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Smart Ordering and Delivering using PIC Microcontroller

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ABSTRACT: Now-a-days, machines have started ruling the world. Industries are slowly getting automated completely. This Automatic food ordering and delivering machine brings in automation on to a sector in the food Industry. There are separate machines for carrying out various tasks. This is a single machine, through which we can easily order the food and get delivered to our dining place instantly. This system helps in reducing the man power and also the time spent over an individual order. It also helps in decreasing the wastage of food by giving correct information to the cook about which item is ordered and which item should be prepared. This system requires only one operator for placing the order on to a plate and final checking of the ordered numbers and to which it get to be delivered. This single machine is also compact and portable. The process is been carried out with the help of PLC. For better trouble shooting and controlling of this machine, we have used Mitsubishi PLC. With the help of this interfaced system, a company's present production status can be known in hand and this helps in taking any immediate decision. This immediate report gets updated automatically as the production continues. All the fault analysis will be carried out easily.

I. INTRODUCTION

The World is slowly getting automated completely. The machines are completely been occupied by us and they have started ruling the world. Mostly everywhere imported machines are used. Though these machines are less cost and more accurate, there are some demerits too.

The food industry hasn't witnessed the growth in the field of technology aiding the industry to the most optimum availability of the mechanism in towards World, that mainly being overall automation in the manufacturing division of the food industry. Thinking regarding this concern is where we came with the thought of designing the automatic food ordering and delivering machine with time management.



Our aim is bringing automation in the food sector in Star hotels and restaurants. In addition to the automatic food ordering mechanism, we also intend to introduce more automation. This will ensure the full automation in food industry which it has been lacking. The system is designed with the present available materials and components as to bring simplicity and more importantly cost effectiveness in the system. The implementation of the entire assembly can be easily incorporated with waste management, reduction of high manpower and time without any high volume changes.



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Thus to solve this we are to introduce a continuous process through IOT and PLC. The machine is programmed to order, bill and deliver the food items continuously. There are separate automated components for ordering at customer end billing at the management end and preparing the ordered items and automatically deliver the items at respective tables. This will ensure that, it is a single machine which does all the process of the food Industry except cooking.

II. STATEMENT

This case study looks at the problem of setting up a fast food restaurant. The basic problem in the food service industry is that restaurants are not realizing efficiencies that would result from better applications of technology in their daily operations. Every fast food has counter where you can place your order and then make the payment. So every fast food needs an employee for taking the order and processing the payment. Labor rates are increasing every now and then and it is difficult to find employees in the middle of the highway, hence to solve this problem we plan to design a "Self Served Fast Food System."

This self-service fast food restaurant will be equipped with a user-friendly touch screen, a credit/debit card reader, and software for completing the process at the backend. For this system there will be a system administrator who will have the rights to enter the menu with their current prevailing prices. He/she can enter anytime in the system by a secured system password to change the menu contents by adding or deleting an item or changing its price. Now when the customer enters the restaurant, he will place his order with the help of the touch screen using the intuitive graphical user interface, right from the selection of language till the payment confirmation. He will select from the food options according to his choice and the system will display the payment amount he has to make once he has finished with his order. He will have the option of paying the bill by cash, debit card or a credit card. The user will slide his card and the system will check for the validity of the card and the payment will be made. A receipt will be printed containing the order number and the order will be sent in the kitchen for processing.

III. SURVEY

Initially the restaurants were atomised with the limited range RF transmitter for food ordering system, which has the transmission range of only 4-5 meters, this was overcome by the technology proposed in [1]. According to this concept of an automatic self-ordering system, order is directly given to the chefs by the customer. The real time ordered data is sent wirelessly using Zigbee technology. Chef can get the information about the order on the display screen along with the table number. In previous technology, use of microcontroller unit on table increases the complexity and PDA system to the waiter increases the Cost of installation and maintenance. LAN system from server to chef increases the networking complexity. Hence this was improved in [2]. This paper aims to implement a restaurant ordering system which enables each customer to wirelessly order his own choice of food straight from the e-menu shown on an embedded touch screen on each customer table without bothering any staff and send the order straight to the kitchen. The whole food process can also be monitored via this touch screen.

IV. HARDWARE COMPONENTS

In smart ordering and delivering system, we have developed a mechanical setup for the process. The following are the hardware components used,

PIC 16F877A Microcontroller
Receiver and Transmitter
LCD
Crystal Oscillator

PIC16F877A MICROCONTROLLER

PIC microcontroller can be programmed with different software's that is available in the market. There are people who still use Assembly language to program PIC MCUs. The below details is for most advanced and common software and compiler that has been developed by Microchip itself.

In order to program the PIC microcontroller we will need an IDE (Integrated Development Environment), where the programming takes place. A compiler, where our program gets converted into MCU readable form called HEX files. An IPE (Integrated Programming Environment), which is used to dump our hex file into our PIC MCUs.



