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RFID-Automated and Authenticated museum guidance system

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Abstract-*A museum is a non-profit, permanent institution in the service of society and its development,open to the public, which acquires, conserves, researches, communicates and exhibits thetangible and intangible heritage of humanity and its environment for the purposes of education,study and enjoyment. RFID based automated & authenticated museum guide is designed to replace manual guides to an extent. It's a voice powered device that speaks out as the tourist is travelling from one monument to another monument (museum).This is achieved by placing a RFID receiver with the tourist (palm device). As soon as the electronic hand held device comes in the local area id the microcontroller receives the RF tag unique id from the receiver and compete it with its own data.If the authentication is received then& then the system will automatically play the audio clip related to that statue /painting. An RFID module basically comprises a tag and a reader. A RFID system comprises of an antenna, a transceiver and a transponder.*

Keywords*: RFIDreader,tags,AVR ,arduino,voice modules.*

I. INTRODUCTION

In the current situation most of the museums are giving human guidance (Museum Guides) for the visitors who visit the museums. Museums cannot provide a human guidance every time. Therefore, visitors have to find places that they want to visit. Furthermore, only the information that display near to the object can be got by visitor. It's not practical.another problem is that some guides may untrain. Guides are sometimes only offered at certain times and only for groups of visitors. A good guide can make all the difference between a mediocre and a memorable museum experience as a talented guide is able to hold the public with their stories. So to overcome this problem one solution is to replace the manual guide & place the RFID enabled palm device. It has been found that visitors remember more from an audio guide than fromreading labels and that they benefit people with disabilities. audioguides that allow visitors to branch into more specific content and select topics (or the language) allow for more personalized and varies tours from different perspectives.

II. LITERATURE SURVEY

Examples of works in applying radio identification frequency identification system (RFID) technology tomuseum services are aplenty and continue to grow in complexity. Application of RFID ranges from guidance andcontent communication systems to museum security and visitor tracking systems. The former applications focusdirectly on improving museum services.

Museums in Korea have had many application of RFID technology as a guidance system, specifically the work of on mobile RFID system in Jeju National Museum[4].Here, they presented a simple guidance system using PDAs as the main interaction toll with the exhibition items and also with museum staffs.

The Museum of Natural History in Aarhus in Denmark, uses RFID technology in an exhibit called "Flying," which includes birds tagged with RFIDchips. In this exhibit, visitors carry RFID readers and scan tags attached tobirds. Scanning a bird results in the presentation of associated text, quizzes,audio, and video to the visitor.[5]

Recent and sophisticated one is the Discovery Point, which is a small remote control like device that allows users to hearshort stories related to the work of art; it is in use at the Carnegie Museum of Art in Pittsburgh (Berkovich et al., 2003).

The Discovery Point prototype is a headset-less audio system consisting of the physical device that the visitor holds and special speakers which deliver pinpointed audio that can only be heard near the work of art[6]

In the "sotto voce:Exploring the Interplay of Conversation and Mobile Audio Spaces" also have designed electronic guidebook, Sotto Voce,has social interaction as a primary design goal. The system enables visitors to share audio information.[7]

In the "RFIDBased Guide Gives Museum Visitors More Freedom"by Yo-Ping Huang and Shan-Shan Wang, National TaipeiUniversity of Technology, Taiwan FrodeEikaSandnes Oslo University College, Norway have designed An interactivemuseum-guide system exploits RFID and handheld computers to let museum visitors better explore exhibition objects.[8]

