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Kissan-Kiosk for Rural Areas using Microcontroller

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Abstract - *A Kissan-Kiosk is a computing unit which consists of both software and specialized hardware, through which we can access the bill status, bill payments, agriculture updates and soil testing and crop advisory for farmers. These in past looked like telephone booths, but now embraced by development they are trying to improve their services to the customers. These systems are largely placed in places having high transactions and places which are easily reachable by farmers like shops, hotel lobbies, and many more. Combining new technologies has enabled these to do many functions like bill payments, in this project Kiosks enable users to pay electricity bill, water bill, phone bill etc. We can extend the kiosks application for various platforms like tourist places to guide the tourists, railway stations to display the train information and ticket vending, in hospitals to vend medicines, in educational institutions to inform the campus information.*

Key Words :Bills, Kiosk, Payment, pH, RFID, Schemes

1. INTRODUCTION

Bill payments are one of the unavoidable tasks that have to be ensured without any fail, we are facing problems like Rush/Queue during payments, it will take lot of time to make the payment. And also today we are having number of online payment apps but according to a survey, as of July (2018) 43,088 out of 5,97,618 villages (as per census 2011) in the country have no proper internet connection to make payments through online .People facing inconvenience during the bill Payments in rural areas. In order to reduce the inconvenience during bill payments, Bill payment Kiosk Machine has been designed to make this task convenient, which provides integrated bill payment services through Kiosk. This is a multi-purpose Kiosk which ensure bill payments under one roof by providing freedom from long queues, fast billing services, ensuring high security for collecting cash, it facilitates multiple modes of payments. To reduce the inconvenience during bill payments in rural areas, where the area do not have internet connection properly, in order to help those people we are going to design this Kiosk. This kiosk accepts any type of bill it may be Electricity bill, Water bill, Phone bill. Another reason for this project is, Agriculture plays a pivotal role in the economic development in India. It is the main source of employment and income in the rural areas, various important industries in India derive their raw materials from the agriculture field, jute industry, sugar factories, coconut and its products, tea, coffee industry, areca based products, etc. are dependent on products of agriculture. The quality of produce greatly depends on the soil quality and weather conditions. Owing to insufficient knowledge of the geographical area and inability to foresee the weather, farmers incur losses due to poor quality of crops. With this project, we hope to put forth certain ideas that could prove profitable to the farmers. The Kissan -Kiosk provides information to the farmer based on the soil quality as to what crop is best suited to be grown. The Kissan-Kiosk assesses the soil sample and provides the NPK values of it. The Kissan-Kiosk also keeps the farmer well informed about the government schemes, loans and subsidies available that could prove beneficial to him.

2. Literature Survey

1. Mr. K.KANNAN-2013 International Journal of Scientific & Engineering Research

Title: SECURED PIN ENTRY METHOD FOR ATM USING MICROCONTROLLER

In this Paper they have proposed the use of embedded system and basic visual programing to build a secured ATM transaction system in a better and easy manner. The Bank provides card to the user and gives random number, a pseudo random code is sent to the card users when they insert their cards in the ATM machine using their phone number. In order to continue their transaction, the users must enter the code received through mobile. If the code entered is incorrect then ATM machine gets locked. This will prevent unauthorized access to the bank account and misuse of lost card by the intruders. This will provide one more layer of security for the account.

2. Akshay Badhe-2018, International Journal on Future Revolution in Communication and Computer Science Engineering

Title: Smart Agriculture and the Soil Nutrient Detection System using IoT

Agriculture development with new technology is very much useful for farmers as it increase the yield. In this technological era, farming without testing soil and without knowledge about the crops will results tin lowering the yield, thereby results in loss to the farmers. This paper gives useful information about soil testing and it's monitoring using

different technologies and sensors. Different sensors are used to measure the soil moisture, temperature, pH value of water source and humidity. The information from the sensors is sent to the ADC then it send to the cloud through Raspberry pi. Finally we can save the information to the cloud and also we can see in mobile phone as well as laptop. Using this information we can know which crop is suitable for the given soil sample. In this way the technology aids farmers to get the exact information about the soil and also it makes the soil testing procedure a lot easier.

