



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF SUPPORT INSTRUMENT FOR
PETANQUE**

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

by

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DECLARATION

I hereby, declared this report entitled “DEVELOPMENT OF SUPPORT INSTRUMENT FOR PETANQUE” is the result of my own research except as cited in references

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of Universiti Teknikal Malaysia Melaka as a partial fulfilment of the requirement for the degree of Bachelor of Electronic Engineering Technology (Industrial Electronic) with Honours. The member of the supervisory committee is as follow.

.....
(KHAIRUL ANUAR BIN A RAHMAN)

DEDICATION

To my beloved parents who were always trust and supported me,

Mohd Ali Bin Salleh and Siti Aishah Binti Harun

For my supervisor

Encik Khairul Anuar Bin A.Rahman

For all my family, friends, team mate thanks for your love, care, supported to till
the end

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ABSTRACT

This invention aims to develop a technological electronic device for an athlete performance. Equipment invention is equipment that newly built through process to make and create new object and more suitable to be applied. The training instrument built consists of three main parts, namely the Arduino pro mini, Inertial Measurement Unit (IMU), and Bluetooth wireless. The study was conducted on Malaysia athlete and SUKMA Melaka petanque athlete to test the suitability of the instrument in assisting the petanque training. Movement of the hand will analyze to see the acceleration and rotation angular of hand in different distances. A digital camera will use for addition device to record and analyze using Silicon Coach Pro 8. This invention existence also aims to facilitate occupation human daily.

ABSTRAK

Ciptaan ini adalah bertujuan untuk membangunkan sebuah alat elektronik berteknologi untuk membantu meningkatkan prestasi atlit petanque. Alat ini merupakan alat yang baru dibina melalui proses yang terdiri daripada tiga bahagian utama iaitu Arduino Pro Mini, Initial Measurement Unit (IMU), dan Bluetooth HC-05. Kajian ini dijalankan ke atas pemain Malaysia, pemain petanque SUKMA Melaka. Alat ini membantu untuk mengukur kelajuan hayunan tangan dan sudut yang digunakan bagi setiap jarak. Pergerakan tangan akan dianalisis untuk melihat kelajuan dan putaran sudut mengikut jarak. Sebuah kamera digital juga turut digunakan untuk merekodkan dan analisis menggunakan Silicon Coach Pro 8. Kewujudan ciptaan ini juga bertujuan untuk memudahkan kehidupan manusia seharian.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

IMU	-	Initial Measurement Unit
APM	-	Arduino Pro Mini
PPM	-	Persekutuan Petanque Malaysia
SUKMA	-	Sukan Malaysia
GUI	-	Graphical User Interface

CHAPTER 1

INTRODUCTION

1.0 Introduction

This section basically guides the author in preparing the entire report content including the graphical illustrations which can be found in appendices. The REPORT CONTENT should be divided into appropriate chapters as guided here. Standard margins on this page, and on all text pages, are 4 cm left, 2.5 right, 2.5 top and 3 cm bottom.

1.1 Background of Study

Nowadays, many athletes had faced several of problems about their performance in competition. This situation causing various parties giving their opinion on this weakness. There is causes which caused quality of the national sports continued to decline in. Regardless from any type of sports. Athlete decline increasingly worrying. For example in Malaysia, various assumptions issued about the athlete. Among them is less spirit of love with country. When playing, athlete not play enthusiastically unless they offered various addition earlier for example they were offered to have money or luxury things. So, sports quality increasingly are affected as patriotic feeling absence in athlete soul. Furthermore, they regarded that field of sports that they participate as ancillary career only. Perception like this

causing them does not give fully focus when undergoing training or wish to improve their game quality value. More worrying is lack of facilities equipment during training every athlete. Sometimes they often undergo training but not consistent.

We do not build many sports area like tennis court, badminton, basketball, petanque court and football stadium that is applicable to organize world-standard championship also. Indeed, sports facilities lack cause people of this country have no chance to play certain games. Apart from that less him training equipment mentioned just now like athlete movement detector and variety more. All factors stated just now had caused these national sports qualities continue not consistent. All parties especially the government need give cooperation that is accurate to overcome the weakness in the national sports program.