IDE: MPLABX v3.35
IPE: MPLAB IPE v3.35
Compiler: XC8

Microchip has given all these three software for free. They can be downloaded directly from their official page. I have also provided the link for your convenience. Once downloaded install them on your computer. If you have any problem doing so you can post them on the comment below.

To dump or upload our code into PIC, we will need a device called PIC kit 3. The PIC kit 3 programmer/debugger is a simple, low-cost in-circuit debugger that is controlled by a PC running MPLAB IDE (v8.20 or greater) software on a Windows platform. The PIC kit 3 programmer/debugger is an integral part of the development engineer's tool suite. In addition to this we will also need other hardware like Perf board or breadboard, Soldering station, PIC ICs, Crystal oscillators, capacitors etc

2) RECEIVER AND TRANSMITTER

The 433MHz wireless module is one of the cheap and easy to use modules for all wireless projects. These modules can be used only in pairs and only simplex communication is possible. Meaning the transmitter can only transmit information and the receiver can only receive it, so you can only send data from point A to B and not from B to A.

The module could cover a minimum of 3 meters and with proper antenna a power supplies it can reach upto 100 meters theoretically. But practically we can hardly get about 30-35 meters in a normal test conditions.

So if you are looking for a simple wireless communication to transmit information within a short distance then these RF pair could be the right choice.

3) LCD

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of



applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

4) CRYSTAL OSCILLATOR

Crystal Oscillator is an Electronics Oscillator circuit which uses the mechanical resonance of a vibrating crystal of piezoelectric material to generate an electrical signal with an accurate frequency. It also has automatic amplitude control and frequency drift is also very low due to change in temperature. Crystal Oscillators are only suitable for high-frequency application.

Every microcontroller needs a crystal oscillator, whenever selecting a crystal oscillator try to purchase silicon oscillator if the accuracy is adequate and the cost is also acceptable, otherwise choose quartz crystal.



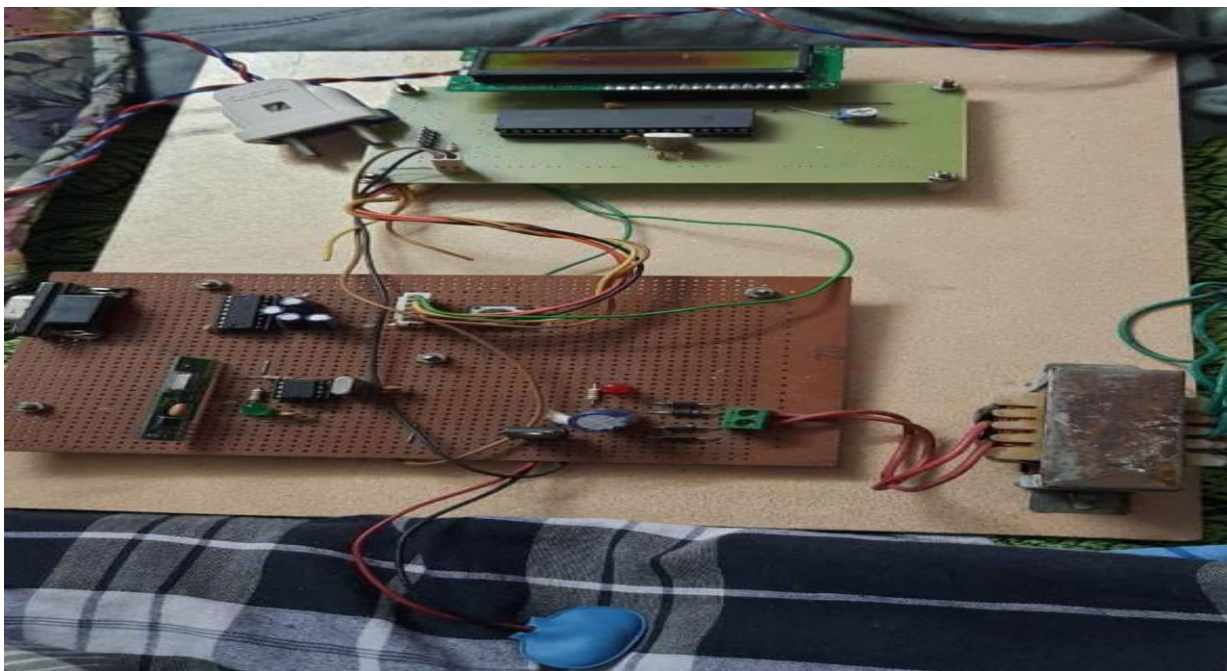


5) VOLTAGE REGULATOR

Most of the Integrated IC's require a constant voltage with which it could operate. Be it a simple Logic Gate or a complex microprocessor they have their own operating voltage. The most common operating voltages are 3.3V, 5V and 12V. While we have batteries and DC Adaptors that could act as a voltage source, most of the time they cannot be directly connected to our circuit design since the voltage from them is not regulated.



