

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The internet of things, or IoT, is a network of physical objects: “things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects like temperature sensors to sophisticated industrial tools like military radar. By means of low-cost computing, the cloud, data analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyper connected world, digital systems can record, monitor, and adjust each interaction between connected things. The physical world meets the digital world and they cooperate.

In a world of growing complexity, new methods and strategies have to be developed to make the life of everyone easier, faster and more efficient. Technological advancements play a large part in making this possible. In the past all paper work had to be written by hand, signed and transported by train before it could get to its destination; today that is no longer the case. Phones and the internet have totally changed the way we transmit information.

Radio-frequency identification (RFID) IoT devices and sensors use electromagnetic fields to automatically identify and track tags attached to objects. An RFID system consists of a tiny radio transponder, a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to track many things ranging from inventory goods to factory manufacturing. [1]

A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system. A typical microcontroller includes a processor, memory and input/output (I/O) peripherals on a single chip.

Sometimes referred to as an embedded controller or microcontroller unit (MCU), microcontrollers are found in vehicles, robots, office machines, medical devices, mobile radio transceivers, vending machines and home appliances, among other devices. They are essentially simple miniature personal computers (PCs) designed to control small features of a larger component, without a complex front-end operating system (OS).

1.2 Problem Statement

Current administrative tasks and activities in Nigerian schools and corporate offices can be made faster and much more efficient.

According to Princewill Ene [2] There are many factors that affect development of science and technological advancement, including but not limited to:

- Lack of funds
- Lack of expertise
- Low level of education
- Lack of appropriate market
- Inadequate infrastructure
- Poverty
- Economic fluctuation
- Political instability
- Ethnicity
- Social vices

With these problems in mind, for technology to be feasible in Nigeria, it has to be: cheap, easy to operate, secure, durable, solve an important problem, small, consume low power and be cheap to maintain. As impossible as all this sounds, with the right tools, technology and mindset it can be done. A simple device that scans student's ID cards,

confirms their info from an online database, and returns a simple yes or no response. This will help boost administrative efficiency and reduce paperwork.

1.3 Aim and Objectives

- Design and build a small hardware device that connects to the internet through Wi-Fi.
- Design and build a small hardware device that can read RFID tags.
- Design and build a small hardware device that runs on minimal electricity and uses batteries.
- Design and build a small hardware device that is easy to use and understand.
- Design and build a website hosted online that communicates efficiently with the small hardware device.
- Design and build a website hosted online that stores the data gotten from the small hardware device.
- Design and build a website hosted online that lets its users download summarized data in any of these formats: Excel and CSV.
- Build a fully functional Iot device that can scan student's RFID enabled ID cards and confirm/store any data needed.

1.4 Significance of the Study

- Make administrative tasks like checking for fee payment, leasing library books, taking attendance faster and more efficient
- Make the life of students and staff easier
- Reduce the use of hardcopy
- Boost data analysis through direct electronic data availability
- Higher security through advanced monitoring of students from their entries and direct confirmation from an online database
- Reduce our carbon footprints through burning of paper containing information that is readily available online

1.5 Scope of the Study

The scope of this study covers the hardware device and online website that holds all the needed data and functionality. It also covers the students and staff of ESUT.

1.6 Limitation of the Study

- Purchase of the RFID enabled cards and assigning them to each student
- Cannot work without an internet active Wi-Fi hotspot device
- Each Wi-Fi hotspot device has to be set to a particular Wi-Fi name and password for the device to find.

1.7 Organization of the Report

This project report is organized into five chapters:

Chapter One: The whole idea behind the work. Includes objective of the study, statement of the research, area of coverage limitation and definition of terms.

Chapter Two: This section deals with the review of study, review of concept theories upon which this work is built on and the potential issues

Chapter Three: This section talks about the software and hardware tools used in the project. The methodology at which this research work will be implemented.

Chapter Four: The system is implemented and presented with its analysis. Functions, operation are in depth explained for reader understating and comprehension. The system requirements are also detailed.

Chapter Five: Summarizes the whole work done and makes possible recommendation and suggest other points to be included into the work for future propose

1.8 Definition of Terms

1. IoT
2. Network
3. Sensors
4. Software
5. Data
6. Internet
7. Radar
8. Digital Systems
9. RFID
10. Electromagnetic fields
11. RFID Tags
12. Radio Transponder
13. Microcontroller
14. Embedded System
15. Processor
16. Input/Output(I/O)
17. PC
18. Wi-Fi
19. Wi-Fi Hotspot
20. Website
21. Online Hosting/Cloud Hosting
22. Excel File Format
23. CSV File Format
24. Node MCU
25. MRC522 RFID Sensor
26. Arduino IDE
27. VS Code
28. PHP
29. JavaScript
30. MySQL

- 31. Debug
- 32. API
- 33. Soldering
- 34. Lead
- 35. LED's
- 36. Buzzers