DEVELOPMENT OF LOW COST RADIO FREQUENCY IDENTIFICATION (RFID) IN AGRICULTURE

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For the most beloved and supporting parents and siblings

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Rohayah Abdullah

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ABSTRACT

Radio Frequency Identification (RFID) is reliable asset management systems that allow human to be more efficient for example in organizing equipment. Recently, barcode system is being used in agriculture application especially in monitoring asset managing system. The recent system is costly and inefficient in term of time. Therefore, this project will propose due to fact that RFID system is more reliable and low cost RFID tags. The main objective of this project is to develop and implement the low cost RFID managing software and hardware in asset managing system. The use of Ultra High Frequency Radio Frequency Identification (UHF RFID) in implementing asset managing system and selecting the hardware platform using RFID tag and reader will contribute to reduce time in the warehouse management. The user interface and collected data will be display on personal computer. The management system will be developed by using Visual Basic where the data can be display and interact with RFID hardware. The database for storing and managing is mainly use the Microsoft Access where it enables to interact with Visual Basic. The RFID system will use passive RFID tags that operate at 902-927MHz and able to read/write information and display the database in user interface. The result of this project will show the functionality of each developed user interface (UI) and how the system actually works. By analyzing the reader's ability to read the passive tags in long range, the position of the reader is decided to be two meter apart at the each gate of the warehouse. The end user can easily find the location of specific packages that have unique identification by looking into the database. At the end of the project, the objective of the project is successfully achieved.

ABSTRAK

Identifikasi Frekuensi Radio (RFID) ialah sistem pengurusan aset yang boleh dipercayai dan menjadikan sistem lebih cekap dalam mengendalikan sesuatu aplikasi. Pada masa kini, sistem kod bar digunakan pada aplikasi pertanian terutama sekali dalam memantau sistem pengurusan aset di gudang. Sistem sedia ada adalah mahal dan tidak secekap dimana ia merupakan proses yang memakan masa. Projek ini mencadangkan, sistem RFID ialah sistem kos rendah dan boleh bergantung pada label pasif RFID. Objektif utama projek ialah untuk menbangunkan dan melaksanakan sistem RFID berkos rendah dalam sektor pertanian. Penggunaan Frekuensi Ultra Tinggi (UHF) RFID adalah sangat sesuai dalam sistem pengurusan aset dan juga dalam pemilihan label pasif dan pembaca RFID sebagai alat identifikasi. Pembangunan skrin pengguna dan data akan dipaparkan di komputer peribadi. Sistem pengurusan ini akan dimajukan dengan menggunakan platform *Visual Basic* dimana data boleh dipamerkan and berinteraksi dengan RFID. *Microsoft Access* digunakan untuk menyimpan dan menguruskan pangkalan data dimana ia boleh berinteraksi dengan *Visual Basic*. Sistem RFID akan menggunakan label pasif RFID dan sistem pengurusan aset. Label pasif RFID beroperasi pada frekuensi 902-927 MHz dan berupaya membaca atau menulis maklumat dan akan dipamerkan pada skrin pengguna. Analisis projek dilakukan untuk mengenal pasti kebolehan sistem RFID untuk digunakan dalam pengurusan aset. Kesesuaian posisi untuk meletakkan pembaca RFID di dalam gudang juga telah dikenalpasti iaitu sejauh dua meter. Pengguna dapat mencari pakej di gudang dengan hanya menggunakan skrin pengguna.

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ABBREVIATION

RFID	-	Radio Frequency Identification
UHF RFID	-	Ultra High Frequency RFID
RAD	-	Rapid Application Development
IDE	-	Interactive Development Environment
VB	-	Visual Basic
GUI	-	Graphical User Interface
ISO	-	International Standards Organization
RF	-	Radio Frequency
MoA	-	Ministry of Agriculture
GPS	-	Global Positioning System
GSM	-	Global System Mobile

CHAPTER 1

INTRODUCTION

1.0 Project Introduction

Agriculture is very important for the social economy especially in the third world such as Malaysia, China and many parts of Asia. The growth of social economies is relying on the basic income of a country. As in Malaysia herself, agriculture is one of the main sources of economy to the country beside tourism and business. In order to sustain the economical at the highest peak, it is all begin with a seed. In agriculture, farmers really rely on the supplied seed from their trustable supplier. If the supplier supplied a low grade of seed, it will become unfortunate to the farmer where they cannot produce a very quality production.

