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ORGANIC FOOD GRADING SYSTEM FOR FRUITS AND VEGETABLES

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ABSTRACT: - *Organic food plays an essential role in our lives. Nowadays, many people are affected by different disorders and many health issues like cancer, diabetes, respiratory disease, blood pressure and all external diseases also. Compared to ancient history, the death rate of people due to health issues has increased rapidly. Why do these types of issues occur? A common answer to this question is food habits. But we don't know what is happening behind this process. Various health issues occur due to an imbalance in the pH of our body. In chemistry, pH historically stands for " Potential of Hydrogen" , which is a scale used to specify the acidity or basicity of an aqueous solution. Acidic solutions are measured to have better pH values than basic or alkaline solutions. Our body works constantly to carefully control pH levels of blood and other fluids. The body's pH balance is also called the acid-base or acid-alkaline balance. The right pH level is needed for good health conditions. The pH scale ranges from 0-14. The readings are based around a pH of 7, which is neutral like pure water. A pH below 7.35 is acids and higher than 7.45 is alkaline or basic. By comparison, our stomach acid has a pH of around 1.5 to 3.5. Thus, it makes it acidic. A low pH is good for digesting food and destroying any germs that get into the stomach. If the pH varies from 4-7, it means it will not destroy the germs in the stomach and will slowly affect the internal organs in our stomach and, as a result, it leads to death. The pH level of our body depends upon the intake of food and vegetables. Therefore, to maintain the pH of our body, we must also take care of the fruits and vegetables which we are consuming. So, this project will justify and record the pH level of fruits and vegetables during their growing period using soil moisture sensor, TDS sensor, pH sensor. And depending on their pH, the grading system will be activated.*

1. INTRODUCTION: -

In the year 2022, India's population will be approximately 1.417 billion. As the population increases, the demand also increases for their food, shelter, daily needs, etc. Food is the most important source for a human being to stay alive on this earth. Animals search for their food, while birds also follow the same procedure for their food. Where humans cannot fight for their food, they must satisfy their needs through their own well-being. As a result, during the ancient period, all the people started framing for their own welfare. Later, depending on the soil type, some of the products may not grow on that land. So, they started to share and exchange their products to fulfill their requirements. As days passed framing has become less prominent over time. As a result, production has reduced rapidly, and many people have started to die due to food scarcity. The farmers cannot produce a huge product due to a growing population and a lack of land for their production. This leads to food scarcity in all over the world. A quarter of the world's hungry people live in India, in which the UNO-India reports that there near to 195 million underfed people. Additionally, 43% of children in India have chronic undernutrition. India is ranked 68th out of 113 major nations in the food security index for 2022. To combat the food shortage, farmers began to use organic fertilizers and pesticides, which will aid in faster growth. Following this process reduced food scarcity by about 80-85%, but people were not healthier than our ancient ancestors. As food scarcity decreased, so did health problems. Thousands and thousands of people were affected by different health issues. How do these problems arise? It's all because of imbalance in pH level. pH stands for "potential of hydrogen". It specifies the hydrogen level of all living organisms. Depending on their nature, pH may vary. A human being's pH, for example, should be between 7.35 and 7.45; if it is higher than 7.45, it indicates that the body contains more alkaline, which is base in nature, and if it is lower than 7.35, it indicates that the body contains more acid in nature. If the values vary, they may be affected by some health issues due to a lack of an immune system. It will be maintained only in the proper food habitats. As a result, fertilizer that does not change the pH of the soil must be used for food production, resulting in a balanced pH of fruits and vegetables.

2. EXISTING TECHNIQUE: -

The Soil is the source of many nutrients' elements. The nature of the soil and its organic matter content is the key factor for various number of elements in the soil. Insoluble compounds , complex and simple forms of soil nutrients are present.

The nutrients of the soil are measured by the value of the pH of the soil . pH gives the exact value of the soil content whether it consists of nutrients. pH should be in the correct range if not it leads in the slow growth and increase in the erosion.