3. Kanthimathi-2015 International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)

Title: GSM Based Automatic Electricity Billing System

Using GSM technology a meter can be designed which reads the information automatically. The GSM module is interfaced with embedded micro controller. The system is installed in home, and a micro controller is fitted with energy meter. The system senses the information from the meter fitted. The sensed information is transferred to GSM module using an external serial port. The processor executes the required codes to send the message to the system using GSM module. One more system is installed in EB office, where the authority is with that office. They will send the request to the system installed in homes. Later using GSM module, a unit signal is sent to the office. Based on the received information, the customer will receive bill information from Authority officer at the office. The power supply to the house will be turned off by giving command to the microcontroller by sending message through GSM module, if the bill is not paid before the time given. Once bill is paid the power supply is given to the customer. Here Power management concept is introduced.

3. Problem Statement

Facing problems during bill payments (Queue/Rush). Most of the rural areas do not have internet connection properly to make the payments in online. And most of the people still not using smartphones to make the payments. Owing to insufficient knowledge of the geographical area and inability to foresee the weather, farmers incur losses due to poor quality of crops.

4. Definition of KIOSK

"Kiosk" is a word from Turkish and has Persian origin, it meant an outdoor pavilion. In IT, a kiosk is a small physical structure often including a computer and a display screen. These units are mostly placed in the places where the crowd is more and more people can access it easily such as shopping mall, bus stands, etc. The units will allows the users to interact with the machine through screen, audio information, and also through videos.

5. Objectives

1. To design and Implement the interactive Kiosk for rural areas
2. To make bill payments ease for rural areas.
3. To check the soil pH value and suggest the suitable crops to farmers.
4. To give information about government schemes.

6. Materials and Methods

6.1 Nuvoton Microcontroller

The Nuvoton microcontroller [W78E052D] has more features and it is low-cost chip and it is useful to embedded system developers Main feature of this microcontroller is that it has a inbuilt UART boot-loader. So, using serial port it can be programmed. It uses less power and processes 8 bits at a time. Also it allows wide range of frequencies. IT has I/O ports to communicate with other components. It has got vectored interrupt management, where the tasks need to be performed during interrupts are predefined. It provides safety to the user's code. It has many modes of operation like idle, power down, etc. These modes will make the system to work as low power Microcontroller. It has built in methods to protect itself from low and high powers, and always maintains minimum power to ensure the required basic functions are running. Fig1 shows the Nuvoton microcontroller.

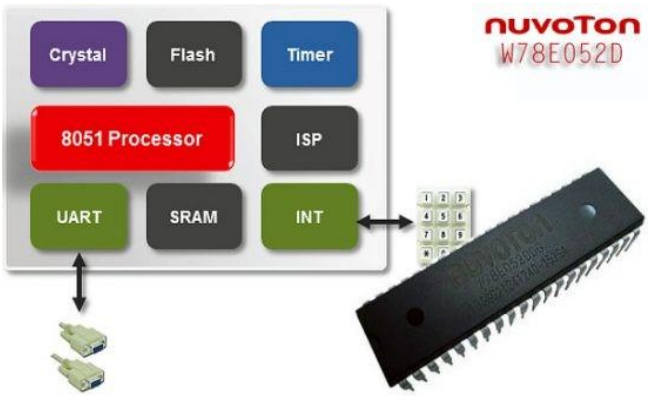

Fig 1: Nuvoton Microcontroller

6.2 Kiel µVision5 Software

The µVision5 IDE software is a Windows-based software that combines an editor, project manager. µVision5 integrates all tools, also including the C compiler, macro assembler, linker/locator, and HEX file generator. The µVision5 IDE offers more features and advantages that helps you to quickly and successfully develop the applications. Those are very easy to use and they are guaranteed to help you to achieve your goals designs.

