

Handheld Device Based Smart Information System

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ABSTRACT:

In this era of an incredibly fast and evaluating industry of usability the topic of user experiences and user interaction has been increasingly popular and widespread lately. As life is getting easier and more plentiful, people are demanding more. They are not satisfied with powerful features and solid quality, the more intuitive way to use the function and more decent user impression is what they need and prefer. The handed device based smart information system is designed to replace tourist guides to an extent. It's a voice powered device that speaks out as the tourist is travelling from one momentum to another (museum). This is achieved by placing a RFID receiver with the tourist (palm device). As soon as the electronic hand held [1][2].

KEY WORDS: Museum Guide System, RFID, Reader, RFID Tag

1. INTRODUCTION

An embedded system is a special-purpose computer system designed to perform a dedicated function. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded system is fast growing technology in various fields like industrial automation, home appliances, automobiles, aeronautics etc. Embedded technology uses PC 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.

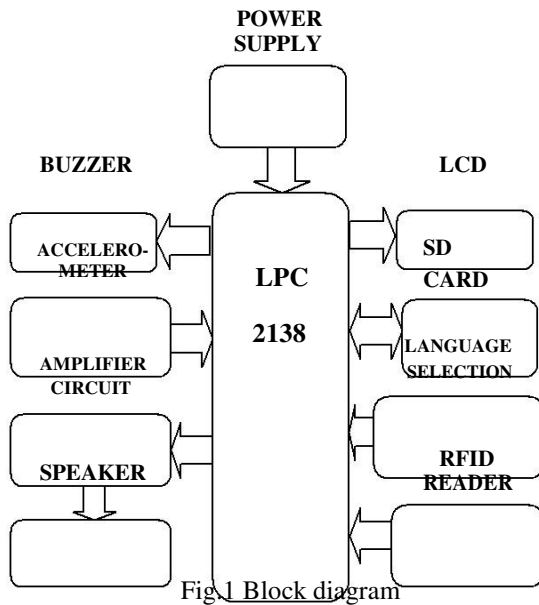
This is achieved by placing a RFID receiver with the visitor (palm device). As soon as the palm device comes in the vicinity of the RF tag the LPC2138 receives the RF tag unique id from the receiver. And matches it with its PWN data base. If match occurs, the LPC2138 will play an audio clip relevant to that statue/painting. Audio files are tagged with location coordinates and a tolerance range. In a particular location, the files that match 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 artifacts [3].

2. LITERATURE SURVEY

Recent and sophisticated one is the Discovery Point, which is a small remote control like device that allows users to hear short stories related to the work of art; it is in use at the Carnegie Museum of Art in Pittsburgh (Berkovich et al., 2003)[4]. 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. In the "RFID-Based Guide Gives Museum Visitors More Freedom" by Yo-Ping Huang and Shan-Shan Wang, National Taipei University of Technology, Taiwan Frode Eika Sandnes, Aslo University College, Norway have designed An interactive museum-guide system[5].

3. BLOCK DIAGRAM



4. EXPLANATION

System development starts with the design architecture of the proposed design. A transparent block diagram has been used to outline the proposed design as shown in Figure. The objective was to replace the manual guide. Guides use various pedagogical strategies to make the contents interesting. In order to provide personalized learning, (Radio Frequency Identification Device (RFID) technology is used to associate each user with a unique identification. RFID comprises a reader and a tag. The reader receives the identity of an object from the embedded tag wirelessly using radio waves and then compares it with the corresponding identification stored in the database.

When a match is found, detailed information is retrieved and user can able to listen the audio clip of the painting, with these our project is providing images related to that painting.. So the user can take a audio as well as image tour of the museum.

A. AXIS ACCELEROMETER (ADXL330)

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 analyze 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. In our project, we are using IC MMA7660FC as a 3-Axis Accelerometer[1].

B. MICROCONTROLLER LPC2138

The LPC2138 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with real-time emulation and embedded with 512 kB of embedded high-speed flash memory.

