Log on to Living Smart Room via Bio Capsule

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Abstract: **In this paper, we have designed a Log on to Living Smart Room via Bio-Capsule is a smart room system that would provide a convenient and hassle free way to turn on the basic necessities (lighting and heating/ac) when you enter a room. This can be very beneficial to elderly and handicapped people as it can save them several trips to the light switch The system identifies different users through the RFID technology. Each user carries his or her own Bio-capsule. The antenna placed at the room entrance would sense the tags and interact with the RFID reader to identify the users present and adjust the environmental settings when the users come into or leave the room.**

Keyword- RFID, Atmega16Microcontroller, Antenna, Temperature Sensor, Colour LCD, Power Supply, Light/Temperature Switches.

I. INTRODUCTION

Bio-capsule is a glass cylindrical RFID tag. It is very similar to those implemented in pets/humans for identification purpose. The intent of this project is to create a smart room using RFID technology. One will carry Bio-capsule RFID transponder in one's purse or wallet. Whenever the RFID tag gains adequate power from the antenna, it will transmit a specific ID to the RFID reader. The RFID reader will communicate to a microprocessor, which controls the room settings based on the ID information. Each ID will have its own user preferences for room lighting and temperature. The microprocessor will act as thermostat and automatic light switches. If two or more people enter the room at the same time, the room settings will change based on a priority.

II. SYSTEM ARCHITECTURE

When the RFID Card Reader is active and a valid RFID transponder tag is placed within range of the activated reader, the unique ID will be transmitted as a 12-byte to the controller and according to the given priority the cabin is contrl and the temperature, lighting, etc are controlled by the PIC microcontroller.

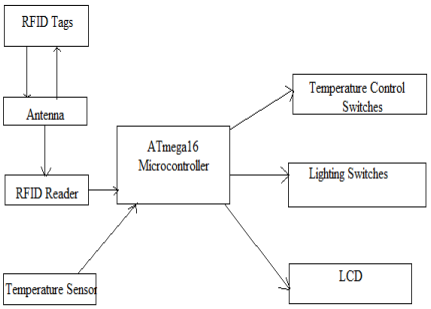

Fig 1. Main Block Diagram

The RFID reader will communicate to a microprocessor, which controls the room settings based on the ID information. Each ID will have its own user preferences for room lighting and temperature. The microprocessor will act as thermostat and automatic light switches. If two or more people enter the room at the same time, the room settings will change based on a priority system, which user number 1 gets the first priority and so on. The user with the highest priority will have say on the room conditions. There will also be a colour LCD monitors and user input pad coming with the system so that the users can change the settings easily through the two devices.

A. Atmel Microcontroller AT89C51

Atmel microcontroller have 4K bytes of flash reprogrammable and erasable read only memory (PEROM) that provides a flexible and cost-effective solution to many embedded control applications. The AT89S51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timer/counters, a five-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry

. B. RFID Reader

The RFID reader will be communicating with the microcontroller through RFID tags and receives the feedback from the RFID tags through the antenna. The reader will then pass the information to the microprocessor for further processing.

C. Antenna

The antenna connects to the RFID reader and works as the communication "bridge" between the RFID tags and the RFID reader. The RFID reader transmits the signal and alternating power wave and receives the feedback from the RFID tags. This project plans to use two antennas at the doorway to help the system in detecting the movement direction of each user.

D.** Temperature **Sensor

The temperature sensor will be placed near the microprocessor with access to the room environment. It detects the current room temperature actively and outputs the figure to the microcontroller. The output from the temperature sensor is a digital output, and the communication between the sensor and the PIC is through SPI.

E. Colour LCD

The LCD display is the communication medium between the system and the users. The system will convey the information to the users through the LCD. The LCD will be interfacing with a parallel-load multi-bit serial transceiver, which connects to the microcontroller.

F. Lighting / Temperature Switches

The microcontroller controls all the lighting and temperature control switches. The on and off for the switches changes based on the desired lighting and temperature settings stored in the microcontroller by different system users. The temperature control switches include switches of different temperature related devices (i.e. fans, heaters).

G. Power supply

This project will require a power supply with different output voltages for different components of the system. The RFID reader and the main circuit needs a 5V DC supply, the LCD backlight requires a 6 to 7 V DC supply, and the LCD logic will need a 3.3 V DC supply.

III .LITERATURE SURVEY

Automated Attendance System

AUTOMATED ATTENDANCE SYSTEM' is designed to collect and manage student's attendance records from RFID devices installed in a class rooms. Based on the verification of student identification at the entrances system, the RFID tag can be embedded in the ID card of the individual. First to activate a new session (hour) the teacher swipes her RFID tag this marks a new attendance session during which the students can swipe once to increment their attendance. The RFID module operate in 125Khz range, when a tag passes through its vicinity, the module senses its presence and extracts its unique serial number and passes this code into microcontroller which matches the code to the correct person and increments the attendance of the particular person. The two major problems faced by organizations are time consuming manual attendance and wastage of electrical power. Our project is going to solve these problems by using RFID technology. The project is designed to store up to 50 card IDs but it is easily scalable up to 65000 card IDs but for that it requires external memory. Radio Frequency Identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders.Normally the RFID system comprises of two main parts: RFID Reader and RFID Tag. RFID Reader is an integrated or passive network which is used to interrogate information from RFID tag. The RFID Reader may consist of antenna, filters, modulator, demodulator, coupler and a micro processor.

IV.ADVANTAGES

1. Automatic Temperature Sensor
2. Automatic Light Sensor
3. Web Camera

V. DISADVANTAGES

1. Short range.
2. This program would most likely be solved with 2 antennas and doing some testing on how best to setup the system.

VI. FUTURE SCOPE

At the end we will achieve smart room depending on the priority using log on to cabin via bio-capsule using single antenna for transmitter and receiver. In future we will use two antenna separate for transmitting and receiving purpose. For further improvements, the system should be developed to be able to handle more than 5 users. Depending on the room type, up to 100 users might be needed. Another issue is there was not enough time to try out the anti-collision feature which is supposed to help the reader detect multiple tags. This should improve the reliability of the reader when the number of tags approaches 5 or more.

VII. CONCLUSION

At the end we will achieve smart room depending on the priority using log on to cabin via biocapsule. 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. Overall, the project was successful. The main components of the project were completed and functional. The project had several major components and it can be considered a success in implementing each part and combining them together to make one working system. The RFID reader is fairly consistent in picking up tags. The temperature sensor constantly updates and is accurate to 1deg Celsius. The LCD was a big success in that it is visually pleasing. It has several easy to use menus for users

to use. Although there is only 1 antenna, the project included the ability to use 2 antennas for detection through the relay switching.

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