6.3 System Block diagram:

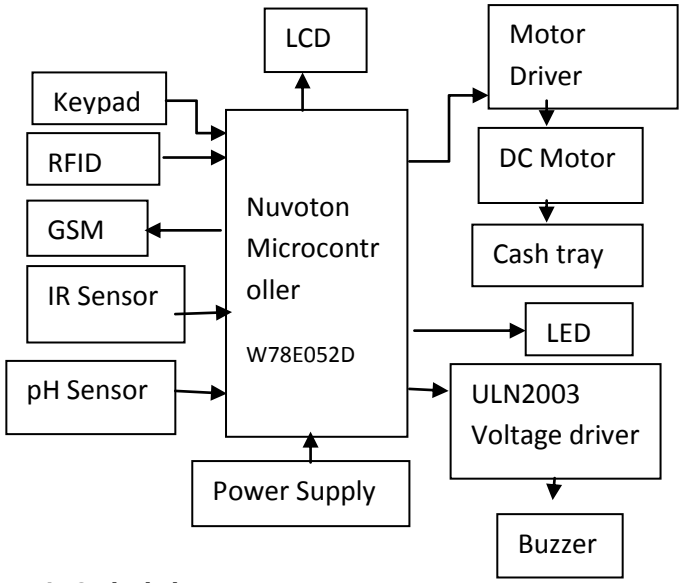

Fig.2 Block diagram

Fig.2 shows the block diagram of the project, details of each block shown below.

LCD*:* It is used to interact with the users.

RFID Reader and Tags: These are captured by a device that stores the data in memory. In this project RFID is used to store the bill details.

GSM: In this project, it is used for communication of information between different systems.

pH Sensor: pH is the measure of acidity and is reported as a number between 0.0 to 14.0, Below 7.0 is acidic (sourness), Above 7.0 is alkaline(sweetness) and 7.0 is neutral. Below 7 is acidic in pH. pH of 1 is more acidic than pH of 5, in the same way pH of 13 is more basic that pH of 9. Soil pH measures how much hydrogen relative to how much calcium, magnesium, potassium, sodium, ad aluminium are in the soil. When there is more hydrogen, the soil is acidic and when there is more nutrients, the soil is alkaline. Most of the plants grown in the range of 5.5 to 7.5 pH value. We can measure pH of soil by inserting pH Sensor meter into the soil-water mixture, users can get the data from the display.

6.4 Different Soils

Table 1 gives the details of crops, soil and their pH values

a) **Black Soil**: The pH range: 7.2-8.5(alkaline) Rich in calcium, potassium, magnesium and Poor in nitrogen, phosphate.

Crops: Cotton, chilly, oil seeds, Ragi etc.

b) **Red Soil***:* Rich in Iron contents which is responsible for its colour, poor in magnesium, phosphoric acid, pH range 4.5 to 6.5(between acidic and neutral)

Crops: Red gram, Green gram, Rice, Wheat, Groundnuts.

c) **Sandy Soil:** which is acidic, acid loving plants can grow.

Crops: Melon, coconut etc.

d) **Loamy Soil***:* pH range 4.5 to 6.5(acidic), It holds good amount of water and has nutrition for plants.

Crops: Carrot, Tomato, Sugarcane, Pulses etc.

e) **Clay soil:** The clay soil can hold more number of nutrients and a lot of water due to its capillaries in between the clay particles.

Crops: Cauliflower, pea, potato etc.

Table 1: Crops and their pH values.