Therefore, the managing system of seed needs to improve so that the supplier can deliver a quality product of seed to the farmers. A good managing system in supplying quality seed is the primary requirement as a supplier. The supplier needs to be more professional in terms of managing and supplying a superb quality of seeds.

Managing and collecting data manually are really tiresome work in agriculture industry. Like the old days, the employees of seed supplier have to collect and record data manually by themselves and this makes work even harder. They need to characterize tons of stockpiles of seed and it is very time consuming process that took weeks to settle them. Furthermore, the employee has to consume more workers to complete the task and will increase the payment for workers.

Then, when technologies are introduced in the agriculture sector, many management systems have their own advantages and disadvantages. For example, the labeling of stock using information cards that stick able on the packages. The major disadvantages of the techniques are damages due to humidity and tear off label. This reason is really solid to agree that the technique is not suitable to the situation. Next, the introductions of the barcode system in management system give a big impact to the managing sector. The barcode system are really reliable and dependable because the effectiveness of the system to overcome the problem in management. So, the barcode system technology really helps the employee to reduce the usage of extra workers and the tasks become easier and faster to be interpreted.

By comparing the barcode technology and Radio Frequency Identification (RFID), there are many advantages of RFID system over barcode system. Even though the barcode system has been used for ages, but it has some disadvantages in term of hardware failure. Therefore, this project proposed to implement a low cost of RFID system in agriculture and more specifically in seed managing system.

The importance of this project is to apply the system in monitoring packages of seed where the packages really are, whether it is being process, packaging or delivered to the costumer. Seed management efficiency will be greatly improved by using modern information such as barcode and network. From the previous research, barcode system is very reliable and can be replaced with RFID system.

1.1 Problem Statement

1.1.1 Poor Managing System

Back in the past years, farmers and farm's supervisor had a hard time to manage the farm starting from cultivation, storages, transportation and sales. This event occurred because of ineffective and inefficient in collecting and managing data. This situation can be happened when the farmers manage the farm without using any technology that actually helps in managing the farm [4].

There are many data and information need to be collected in managing in agriculture sector especially in the beginning process of seeding or cultivation. Literally, it take longer time to collect stock data manually and managing them individually according to their class and requirement. In terms of entrepreneurship, a good managing system will give a good result in growth of economic. Therefore, this project will introduce RFID system in management system that will improve the productivity and efficiency of collecting and managing data. The user or the farmers will supervise about their current stock and progress of sales at the same time by monitoring from the office. In some other word, the present of the effective technology in managing system will help the user to be more productive in the future.

1.1.2 Recent technology used in managing system not so efficient.

Barcode system can be called an old system that still use nowadays in managing stock and goods. The system also can be interpret as the technology that really help human in everyday life either we realize or not. In agriculture sector, it is kind of new technology has been used recently to manage a farm and controlling the movement of stocks. The main proposed in using barcode system in management is the effectiveness of system in collecting and managing data. The ability of the system to manage tons of information makes them a reliable system that help human.

The present of technology in agriculture is a new approach so that it will catch up to the latest technology. Back at the late 80's, agriculture based of entrepreneur and farms' manager have to collect data every time they need to evaluate the annually sales. Some of information might get lost or miss because of lots of information need to be stored. Therefore, at that moment of time, the Barcode technology has help them in keeping all the essential information and prevent of loss of data [2].

Even though barcode system is the best solution at that time, the cost of developing and the usage of barcode are too high which may cost unfortunate to the farmers. Barcode system is more suitable and efficient in other application field of works such as managing the stock of packaging product rather than used in agriculture field [2]. The disadvantage of barcode in real life application had limited them to be used in agriculture. If the printed barcode get smudge or imperfect shape, it will lost the important data in collecting. This loss information may lead to disaster in business [3].