

Smart Restaurant

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Abstract:- Smart Restaurant is concept to realize the automation in restaurants or hotels. In this restaurant the kitchen people can get orders from each table through voice alert. This project consists of two sections one is transmitter section and other is receiver section. In our project we have designed an electronic system to order through RF based wireless communication using a menu card provided on each table. Touch panel is used here, which offers simple and multiple menus driven control panel. Mainly touch screen technology is used where control or settings of different parameters in wide manner. We can select the items shown in its display along with its price and can order the selected items through touch panel. The total cost of the items is also displayed. This order details are collected by wireless receiver placed in the kitchen and will display the items in its display along with the voice announcement through speaker. Each table has its own unique digital code. So the kitchen people can supply those items to that table after preparing it. This will give advantage to avoid the time delay usually experienced during bearer coming, collecting order and finally passes to the kitchen manually.

Keywords – Radio frequency, automation, microcontroller unit, liquid crystal display, transceiver

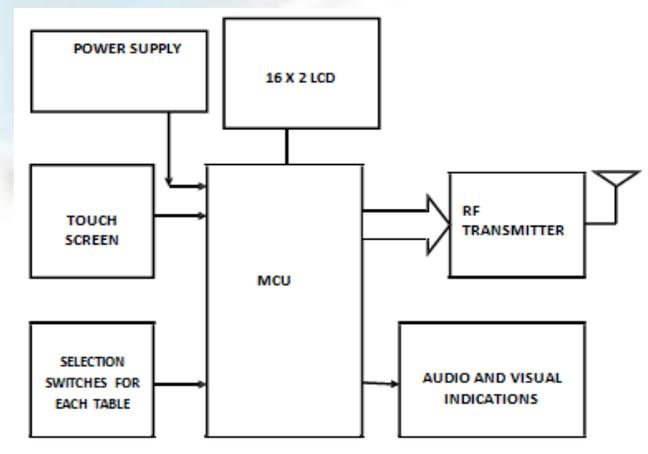
1. INTRODUCTION

In the last years the restaurant industry has lived through many changes. Anyway, there is an area that was not improved since several decades. While technology is changing the way we do almost everything, menu cards are still mostly untouched - although they have several disadvantages that can be improved significantly by a digital approach. The Voice Operated Restaurants project aims to improve this situation. One of the most important areas for the restaurant industry is obviously the customer service. To engage friendly and obliging service staff is most challenging for the majority of restaurant managers. But this is not the only issue in this area. It's also hard to motivate people every day, because the customer service in restaurants might become very stressful. Most of the stress occurs as soon as one customer service member needs to take care of way too many customers at once. That's why this project aims to support processes needed for the restaurant staff and allow them to focus on the important part - friendly customer service. Adapting this goal for the customers this project increases the overall experience at the next trip to a restaurant. The project is focused on the order process the kitchen

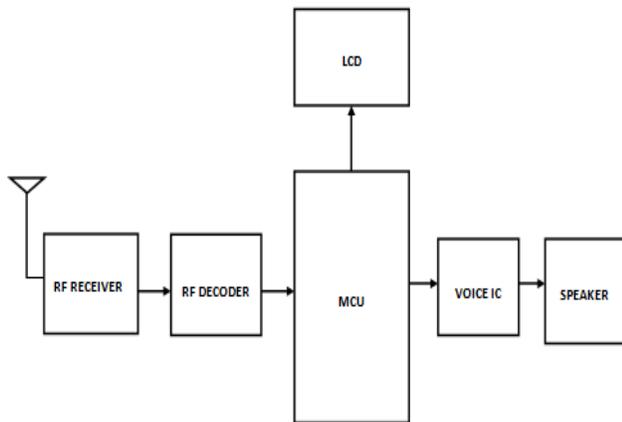
organization and business processes like invoice management. It provides a digital management system for each of these processes. Here we used RF technology for designing the project. Radio frequency (RF) is a rate of oscillation in the range of about 3 kHz 300 GHz, which corresponds to the frequency of radio waves, and the alternating currents which carry radio signals

2. BLOCK DIAGRAM

Transmitter



Receiver



3. WORKING

Voice Operated Modern Restaurant is a system which is used to overcome the limitation of currently followed system in the restaurant industry. Our system will provide an automated, fast and accurate care to each customer by allowing customers to transmit orders directly to the kitchen through a touch pad provided at each table via RF communication. A voice module is interfaced at the receiver section, it announces the ordered items to the kitchen people.

Transmitter section:

An electronic card is provided on each table. It consists of a touch panel, MCU, encoder, an RF transmitter and an LCD. Selection key is provided for setting table name. The customer can select the items through the touch panel. A resistive type touch screen is used for this. MCU reads data from the panel and gives corresponding digital output to an encoder. It encodes one of the active inputs to a coded binary output. RF transmitter transmits this coded binary output from the encoder. The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz. Here we are using 2.4GHz band.

Receiver section:

The receiver section is placed in the kitchen, it consists of an RF receiver, RF decoder, MCU, voice module, speaker, display unit, audio and visual indications. RF receiver receives the coded binary data transmitted by the RF transmitter and given to

the RF decoder. RF decoder decodes the input and gives four bit digital data to the MCU only if the address bit of encoder and decoder matches. MCU receives a digital data, which is corresponds to the selected items. Initially food items can be stored in the voice module and later reproduces it as per the instruction from the microcontroller.

