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An Intelligent Vision based Guiding & Information System with Voice Announcement

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ABSTRACT

A guiding system is a specific mechanism that is used for providing key responses or information for the visitors. However, traditional guiding systems certainty have several disadvantages such like without real-time interaction with users and monotonous. This project presents an intelligent guiding system, which allows a user to react in real-time with it without any additional auxiliaries. A Museum guide system which is based on handheld devices (e.g. PDAs, short for Personal Digital Assistants) is introduced in this project. Radio frequency identification (RFID) is used to navigate and to get the index number of exhibit. Compared to traditional guiding systems, such as tape or CD guide machine, this system provides a visitors good visual and an audio experience with multimedia technologies. Visitors can either roam at their own pleasures and browse the information from the device themselves, or sit on one place and search for information and relevant interesting knowledge.

***Keywords*— serial communication, coding compiling, PDA, RFID module, burning.**

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I. INTRODUCTION

An embedded system is a special-purpose computer system designed to perform a dedicated tasks or function. Since the system is dedicated to particular tasks, design engineers can optimize it, reducing the size and cost of the products. Embedded system is a fast growing technology in various fields like an industrial automation, home appliances, automobiles, aeronautics etc. Embedded technology uses computer or a controller to do the specified task and the programming is done using assembly language programming or embedded C.

RFID enabled smart information system using SD card. It's a voice enabled device that speaks out as the information about the statue/painting etc. When the person is standing near the painting, it will detect the RFID tag and will play an audio clip relevant to that painting. This is achieved by placing a RFID receiver with the visitor (palm device).As soon as this palm device comes in the vicinity ID the RF tag the LPC2138 receives the RF tag unique id from the receiver. And matches it with its PWN data base. If match occurs, the LPC2138 will play an audio clip relevant to that statue or painting. Audio files are tagged with particular location coordinates and a tolerance range. In a location, the files that matches with the tolerance range are played.

The palm guide for museum Project involves the use of a handheld device. Interest in handheld technology is growing, especially in museums. Schools are becoming more interested in the technology. Proponents of handheld technology believe that because it is more affordable and more portable than other technologies its' popularity will grow.

Moreover, the handheld device approach is especially suitable for space constrained venues where there is no space for information kiosks in the vicinity of the artefacts. The small assistants are portable and the approach scales unlike information kiosks that can only be used by one person at the time. In our implementation, PDA (personal digital assistants were used as the handheld platform

II. LITERATURE SURVEY

A handheld or PDA (Personal Digital Assistant) has been described as a "small, low-cost, highly versatile, mobile computer" .It has also been described as a "small, handheld device that provides tools to enhance personal productivity". PDA's are mainly designed to be a Personal Information Managers (PIMs) and are usually includes

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calendar, address book, task lists and notes. Most PDA's have a pen based(stylus) input and usually have handwriting recognition. Some have an inbuilt keyboard or an external keyboard connected to it. Many PDA's are now equipped with wireless connectivity and Bluetooth, while other PDA's come with expansion slots which could host a number of add-ons including GPS and wireless connectivity. The two most popular kinds of PDAs are the Palm OS PDAs and the Microsoft Pocket PC.

The Electronic Guidebook Project was created at the Exploratorium in San Francisco in partnership with researchers from Hewlett Packard Labs and The Concord Consortium. The Electronic Guidebook project investigated "the use of handheld computing devices and wireless networks to support a richer learning experience for science museum visitors". The project's goal is to find out how a "network of mobile devices, wireless networks and web-based content" would allow users to "engage in a communication of activities before, during and after a museum visit to support a deeper engagement with the exhibits and the ideas they can communicate"

The project's technology enables users to interact with exhibits with a wireless device and have URL's sent to their PDA. This project made use of a Pi- station (point-of information station) that included a digital camera, infrared beacon, and RFID transmitter/receiver. The Pi-station is placed next to an exhibit. The users use a handheld device like a PDA to interact with these stations. The infrared beacon sends a URL to the handheld device when it is close to the exhibit. The corresponding webpage is then automatically downloaded from the content server.

