of form that also played by two players is called "mixed doubles" which is played by two different genders for each side. Badminton often played in a yard or on a beach as an outdoor activity while for a formal game is often played on a rectangular indoor court.

For a professional level of badminton player, they mostly required a coach that can well be versed in the game. Basically, becoming a coach can be very challenging as any other sport. To become successful badminton coach, they have to know the basics and they have to fulfill the requirement to become the coach such as having the skills and certifications, team building, can practicing proper strength and conditioning.

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1.2 Statement of the Purpose

The purpose of the research is to analyze the movement of a racquet for badminton player such as serve pattern, drop pattern, smash pattern, blocking pattern and other.

1.3 Problem Statement

Nowadays, Badminton is one of the popular sports game in Malaysia and many players have a dream to become a professional badminton player. To achieve the dream, the requirement for a professional coach is also very demanding among the players. It will be difficult for a coach to train many candidates under them if there are no tools that can help them to improve the skills for the player. To improve the skills, they need a data analysis of each player so that they can manage to train all the players.

Most badminton player usually knows their own pattern of movement while playing the badminton. But the problem is how can they prove what kind of pattern they comfortable with and what kind of pattern they rarely used. Different kind of pattern actually can help badminton players to improve their variation used for the pattern so that they will know what kind of pattern they can use while facing their opponent. The characteristic of the badminton movement pattern is very useful to train a badminton player but the pattern usually can only know by the coach through observation or watching the video of players practice or watching them play on a training session.

Based on the problem statements, this project is created to help badminton coach and badminton players itself to monitor the characteristic of player movement so that it can be useful to be used while training.

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1.4 Objectives

The objectives of this research are:

i. To describe the characteristic of badminton player movement. This analysis can describe what kind of pattern or stroked used by monitoring the graph that display on the screen.

ii. To design a system that can assist badminton coach analyze game pattern of their trainees.

This analysis system can help badminton coach to study the pattern of badminton player not only by observing the player but they can also save the data analysis about the player movement so that it can be used as a reference for other player.

iii. To build a system that help badminton player know their own strength while playing the game.

This analysis system can help player know what pattern they usually used while there are playing. They can know what is the different of their own pattern when they played with different opponent.

1.5 Scopes of The Project

Scope of the project is the criteria that needs to be achieved and the work must be done to deliver the project. In other words, a list of specific project goals, features, and function need to be determined before starting a project.

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The scope of this project is to design analysis system for badminton player movement using Arduino MEGA as a controller. This system is used for one badminton player only. This analysis system is suitable to be use at badminton court area.

This project focus on the pattern of badminton player movement and use as analysis system. Arduino MEGA is use as a controller because it is one of the microcontroller based embedded system that can perform task such as reading data from IMU sensor which is used as the main component on this project.

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