III. SYSTEM MODULE

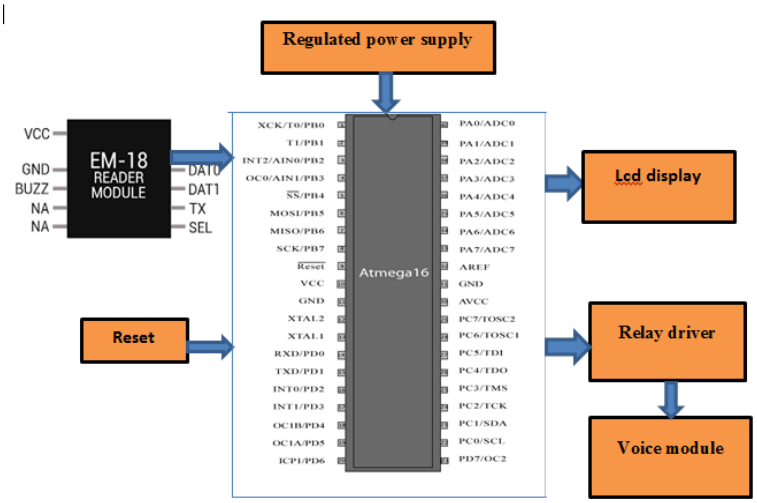


Figure 1.Block diagram

1.1.RFID Tag

The basic RFID building blocks are miniature electronic devices known as Tags which talkto Readers. The RFID tags,also known as transponder, are usually small pieces of material, typically comprising three components: an antenna, a microchipunit containing memory storage an encapsulating material. Tag are embedded or attached to an item. The Tag has memory whichstores information as either read only, write once or unlimited read/write. Tags typically range in size from a postage stamp to abook, depending on read distance and features. RFID tags come in a wide variety of shapes and sizes.

1.2.RFID Readers

The Reader is able to talk to the Tag using radio waves over the air to send or receive information. The distance between the Tag and Reader for the radio waves to be strong enough for the devices to talk with each other is an importantspecification in building a reliable RFID system. Once you have reliable radio communications between the Tag and the Readerthe system may take action based on results of their communication. RFID may send information downstream to your legacysystems or update digital information stored on the Tag. This wide range of options and the real time capability of RFID give itexciting new capabilities, distinct advantages and specific costs to build its infrastructure. RFID systems are also distinguished bytheir frequency ranges. Low-frequency (30 KHz to500 KHz) systems have short reading ranges and lower systemcosts.

1.3.Power Supply

Power supply can be applied to the board using MINI-B USB cable provided with the board. Onboard voltage regulators provide the appropriate voltage levels to each component on the board. Power LED(GREEN) will indicate the presence of power supply.Another way to power the board using Li-polymer battery, via on-board battery connector. On-boardbattery charger circuit enables to charge the battery over USB connection. LED diode (RED) will indicatewhen battery is charging. Charging current is ~250Ma and charging voltage is 4.2V DC.

1.4.Arduino

Figure 2.Arduino

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital andinput/output (I/O) pins that may be interfaced to various expansion boards (*shields*) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++.

1.5.Voice module [AP 89042]

Today's purchaser exaction the best in audio/voice. They want pure sound wherever they are in whatever format they want to use. APLUS provide the technology to increase a listener's audio/voice experience.The ap89042 series are enough strong audio processor along with high performance audio analog-to-digital converters(ADCs) and digital-to-analog converters (DACs). The ap89042 series are a fully integrated solution offering highperformance and unparalleled integration with analog input, digital processing and analog output functionality. Theap89042 series incorporates all the functionality required to perform demanding audio/voice applications. High qualityaudio/voice systems with lower bill-of-material costs can be implemented with the ap89042 series because of itsintegrated analog data converters and full suite of quality-enhancing features such as sample-rate convertor.

1.6.Hardware Interface

There are so many types of microcontroller families. Those are AVR, 8051 microcontroller, Arm, PIC microcontroller.Atmega 16 is selected The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture.By executing powerful information in single clock cycle, The ATmega 16 achieves throughputs approaching 1MIPS per MHZ allowing the system designer to optimize power consumption versus processing speed.ATmega16 has 16 KB programmable flash memory, static RAM of 1 KB and EEPROM of 512 Bytes. The endurance cycle of flash memory and EEPROM is 10,000 and 10000, respectively.ATmega16 is a 40 pin microcontroller. There are 32 I/O (input/output) lines which are divided into four 8-bit ports designated as PORTA, PORTB, PORTC and PORTD.