In this way, text, images video, and audio are delivered to the PDA. In addition users bookmark the exhibits, take digital pictures with the camera near the exhibit and have a record of their visit. This user information can be stored in a "My Exploratorium" web page that that can be accessed later.

III. Limitation Of Existing System

- In current existing system manpower is required this is major limitation of the system.
- In manual guiding system more time is required to response to the people.
- In manual guiding system efficiency and accuracy is less.

IV. Hardware Development

Block diagram

Following block diagram shows all the elements of our system. It contains the mainly six elements which are as follows

1. LPC2138 ARM LPC2138
2. Announcement system.
3. RFID Reader.
4. SD Card.
5. 16*2 LCD Display.
6. Accelerometer.

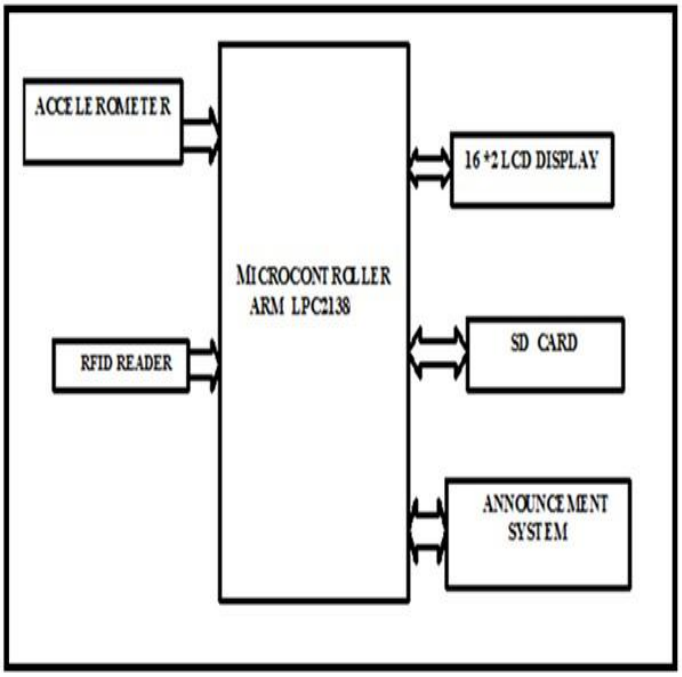

Fig 1: Block diagram of complete system

Main objective of this project is to give the information about paintings/statues in museum automatically without any guide.

Here we use 5 units for a visitor's guide:

1. RFID section
2. Voice announcement system
3. 3-Axis accelerometer
4. Liquid crystal display
5. SD card

RFID section

In this section the RFID receiver continuously scans the RFID tags. If the receiver receives the unique code of a particular painting, then it compares that unique code to its database, if match occurs then it announces the name and the detailed information of the painting.

Voice announcement system

As soon as the co-ordinates match, the LPC2138 announces the name and the detailed information of the painting using pre-recorded messages (wav files) via an SPI based micro SD card. These files are played back by the LPC2138 using the on-board DAC and the amplifier section and speaker. In the system, two buttons are provided to announce the information in two choices that means to play

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information in two languages - Marathi & English. A user can select any one of the two choices.

3-Axis accelerometer

An accelerometer is an electromechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic - caused by moving or vibrating the accelerometer.

By measuring the amount of static acceleration due to gravity, you can find out the angle the device is tilted at with respect to the earth. By sensing the amount of dynamic acceleration, you can analyse the way the device is moving.

Accelerometers use the piezoelectric effect - they contain microscopic crystal structures that get stressed by accelerative forces, which cause a voltage to be generated. Another way to do it is by sensing changes in capacitance. If you have two microstructures next to each other, they have a certain capacitance between them. If an accelerative force moves one of the structures, then the capacitance will change. Add some circuitry to convert from capacitance to voltage, and you will get an accelerometer.