From this problem above this invention aims to develop a technological electronic device for an athlete performance. Equipment invention is equipment that newly built through process to make and create new object and more suitable to be applied. This invention existence also aims to facilitate occupation human daily. Invention process based on combination of three concepts namely mind, skill and also attitude or value. All three affiliates joined able to solve problem by implementing idea incitement activity and commercial value in sports engineering industrial field. Invention also produced from distinctive idea or renovated from other sports idea.

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Many opinions about design and era of change. According to James and Jeffrey (1999) states that invention had begun before Christian calendar more. Among earliest design is an instrument "Archimedes Screw" creation Archimedes in year of 212 century. Many inventors produced various creations to be used by human.

Every change carried out on something creation, is just to meet requirements and human convenience. For example is daily life, we often use goods that becoming need like attire, electrical goods and others. It makes easier and more manageable life following instrument existence that has been designed by certain persons.

Sports equipment that is increasingly sophisticated was invented specific for certain sports to enhance the development and achievement in the sports. Among sports equipment which uses engineering technology is electronic table tennis, club ball launcher golf, tennis ball launcher and others. This equipment main function is to train and help athlete undergoing skills training hit ball. This further get help coach to increasing athlete's performance by watching athlete's performance during training carried out and can see mistake carried out by athlete. (Ong Kong Swee & Wee Eng Hoe, 2006)

Development and progress of science, technology, engineering and ICT helped enliven further competitor and success in field of sports in world level. Latterly have various modern equipment invented to help athlete recording success that is greater and more proud. In swimming competitions world for example, swimsuit design improvement gave advantage to athlete to break the record in various championships in world level. Same goes with athlete sprinter, track and field athlete clothes and bicycle racer so tight and smooth surface. This due to clothes like this can reduce air resistance and altogether help athlete to create their time better and more excellence (Cheah Swee Ming, 1995)

Progress and latest development in sports areas of technology also visible in sports shoes creation. This shoes designed use sophisticated technology. All shoes layer created for comfort and secured. Most expensive shoes that ever coined is shoes sprint worn by sprinters Carl Lewis when recording the fastest time of 9.86 seconds in 100 meter in World Athlete Championship in year 1991. This shoes price is RM230000. This shoe were created only 115 gram and take a year to be completed with computer aided. The shoes sophistication feel like is barefoot when used. It collapsible like handkerchief (Carl Lewis, 1991)

The computer usage significant is nondurable because too expensive and often damaged. In second revolution of computer start in year 1970 with personal computer emergence. This revolution enable computer brought to class and anywhere. In early 1980 an instructor has embarked on where experiment they using the computer to develop software program use software program to issue an order to users as platform to be more advanced. Currently, we can see everywhere only like business and education have computer, video, compact disc and others. (Bonnie and Khayum, 1995)

Measurement is important assets for those who inquisitive distance, highly and so on. Especially in those who often do distance measurement which involves in sport game determined with distance. Among them in petanque game, score determination determined based on distance between ball and jack. Apart from that they often measure how distance position that is suitable to make the throw.

Other than that, movement for human body also can be measured by the instrument that can detect the speed and angular. This a little bit can help to find skill in sports. Among sports that have shown speed measurable is a baseball sport. It detected when player hits the ball the sensor will detect the player hand movement

Based on athlete requirements suggested a new instrument for athlete petanque training will create for a better improvement in athlete performance. He suggested the instrument that can detect the acceleration of boule in different distance. Then, he suggested to measure the angular rotation of hand when throw the boule (Nuzul Azwan Bin Temizi, 2001).

1.2 Problem Statement

Nowadays our athlete had faced with few problem when participate in game. They cannot consistent with their performance. Their skill changing and become worst and also not consistent cause defeat. Apart from that they still unable to overcome problem because don't have instrument in petanque game. Due to this they could not detect their fault and continue to repeat the mistake.