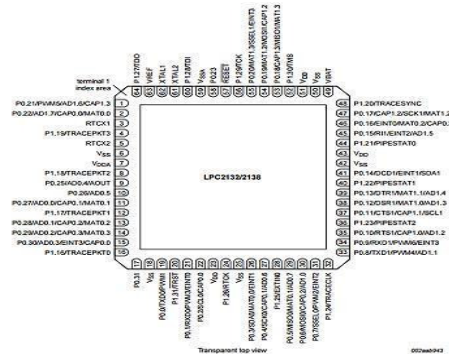


Fig 2. LPC2138

Features:

- a)Fast GPIO ports enable port pin toggling up to 3.5 times faster
- b)In-system programming/In application programming (ISP/IAP) via on chip loader.
- C)UART0/1 generates fractional baud rate generator.
- d) Two 32-bit timers/external event counters
- e) Low power real- time clock with independent power dedicated 32 kHz clock input
- f) Single 10-bit DAC

g) 8-channel 10-bit ADC

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

D. 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.

EM-18 RFID READER MODULE:



Fig 3. EM-18 RFID reader module

The EM -18 RFID Reader module operating at 125 kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a Wigand output.

FEATURES:

- a) RF transmit frequency:125khz
- b) Supported standards EM4001 64-bit RFID compatible
- c) Communicationparameter:9600bps,8,N,1
- d) Power supply:4.6V-5.5VDC
- e) Current consumption=50ma<10ma

- f) Compatible with 64 bit EM4001.
- g) powered up with 5v supply.

E. LIQUID CRYSTAL DISPLAY

LCD is used in a 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 microcontroller. 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.

5. APPLICATION

A. EXHIBITION:

For giving the information of different painting, project etc.in detail automatically. In exhibition, there are so many antics are kept.so,the people can get dedicated information about that antics.

B. MUSEUM:

In museum, system helps us to give information about various statues, historical or ancient objects. In museum, this system gives people can except inspiration and fun instead of pure knowledge when visiting art museums.

C. SHOWROOM:

Companies launching new vehicles. So, the information reach to people by using this smart system.example: mercedes Benz launches cars mostly kept sales in showroom.so,the information is provide to customers for various features of different cars and models.

6. ADVANTAGES

- a). Efficient way of information for blind people:

It will give information automatically, as so need to handle the system. The blind people can not see the painting information so, they can listen by using this system.

- b). Less time delays:

Time required to matched the frequency of RFID card and play audio of painting is less. This system

uses location coordinates of accelerometer. So automatically information play related to painting.

c). fully automated system:

Information about painting stored in SD card will play automatically. RF communications between tag and reader, the system may take action based on output of Rf communications.

d). Low power requirements:

System controlled by micro-controller power required to microcontroller is low. It has operating voltage range=2.0 to 5.5v Maximum sink/source current=25ma, Maximum current required for transformer=750ma.

7. CONCLUSION

In behalf of providing a simple way to absorb new knowledge for every visitor in museums We will design this project for overcoming the difficulties of existing system .Efficient use of available components will be done for this project. We believe that the establishment of on-hand virtual museum would give people the inspiration to learn knowledge that less noticed in daily life..

This helps tourists to move in any premises of museum with the help of RFID Technology. The voice chip module is also interfaced for audio playback for the recorded voice messages relevant to particular object. I believe that our step is towards complete automated guidance system for tourists. 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 the help of advanced technology.

8. FUTURE SCOPE

The “Wheel chair” can be implemented for physically handicapped persons. By using touch screen. We can also move the wheel chair left, right, forward and reverse. Useful for physically handicapped persons.

9. RESULTS

The “handheld based smart information system “will give the paintings information automatically according to the position of 3-axis accelerometer i.e LEFT, RIGHT, UP,AND DOWN.

A single RFID card having information about four different painting. Depending upon the position of accelerometer the Audio will be played of respective painting.

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