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Pervasive Interaction Smart Bag Using RFID Technology

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Abstract — Pervasive Interaction Smart Bag is a novel idea that uses RFID Technology for packing our items smartly. Radio Frequency Identification (RFID) uses a reader to get information from a tag attached to the item. By adopting this technique, a Smart Bag is formulated. Entities which are utilized in building a smart bag are RFID receiver, Keypad, microcontroller, LCD, Voice IC, GPS, GSM. List of items and its count can be given by using keypad. Items are hooked up with RFID tags. Communication circuits comprises of microcontroller and RFID receiver in which message passing, reading of item is done. When the items are placed inside the bag, the RFID receiver reads the RFID Tag and sends the items in the bag to the microcontroller. The microcontroller compares it with the entered list. If any item is missing then the microcontroller produces a voice alert of missing item. The Smart Bag consists of a Digital Lock. The bag can be only unlocked by entering the secret code to the microcontroller. When an unauthorized person tried to open the bag the microcontroller sends the temporary message to the owner using GSM modem. This message consists of the GPS location of the bag.

***Index Terms*—RFID, Microcontroller, GSM, GPS, Digital Lock, APR 9600, MAX 232.**

I. INTRODUCTION

Radio frequency identification (RFID) is one of the greatest technologies. RFID technology provides enormous economic benefits for both business and consumers. RFID tags attached to items they may be carrying or wearing. Radio Frequency Identification (RFID) uses a reader to get information from a tag attached to the item. FID technologies are grouped under the more generic Automatic Identification (Auto ID) technologies. By adopting this technique, a Smart Bag is formulated. The objective is to design "RFID BAG". Everyone forgets items from time to time; some more than others. This problem is occurring not only for older people everyone having this problem. This project is intended to solve this problem by keeping track of a person's daily used items [3]. A smart bag that helps users remembers their daily packed items and track their packing items over time. Also remind users when items are forgotten [1]. In Existing System [5] the RC system is based on a multi-RFID approach in which each RFID chip is associated to an RC key. Once a key is pressed, the respective chip goes to active mode and is read by the reader to identify the pressed key; and the inactive chips do not interfere with the active one. Each key of the RC is associated to an RFID with a unique identifier, which allows the device to be controlled to identify the key pressed by the user [5].

II. WORKING REPRESENTATION

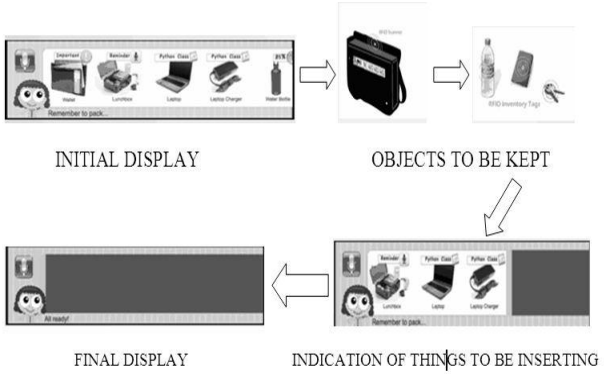

Fig1. Working representation of the Bag

The above figure shows that how the display is working while packing the items in the bag. Graphical Display is used because using this display only able to show the pictures on the display. Other displays able to show only the text or numbers. In Tag contains the unique identification of item. Already the information about what are all the items packed inside the bag is stored in the microcontroller using the keypad. In the display the picture of items which we pack is shown. When the items are placed one by one inside the bag, the RFID receiver reads the RFID Tag [6] and sends the item's information in the bag to the microcontroller. When the microcontroller receives the information the picture of item which is read is become invisible [1]. The microcontroller compares it with the entered list. If any item is missing then the microcontroller produces a voice alert of missing item. Digital code lock is fixed in the bag. The bag is open only by entering password by using keypad in the Digital code lock. When an unauthorized person tried to open the bag the microcontroller sends the temporary message to the owner's mobile using GSM modem. This message consists of the GPS location of the bag. Using this message find out where the bag is. This System is also used as packing system in Industries, Shops, and Groceries. Main advantages of this system is giving alert of missing items when packing, identify the location of the bag, location of the bag is received as message format. Here many tags are used, but they are colliding with each other based on the paper [4].

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III. SYSTEM ARCHITECTURE

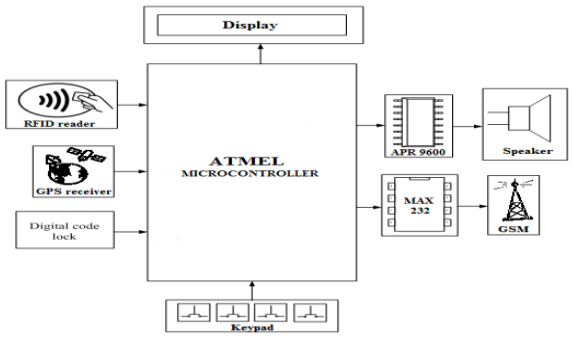

Fig 2. System Design

A. Atmel Microcontroller (AT89C51)

Microcontroller is the heart of the device which handles all the sub devices connected across it. We have used Atmel microcontroller. It has flash type reprogrammable memory. In this system use Atmel Microcontroller having 4K bytes of Flash programmable and erasable read only memory (PEROM) then provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89C51 is a low power, high performance C-MOS 8-bit microcomputer with 4k bytes of flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry standard MCS-51 instruction set and pin out.

B. GPS

Global Positioning System (GPS) is a navigational system that can pinpoint our position anywhere on the globe. The satellites transmit signals that can be detected by anyone with a GPS receiver. GPS receivers take this information and calculate the user's exact location. GSM is used for sending message about current location.

C. MAX232

The MAX232 is an IC that converts signals from an RS 232 serial port to signals suitable for compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals, operates at a broader voltage range, from 3 to 5.5 V.

D. APR 9600

APR 9600 is a Single-Chip High-quality Voice Recording & Playback device. It is User-friendly, easy-to-use operation, Non-volatile Flash memory technology, No battery backup required, No external ICs required, Minimum external components be used. Use "Graphical display", Display in bag contains pictures showing the items on the packing list daily.

IV. IMPLEMENTATION

"KEIL C COMPILER" is used for compilation. Keil development tools for the Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. The Keil Development Tools are designed to solve the complex problems facing embedded software developers. Simulation helps you understand hardware configurations and avoids time wasted on setup problems. Additionally, with simulation, you can write and test applications before target hardware is available. All code is written in C, so no assembly language is required.

V. CONCLUSION

The progress in science & technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place. The proposed system based on Atmel microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform several tedious and repetitive tasks. Though it is designed keeping in mind about the need for industry, it can extended for other purposes such as commercial & research applications. Due to the probability of high technology (Atmel microcontroller) used this system is fully software controlled with less hardware circuit. The feature makes this system is the base for future systems. In future we can use this idea of smart bag to packing system in factories, shops, super markets etc.

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