Crops	pH value	Soil
Cotton	5.8-8.0	Black
Wheat	6.3-7.0	Red
Groundnuts	6.5-7.0	Red
Ragi	4.5-8.0	Black
Coconut	5.0-8.0	Sandy
Carrot	5.8- 6.4	Sandy / loamy
Tomato	5.5-7.5	Sandy / loamy
Oats	5.8-7.0	Black

8. Power Supply Circuit:

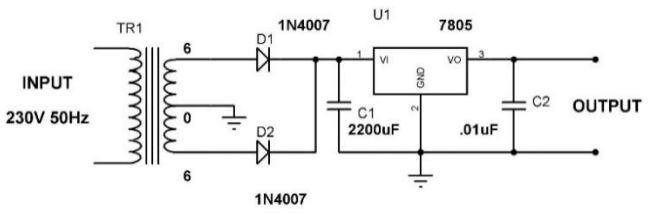

Fig.3 Power Supply Circuit.

Fig 3 shows the power supply circuit following are the blocks of power supply circuit

Transformer: It is used either step up or step down the ac signal. It uses the coils mounted on Ferro magnetic materials. Based on the number of terns on input and output sides, the signal will be stepped up or stepped down.

Rectifier: As a full wave rectifier, the diodes D1 and D2 are connected across the secondary winding of the transformer. During the positive half-cycle of voltage, the secondary winding end A becomes positive and end B becomes negative. Therefore diode D2 conducts and D1 does not. The current across the center tap terminal is in the same direction for both half cycles of AC voltage. Therefore pulsating DC is obtained at the point C with respect to ground.

Filter: The capacitor C1 is used for filtering and connector across the rectifier output. Capacitor filters AC component present in the rectifier DC and gives steady DC Voltage. As a rectifier voltage increases, it charges the capacitor and also supplies current in the load. When capacitor is charged to the peek value of the rectifier voltage, rectifier voltage starts decrease.

Voltage Regulation: It is the supporting system used to keep the voltage level within the range of operation. If the voltage varies, voltage regulator will do some action to keep the voltage in the range of operation.

9. Methodology

- Initially bill payment KIOSK displays a message on LCD that "WELCOME TO KISSAN-KIOSK".
- User has to initiate the bill payment by pressing key.
- KIOSK ask to enter the bill number.
- User has to enter the Bill no using Keypad.
- It will display the bill amount on LCD.
- Then user has to select the payment option.
- User can make the payment in two methods.
- Debit card 2. Cash Deposit.
- If he select the debit card option then it will ask for swipe your card.
- Then user has to enter associated password.
- It will verify and deduct the payment from account.
- If he select Cash deposit option then it will ask to put cash in cash tray.
- We have IR sensor, which will detect the currency and tray will take the cash.
- We have GSM, Which will send payment information to user.

We use pH (NPK) sensor to monitor the soil pH and based on the value system will advise the suitable crops.

10. Result:

Fig.4 LCD display

Fig.5 Bill Payment section

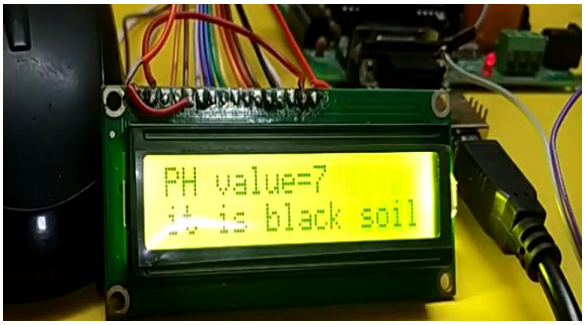

Fig.6 pH Section

Fig.7 Suggesting Suitable Crops

Above figures are the result of the project, It shows pH section, Bill payment part and also crop suggestions.

11. Conclusion and Future Scope

Kiosk is a machine used to guide people without human interference. In this project we are designing a kiosk, which is helpful for bill payments and farmers in rural areas. Kiosks are majorly installed at locations with high movements of people so in future we can do similar types of kiosks which is used in historical places to guide the visitors, in colleges to give information about colleges, in hospitals to vend medicines, in railway stations, etc. Kiosks reduces the man work and they are easy to handle by the people.

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