When MCU receives input from the decoder it controls the display unit in order to display the ordered items. Visual indication is also interfaced with the MCU for the intimation.

4. DESCRIPTION OF COMPONENTS

4.1 TRANSMITTER SECTION

Selection Switches

Here selection switches are used in order to set the binary code corresponding to a particular table, as the same system can be used at different tables.

Touch Screen

Analog resistive touch screen is used here. This means by touching the screen at one point, a resistance between each edge is formed for both the x and y axes. As you move your finger or stylus across the screen the resistance changes between opposing sides of each axis. By applying a voltage across each axis, a changing resistance results in a changing voltage. This voltage is given to the microcontroller through an ADC, it can find x and y positions.

MCU (MICROCONTROLLER UNIT)

MCU is the central processing unit, which controls all the functions of other blocks in this system. MCU takes or read data from the touch panel and controls all the functions of the whole system by manipulating these data. If the customers selects the items on the card and press the SEND key, then the MCU gives a digital data corresponding to the entered items to the encoder. An LCD is interfaced with the MCU; it displays the food items with their prices.

RF Encoder

The purpose of digital encoders is for security. Any digital data is first converted to a coded form

before sending wirelessly to get ensure data integrity from noises and offers security from other faulty messages. The encoded data is decoded in the receiver side and the original data is recovered. Here encoder receives data input from the MCU and convert it into a coded output signal. This coded output is corresponds to the selected items.

RF Transmitter

RF transmitter is used to transmit the customer's selection details. So the data is digital encoded form and the RF transmitter module should have the capability of transmitting digital data. The data rate for the address selection operation is very slow, so a slow speed high range RF module is preferred for the application. The RF module, as the name suggests, operates at Radio Frequency. The corresponding frequency range varies between 30 kHz & 300 GHz.

Display Section

Display unit is interfaced with the system for user information. Here it displays the items along with their prices that were available to the customer. It also displays the total cost of the selected items. LCD module is a dot matrix liquid crystal display that displays alphanumeric, kana (Japanese character) and symbols. The CMOS technology makes the device ideal for applications in handheld portable and other powered instruments with low power consumptions.

Audio Visual Indications

An audio alarm is connected with the MCU. A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows.

Two LEDs are used here as visual indicators. A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness

4.2RECEIVER SECTION

RF Receiver

The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter. Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission. RF communication uses a specific frequency unlike IR signals which are affected by other IR emitting sources.

RF Decoder

A decoder is a device which does the reverse of an encoder, undoing the encoding so that the original information can be retrieved. The same method used to encode is usually just reversed in order to decode. In digital electronics, a decoder can take the form of a multiple-input, multiple-output logic circuit that converts coded inputs into coded outputs, where the input and output codes are different. e.g. n-to-2ⁿ, binary-coded decimal decoders. Decoders are used in counter system, analog to digital converters and the output can be used to drive display system.

It accepts data from RF receiver and compares received address with its own address. If it matches, the decoder decodes the data and provides it to MCU.

MCU (MICROCONTROLLER UNIT)

MCU receives a digital data, which is corresponds to the items in the menu card that was ordered by the customer. When MCU receives input from the decoder it displays the ordered items on the display unit. It also control the voce module to reproduces the stored items as per the data received.

Display Section

The display unit interfaced at the receiver section displays the ordered items by the customer to the kitchen people.

Voice Announcement

The speech module is used to store the voice tags. It is capable of storing 254 voice groups of length 341 sec. The food items are initially stored and later reproduced as on demand from the microcontroller.

Loud Speaker

A **loudspeaker** (or "speaker") is an electro acoustic transducer that produces sound in response to an electrical audio signal input. The most common form of loudspeaker uses a paper cone supporting a voice coil electromagnet acting on a permanent magnet, but many other types exist. Where high fidelity reproduction of sound is required, multiple loudspeakers may be used, each reproducing a part of the audible frequency range.

Miniature loudspeakers are found in devices such as radio and TV receivers, and many forms of music players. Larger loudspeaker systems are used for music, sound reinforcement in theatres and concerts, and in public address systems. Here the voice tag i.e., the selected items is reproduced through this loudspeaker.

5. ADVANTAGES AND DISADVANTAGES

Advantages:

- Fast and convenient customer service
- Selection and ordering of items are possible through touch panel
- 2.4 GHz RF technology is used for transmission.
- Voice announcement at the kitchen
- Visual indications
- Item display on LCD for customers as well as kitchen.

Disadvantages:

- The RF communication used here is not powerful.
- In our system there is no communication to main counter

6. APPLICATIONS

Restaurant automation

7. CONCLUSION

The electronic menu card system helps the people to select the food items through the touch screen panel. The kitchen people alerted through voice announcement as well as can read the items from each table at the LCD screen in kitchen to work it fast. RF communication is used for this purpose. This is very much helpful in star hotels and resorts where the preparation time is much greater. In future we can change this system to multiple transmitter and single receiver one by the help of MCU or computer.

8. REFERENCE

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