International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

RFID AND IOT RECOMMENDED SYSTEM OF FOOD INGREDIENTS FOR PATIENTS WITH SPECIFIC DISEASES

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Abstract - *Dietary regimens are normally tailored to the expectations and needs of patients by nutrition specialists. Patients can, however, substitute dishes or ingredients based on availability or personal preferences. Every year, more than 300,000 people are admitted to hospitals and 5,000 people die as a result of eating infected foods and beverages. Smart cards are compact integrated devices with data storage and data transmission that are used in information technology. In our proposed scheme, we've introduced a smart tag system that includes food ingredients (i.e., raw food materials, and processed food). The ingredients in the food are read and sent to the Arduino controller. Real-time data is transmitted to the device via cable from the Arduino controller and accessed using the Java platform. The SQL database is used to collect real-time data. Finally, we used data mining techniques such as the collaborative filtering algorithm to determine which foods should be avoided by a specific diseased patient. Based on the patient's disease, and quick data access services, it is possible to decide what foods should be eaten and which should not be consumed.*

Key Words: RFID, AES encryption, RF module

1. INTRODUCTION

Estimating food intake is particularly relevant to health-related issues such as diabetes and obesity. Nutrition specialists usually tailor dietary regimens to patients' preferences and needs[1],[2]. However, patients might change dishes or ingredients due to availability or preferences.

Smart cards are used in information technologies as portable integrated devices with data storage and data processing capabilities. As in other fields, smart card use in food ingredients and consumption. Smart cards are used as an Electronic Food ingredient Record (EFIR). Their efficient use with easy and fast data access facilities leads to identify what food should be consumed and what food shouldn't been consumed depending on the patient disease[3],[4]. In existing system or in our extensive literature survey smart card based supply chain only been researched and briefed. No existing platforms deal with food ingredients and patient disease.

1.1 METHODOLOGIES

- **RFID READER**

Radio frequency identification (RFID) is one method for Automatic Identification and Data Capture (AIDC). RFID tags are used in many industries. An RFID system consists of three components: an antenna and transceiver and a transponder. The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna. An RFID reader's function is to interrogate RFID tags. The means of interrogation is wireless and because the distance is relatively short; line of sight between the reader and tags is not necessary. A reader contains an RF module, which acts as both a transmitter and receiver of radio frequency signals. The transmitter consists of an oscillator to create the carrier frequency; a modulator to impinge data commands upon this carrier signal and an amplifier to boost the signal enough to awaken the tag. The receiver has to demodulate to extract the returned data and also contains an amplifier to strengthen the signal for processing. A microprocessor forms the control unit, which employs an operating system and memory to filter and store the data.

FEATURES:

- Supply voltage: 12v DC
- Output: UART and TTL
- In-built buzzer indicator
- Signal LED is placed

APPLICATIONS:

- Passports
- Toll booth passes
- Hospitals
- Libraries

Fig – 1: RFID reader

- **PROGRAMMING MICROCONTROLLER**:

The Arduino Uno is a micro controller board based on the ATmega328 (data sheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

Microcontroller: ATmega328
Operating Voltage: 5V
Input Voltage (recommended): 7-12V
Input Voltage (limits): 6-20V
Digital I/O Pins: 14 (of which 6 provide PWM output)
Analog Input Pins: 6
DC Current per I/O Pin: 40 mA
DC Current for 3.3V Pin: 50 mA
Flash Memory 32 KB of which 0.5 KB used by boot loader
SRAM: 2 KB
EEPROM: 1 KB
Clock Speed: 16 MHz

- **DATA COLLECTION USING JAVA**

It offers all of the required features for proper serial communications when used by Java developers. The API defines an abstract Serial Port class to render the API portable across platforms. This class is then sub classed, and the sub classed object includes platform-specific features. Through the JVM, this concrete class interacts with a Dynamic Link Library (DLL) file. Once a Serial Port object has been created, communications through the physical port are conducted through standard Input and output stream objects.