Hence, based on the problem aforementioned, this project will conduct the investigation to identify, analyze and evaluate the design that suitable related to athlete petanque based on individual skill. Also, this project will utilize direct to player survey through developing the questionnaires. Thus, the athlete skill will analyzed and evaluated based on relationship between psychology during training and movement their hand and their speed of boule.

1.3 Objectives

Athletes play an important role to determine the successful of this product. Towards the creating the instrument there are characteristic for creation. The objectives of this project are as follows:

- To improve individual participation skill in petanque
- Practice in more systematic and efficient way to consistent the way athlete play.
- Introduce and expose new instrument to all athlete involved

To improve the quality of sport at consistent level countries such as Euro

1.4 Scope

In this project, IMU is mainly used to measure the velocity. It can be divided into two consists of two types of sensors accelerometers and gyroscopes. The accelerometer use to measure the inertial acceleration of athlete hand (arm) in different distances. While gyroscope measure angular rotation of hand when throw the boule. Both sensors typically have three degree of freedom to measure from three axes.

The data from the sensor will transmit by wireless to the laptop/gadget using the Bluetooth Terminal application and for computer. It will transmit by Tera Term software. The sensor will detect the acceleration and also the angle. Moreover, through the survey conducted by generating the questionnaire related to petanque sport required for analyzing the data collected. For analysis purpose, this project will also utilize the software that can depict the interrelationship between movement hand and their speed of arm according to the distances

Questionnaire developed in this project through preliminary stage in order to get the way that is suitable and relevant to investigate and analyzed. In developing questionnaire, training time also will ask in every player available. Moreover, the questionnaires developed in this project will distribute in Google Form towards the petanque player from low level player to high level player as the respondents. The questionnaires will cover the demography range scales of gender, state, range involved, training times and the significant of instrument.

1.5 Summary

Briefly, from this chapter discussed about research that related to product instrument creation to achieve development of instrument for petanque. In this chapter was explained the background project, problem statement, objective, scope and the summary. However this is starting part for project. In the end of this chapter one, chapter two will continue. This chapter is about literature review on studies after discussed by researcher.

CHAPTER 2

LITERATURE REVIEW

This chapter will discuss about mainly on the theory research and currently development of instrument for others sport. This literature review function to help in more understandings regarding this project. In this chapter I will elaborate about petanque briefly

2.0 Introduction of Petanque

Petanque is sports be played by triple (triple) but it can also be played individually (single) or together (double). Other version is not allowed. Petanque game in generally intend to bring closer boule with jack. All player try to be near to their boule with a jack. In this game require good cooperation and should be is support with techniques that has been learned so that can play well if we play in category double and triple.

This game played on sandy surface and square shaped commonly made in open field however can also played in closed field. Petanque competition uses ball that is round and made of metal. Ball validity condition must be marked manufacturer and weight. No modify except owner's name or logo. Diameter size election ball can be done according to palm. Usually shooter will use king size ball while pointer uses small sized ball. Ball weight is followed on player strength. For shooter use ball that is light and for pointer use heavy (Sheikh Ismail Silan, 1998)

Petanque court size for national level competition use and minimum international is 15-17 meter long and width 4 meter. The size will be added 2 meter long and width. If have concrete frame around it. There are various choice to build petanque court because it has no specific regulations. For court in open area, use quarry dust and piled in clearing.

Dominant movement analysis in petanque game, there is a policy movement namely non-locomotor. Non-locomotors is petanque player there is movement that did not move place, like squat down, bend, movements included into clump movement non-locomotor.

2.1 Sport Instrument

To improve a quality of athlete many support instruments have been created over last 20 years. In response to the demands of athlete support instrument have been developed to improving quality of athlete.

The development of sport instrument have begun over the past 100 years and the designs of all sport instrument is different but for petanque still don't have any instrument for support this athlete.

2.2 Previous Development of Sport Instrument

2.2.1 Wearable Wireless Sensing for Sports and Ubiquitous Interactivity

Michael Lapinski, Mark Feldmeier and Joseph A. Paradiso (2011) developed wearable wireless sensing for sports and ubiquitous interactivity. In general this wearable wireless sensing for sport is using IMU to measure the performance of professional baseball players.