EMBEDDED MANAGEMENT SYSTEM FOR OUT PATIENT DEPARTMENT

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Abstract
In the recent past one field which has brought in many changes in the human lives is the technology. Technology is meant for bringing innovation in human lives and reduces the efforts to accomplish a task. Corporate hospitals today employ large number of doctors specialized in various fields. Out patients who wish to consult a particular doctor finds it very difficult to locate their respective doctor’s cabin. Keeping the patient’s difficulty of tracking the doctors, an embedded based device has been designed to assist patients to easily locate the doctor’s cabin. The device displays the room no and token number outside of the consultant’s room and as well as on the waiting room. The data of number of patients for various illnesses was collected from registration counters. The data for arrival patters of patients, the time taken at registration counters and at wards can be collected for one week period. The collected data’s will be used to calculate the efficiency of the hospital. An embedded system is defined as “A Programmable device, which can be designed to perform dedicated functionalities of a trivial system to scheduled functionalities of a large system”. The main aim of this project is to reduce the efforts of the patients who come to the hospital to consult the doctor to resolve their health concerns. And also useful for the hospital administration. This project is accomplished using embedded devices like microcontroller, microprocessor, printer, SD card, 7 segment led, and RS-485 communication protocol.

Keywords: RS-485, LCD, Memory Card, Key board, RTC, Microcontroller, Printer.

1. Introduction
In life every day, an implanted framework assumes a key part in making way of life simple and uncomplicated. An inserted framework is characterized as "A Programmable gadget, which can be intended to perform devoted functionalities of an insignificant framework to booked functionalities of a vast framework". The primary point of
This task is to lessen the endeavors of the patients who go to the doctor's facility to counsel the specialist to determine their wellbeing concerns.

This undertaking is proficient utilizing standard inserted gadgets like Microcontrollers, SD card, LCD, RS-485 and utilizing SPI(Serial Peripheral Interface) correspondence convention to set up correspondence between the console and the Microcontroller.

2. Block Diagram

The piece outline of outpatient unit is appeared in Figure 1. Figure 2 portrays OPD (Out Patient Office) unit in various specialist's room and Figure 3 portrays the showcase unit which shows the patient name and token number outside the advisor's room.

3. Description

The Main small scale controller (Master OPD Unit) is interfaced with the few generally utilized gadgets, for example, RTC(Real Time Clock), Memory Card, LCD and PC Key Board. Each of these gadgets have their one of a kind
utilization in this procedure. The RTC is utilized to store the Event Date and Time, and I2C correspondence is utilized to exchange the information between the primary microcontroller unit also, RTC. PC console is utilized to record the points of interest of the patient in the Memory card and the correspondence between these two is done utilizing SPI interface.

The Memory card is utilized to store the points of interest of the patients with the end goal of showing on the TFT screen which is conveyed outside the each specialist's room. Contingent upon the quantity of offices in the healing facility, square with number of TFT screens are utilized to list down the patient's names who have themselves enlisted under every specialist. Each specialist's room comprises of an OPD slave unit, utilized for making a correspondence between the gathering (Master OPD Unit) and their individual desk areas, this prerequisite can be caught utilizing RS-485 correspondence convention which is like serial correspondence convention however varies in the separation over which RS-485 transmits the information. Each OPD slave contains one slave microcontroller, switch and LED. The slave microcontroller is utilized to get the information from the principle microcontroller (Master OPD unit) to continue further. The switch is interfaced with the slave microcontroller unit to begin the solicitation strategy i.e. at the point when the switch is squeezed the OPD slave microcontroller sends solicitation to principle microcontroller (Master OPD Unit) asking for the following patient's subtle elements; when the fundamental microcontroller gets informed, it gets the following patient's information from the Memory card utilizing SPI correspondence convention. The LED generally condensed as Busy Driven shows the status of the solicitation which is made by a specialist. At first the LED starts in an OFF condition.