V. HARDWARE SETUP



VI. CONCLUSION & FUTURE SCOPE

Wireless Technology is very useful as it is faster, easy to access and cost efficient. Zigbee based menu ordering system will definitely help to save time and easy access to food. It will increase the revenue of restaurants. The module of stock maintenance and raw material management can be added to the existing system to ease the work of restaurant admin. Enhance user interface by including more interactive features. Allow customers to customize their orders. In future, work can be done on providing provisions to accept different types of payments like credit cards, debit cards, tips, etc. We can also add different payment options such as Google Pay, PhonePe etc. We can also add a feature to see live order status and provide deals to influence customer regularity.

With little bit modification we can use this project in the library. In some libraries, users are not allowed to enter inside the library. In this case if any user needs books then he/she has to give book name to the librarian.

Same concept we can also applied for banking transactions such as transfer, deposit, withdrawal of money.

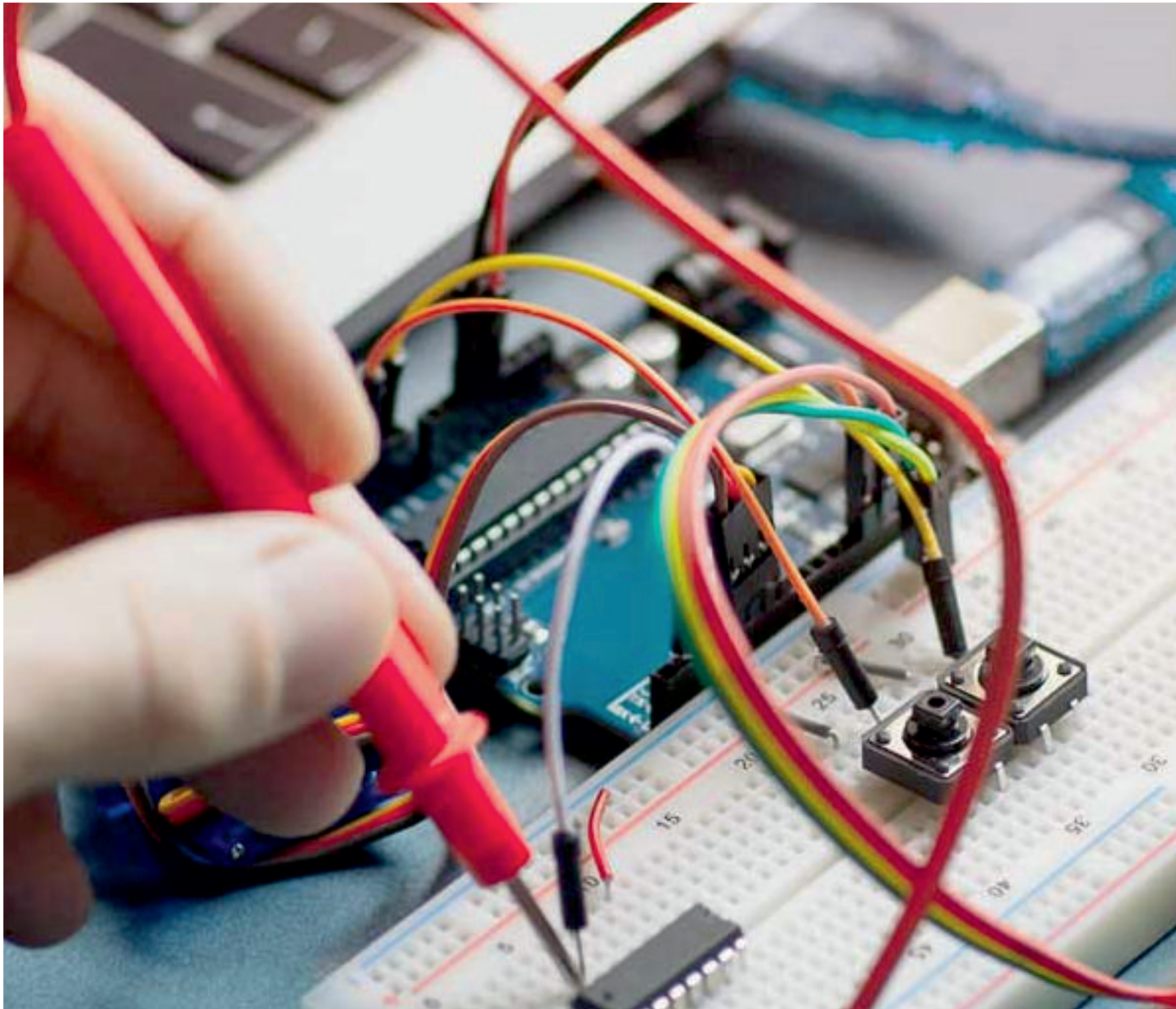


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