The three axis accelerometer is basically used to identify the movements across the three axis i.e. x-axis, y-axis, z-axis. Accelerometer is an electronic device which is interfaced using I2C protocol and provides the reading after every 1msec. According to the requirement of the application, the LPC2138 will take the reading from the accelerometer within a fixed interval of time and do the necessary operation according to the requirement of the application.

Liquid crystal display

LCD is used in the project to visualize the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD.

LCD can also used in a project to check the output of different modules interfaced with the LPC2138. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

SD (Secure Digital) card

SD card is basically used as a storage device which is required to store the required data. The system database can be used to store in SD card and can be accessed from that whenever it is required. SD card is interfaced with the system using a protocol called SPI protocol

V. LIMITATION OF EXISTING SYSTEM

Flowchart

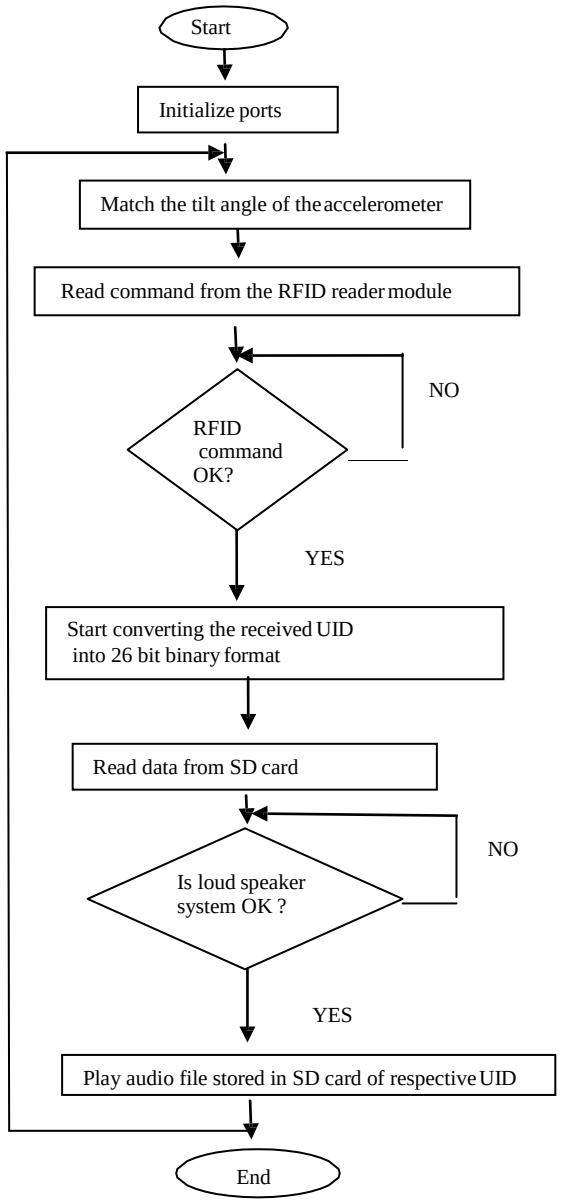

Fig 2: Flowchart of complete system

Algorithm

- Step 1: Start.
- Step 2: Initialize the ports.
- Step 3: Match the tilt angle of accelerometer.
- Step 4: Read the command from RFID reader module.

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- Step 5: Convert that command number into the 24bit binary format.
- Step 6: Access the information from respective tag from SD card through interface.
- Step 7: Play the information through loudspeaker system.
- Step 8 :End

VI. RESULT

With consideration of proposed architecture we developed a digital guiding system for museum with result of required information about particular object or picture.

VII. CONCLUSION

This paper represents a novel approach for user to efficient way of guiding information in museum by using RFID module. The use of handhelds is increasing in museums. Schools are usually slow in adopting new technologies, but a handheld's lower price and portability may make its' purchase more attractive. Researchers are starting to look closely at how handhelds within a curriculum can promote learning and collaboration. More research needs to follow, so we can begin to better understand how handhelds support learning.

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