After the treatment is done, the specialist presses the change to advise the fundamental microcontroller unit, then the LED is tuned to dynamic (ON) State; when the OPD slave gets the information from the MCU, the OPD slave LED consequently kills. The same data can be used to show on the TFT screen which is interfaced with the OPD principle microcontroller unit utilizing RS-485. The TFT screen is the principle highlight of this innovation; it shows the rundown of the patients who have enrolled under every specialist.

4. Hardware Components

Liquid control display: It is utilized at the gathering to let the secretary think about the quantity of individuals enrolled. It likewise fills the need of guaranteeing whether the assistant is putting away the points of interest in the right design or not. Max-485: It is the critical part in this innovation since it can be utilized to set up the RS-485
correspondence; building up this correspondence is so critical in light of the fact that it exchanges the information from the primary microcontroller to the slave microcontroller unit.

**keyboard:** It is the critical part in this innovation since it can be utilized to set up the RS-485 correspondence; building up this correspondence is so critical in light of the fact that it exchange the information from the primary microcontroller to the slave microcontroller unit.

**RTC:** It is an extremely essential implanted gadget which stores the date and time of the occasions happening on consistent schedule, and the correspondence between small scale controller and RTC is built up utilizing I2C correspondence convention.

**Memory Card:** It is a very basic electronic device which we use frequently in our daily life. This is used for storing the Data which is very useful in displaying on the LCD, which is the main essential feature of this technology.

**TFT screen:** It is an very important part of this innovation which is utilized to show the names of the patients who are enlisted.

5. **Procedure**

The Main miniaturized scale controller is interfaced with the RTC, PC console and Memory Card. The PC Console is interfaced with the Main Microcontroller Unit with a perspective to make a note of the points of interest of the individual who goes to the healing facility and the same is put away in the memory card. Points of interest incorporate the individual's name, sickness, token number and the name of the specialist the patient wishes to counsel. The RTC is refined with the principle microcontroller with a goal of putting away the occasion date and time, So that points of interest can be utilized further. The correspondence between smaller scale controller and RTC is e fulfilled utilizing I2C correspondence convention. The TFT shading screen shows the patient's name and token which is gotten (utilizing RS-485 correspondence) from the primary microcontroller unit. Once the specialists get into their individual work spaces, the assistant presses the begin catch which is only a key (F2) from the PC console. The begin catch is devoted for starting the usefulness of this idea. When the begin catch (F2 Key) is squeezed the names of the enlisted patients under every specialist is shown on the TFT shading screen which is conveyed outside the specialist's room. The TFT screens are interfaced utilizing serial-USB link. In the specialist's room one more smaller scale controller unit (OPD Slave) is conveyed which is typically interfaced with the Switch to send the
solicitation to the principle microcontroller to get the data about the following patient. In Each Doctor's room, one LED is conveyed to show the status of the solicitation made by the specialist utilizing a switch. This LED is shortened as Busy LED. Toward the starting, Busy LED begins in switch off condition; once the Doctor is finished with the treatment for one specific patient, the specialist presses the switch, thus the LED is tuned to dynamic state. This solicitation cautions the fundamental microcontroller to send the subtle elements of the following individual recorded in the Memory Card. Once the Main Microcontroller is finished with the Data getting from the Memory card utilizing SPI correspondence convention, the Microcontroller exchanges the information utilizing RS-485 to the slave microcontroller. Once the slave microcontroller gets the information, the Busy LED is tuned to put off state showing that the solicitation made by the specialist is prepared. The entire correspondence between the Main microcontroller unit and the slave microcontroller is conveyed in the specialist's room utilizing RS-485 correspondence. At the gathering likewise, the LCD is sent to dispose of the numbers which are being put away in the Memory Card.

6. Result

The idea of the "Outpatient Department" has been composed and created. It can be moved up to remote innovation for future reason.

7. Conclusion

Toward the day's end, innovation must be utilized to make a way that smoothen the human's life. This undertaking has been intended to make enlistment adaptable and the patients additionally are told their turn of meeting the specialist.

8. References

2. www.atmel.com, AVR Microcontrollers
3. www.dharmanitech.com SD Card interfacing