1.7.LCD Display

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector.This LCD has two registers, namely, Command andData.The command register stores the command instructions given to the LCD. A command is an instruction given toLCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. Thedata register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed onthe LCD. LCD is used to display the name of monuments which are placed in the museum.

IV. SYSTEM FLOW CHART

Visitors of museum are provided with RFID cards,which consist of a tag.After initializing the system RFID card will be swapped.System will check for authentication.If the visitor is authorized then the access will be provided.system will start playing the audio related to statue/monument.If the tag is not authenticate,it will display an error message.

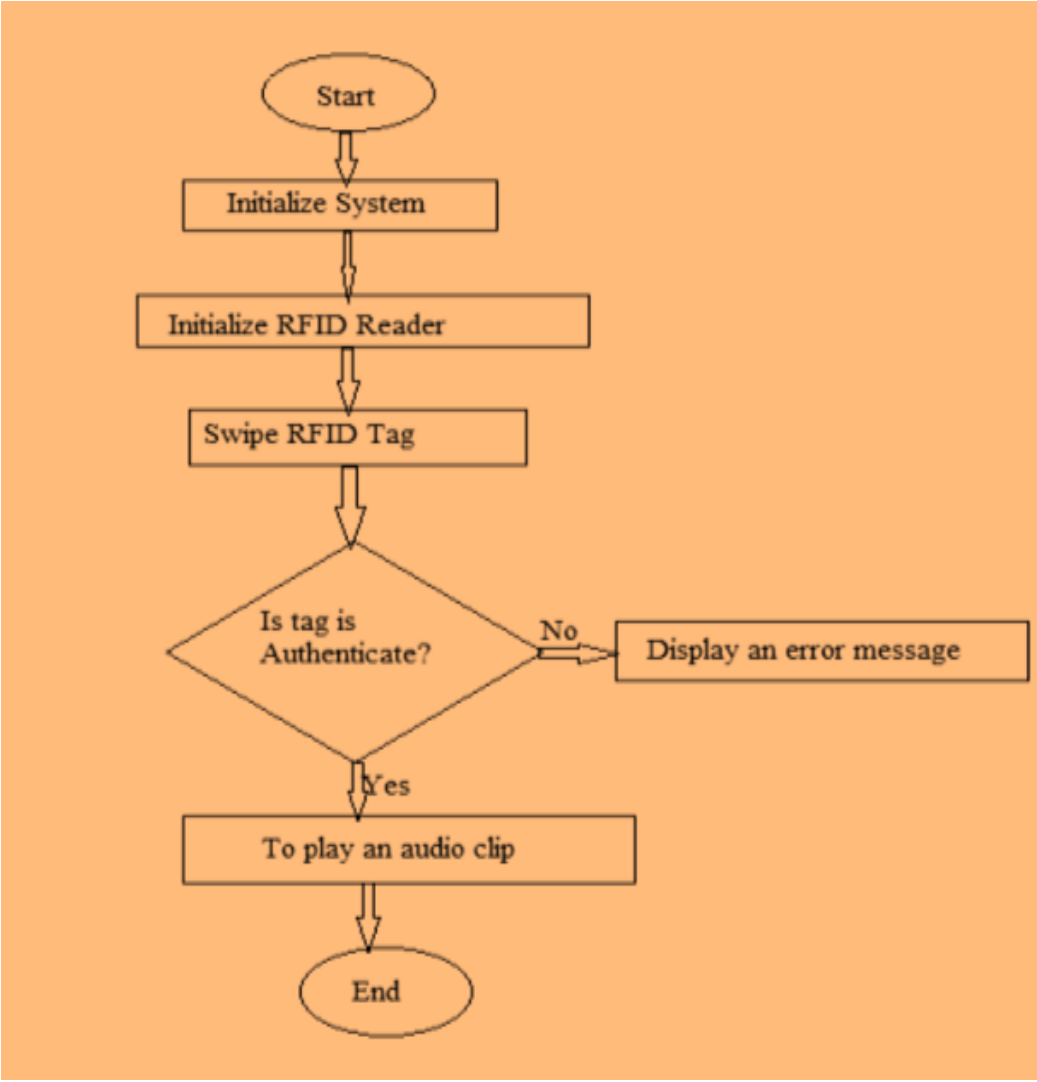
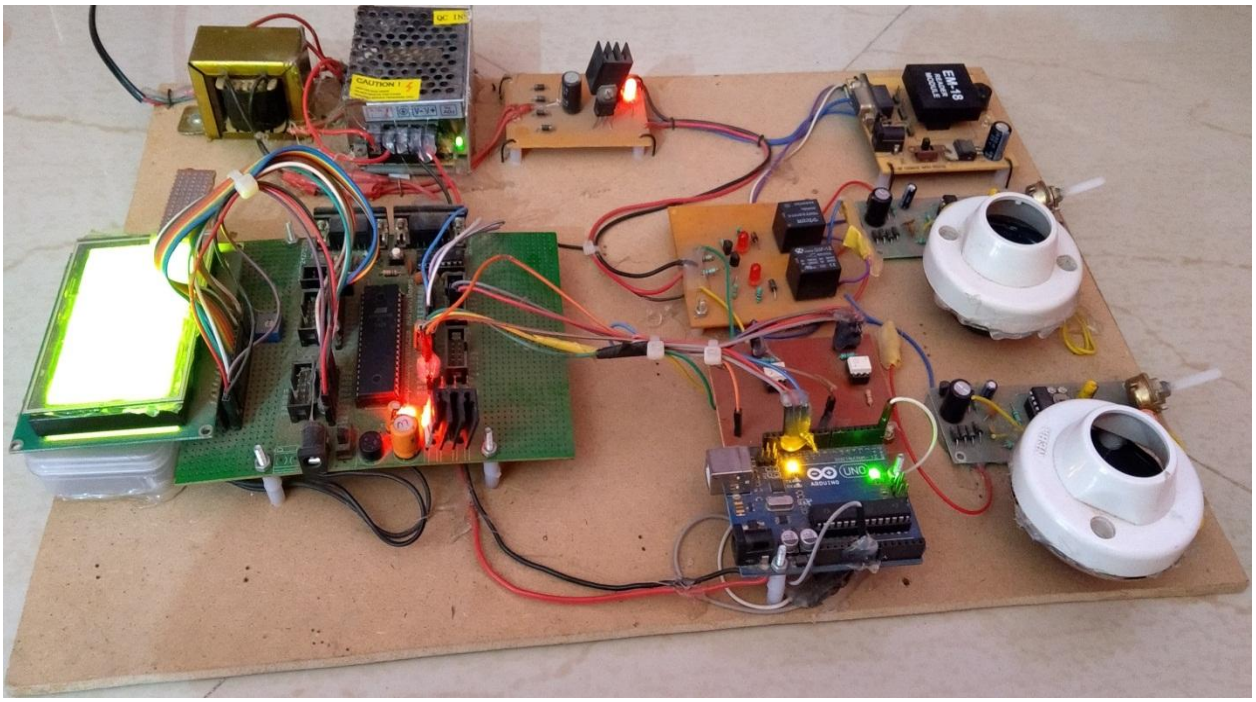


Figure 3.Flow Chart

V. RESULT AND COCLUSION



The main aim of the project was to implement an automated yet authenticated museum guided system using RFID.Hence,the project has been successfully completed and tested with Integration ofthe features of every hardware component for its development.The project has completed using very simple and easily available components making it lightweight and portable.The voice chip module is also interfaced for audio playback for the recorded voice messages relevant to particular objectThis helps tourists to move in any premises of museum with the help of RFID technology.This technology completely eliminates the need of manual guides and allow more personalized and varied tours from different perspectives. Finally we can conclude that this project application gives a very good feature and there is huge scope for further research and development for using the same with advanced technology.

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