- **COLLOBORATIVE FILTERING**

Collaborative filtering, also known as social filtering, is a method of filtering information based on the recommendations of other people. Collaborative filtering (CF) is a web-based technique for creating customized recommendations[5],[6]. Model-based collaborative filtering is the method we employ. Data mining is used to build models, and the machine learns algorithms to search for them. These models are then used to come up with predictions for actual data. Collaborative filtering uses algorithms to filter data from user reviews to make personalized recommendations for users with similar preferences.

- **AES ENCRYPTION:**

Advanced Encryption Standard (AES), in addition to popular as Rijndael (its original name) happen a qualification for the encryption of photoelectric information in visible form established for one U.S. National Institute of Standards and Technology (NIST) fashionable 2001. AES happen a subset of the Rijndael cipher grown by two Belgian cryptographers, JoanDaemon and Vincent Rijmen, the one offer a suggestion to NIST during the AES preference from among choices process. Rijndael exist an offspring of ciphers with various key and block sizes. AES keep ahead of a 4 × 4 pillar-major order something from which another originates of bytes, name something united states of America, although few account of a happening of Rijndael bear a best block size and bear supplementary pillar fashionable the state. Most AES prediction happen exhausted a special subject to limitations field. AES reside of assorted rounds of assorted processing steps that contain replacement, change and mixing of the recommendation ordinary readable form and change completely it into the definitive output of Cipher text.

- **AES: PSEUDOCODE**

Cipher (byte in [16], byte out [16], key_array round_key [Nr+1])
begin
byte state [16];
state = in;
Add Round Key(state, round key [0]); for i = 1 to Nr-1 step size 1 do SubBytes(state);
ShiftRows (state); MixColumns(state);
AddRoundKey(state, round_key[i]); end for
SubBytes(state);
ShiftRows(state);
AddRoundKey(state, round_key[Nr]);
End

- **CLOUD STORAGE**

Cloud storage is a model of data storage where the digital data is stored in logical pools, the physical storage spans multiple servers (and often locations), and the physical environment is typically owned and managed by a hosting company. These cloud storage providers are responsible for keeping the data available and accessible, and the physical environment protected and running[7].

2. OUTPUT

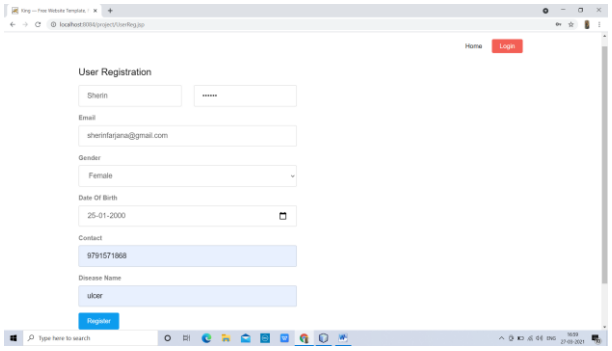

Fig – 2: User Registration

Fig – 3: web page

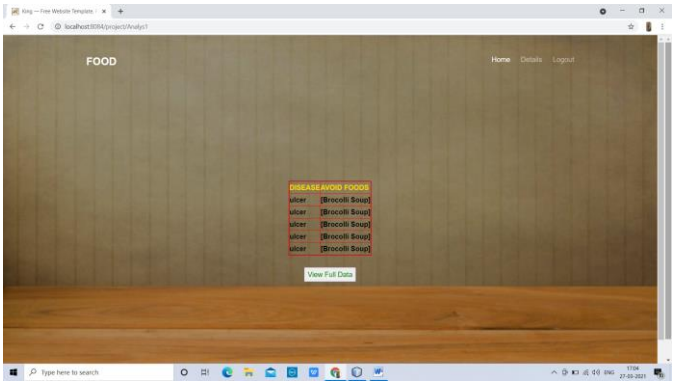

Fig – 4: Analysis

3. FUTURE ENHANCEMENTS

· Using a GSM module we can transfer the bill to mobile.

· Voice assistance can be included.

· Net banking can be included.

· Robotic ARM can be used for picking and dropping of products.

4. CONCLUSIONS

The progress in science and technology is a nonstop process. New things and new technologies are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place. Hence this project on RFID based smart card system alerts the end users while purchasing the food items, having processed food at restaurants based their disease. Thus this food assistant system based on the customer disease to save human lives and time.

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