3. SYSTEM HARDWARE: -

3.1. RASBERRYPI

The Raspberry Pi is a hardware device which is useful for many purposes. Raspberry Pi majorly consists of a processor and graphic chip, programmed memory that is Random Access Memory (RAM),a Ethernet port, power source, GPIO pins, connector and an Xbee socket. It is literally known as a mini computer. As the PC boots into Windows from its hard disc same the raspberry pi boot from its SD card. Raspberry Pi is used in many sources such a wireless print server, robot controller, time lapse camera. It has many advantages as it has huge processing power, it supports many platforms such a Linux, Python and it consists of many interfaces such as Wi-Fi, HDMI, multiple USB ports, Ethernet, Bluetooth, many GPIOs. Raspberry pi consists of two types Model A and Model B.

MODEL A: -

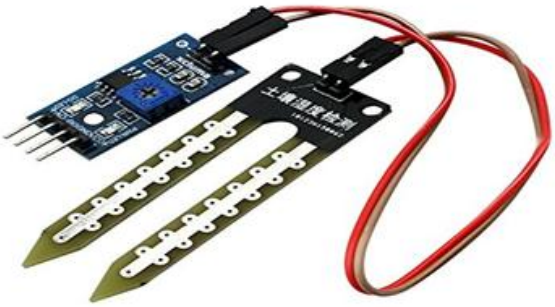
The Model A Raspberry Pi is one of the types of the Raspberry Pi. It is small and low in cost. The Raspberry Pi is classified according to the network capabilities. The Model A Raspberry Pi consists of the same components such as the processor and graphic chip, programmed memory that is Random Access Memory (RAM),an Ethernet port, power source, GPIO pins, connector and an Xbee socket. The Model A Raspberry Pi is most popular due to its size and the cost. It is more effective to use as well. As it is one of the types of the Raspberry Pi it consists of all the features of the raspberry pi. There are more advantages in using the Model A Raspberry Pi. It has many features such as it consists of faster processor, it supports all type of codes and it can be used as a portable computer.

MODEL B: -

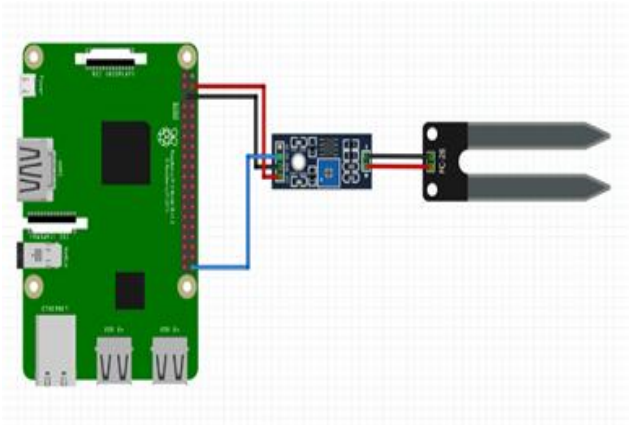
The Model B Raspberry Pi is the second type of the Raspberry Pi. It consists of the processor which is of 700MHz. The size of the SDRAM is 512 MB and it consists of a core CPU ARM1176JZF-S. The Ethernet plays a role as a primary gateway for connecting the internet to the other devices. The Ethernet is more prioritized in the Model B Raspberry pi as it plays a vital role in it. The micro-USB adapter with the range of minimum 2.5 watts gives power to the Model B Raspberry Pi. The internal data connectivity option is unavailable in the Model B Raspberry Pi. The USB board only supports the external data connectivity.

3.2. SOIL MOISTER SENSOR

Soil moisture is one of the major parameters to a good and healthy plants. The soil moisture is the level of the water present in the soil. It should be in the correct exact level according to the type of plant planted and according to the temperature. The monitoring of the soil moisture level helps in maintaining the health of the plant. There are many ways to detect the soil moisture level.



There is a separate sensor to measure the level of the soil moisture. The soil moisture sensor consists of two probes in it. The two probes are digger in the soil to measure the level of the moisture. The sensor consists of a electronic module which helps in connecting the sensor to the Arduino or any external device. The reading is sent from the sensor and can be viewed by the external devices. The module consists of a sensitivity adjustment and a LM393 Comparator. The module additionally consists of a potentiometer which uses in adjusting the sensitivity. The soil moisture sensor also consists of pins such as Analog and Digital pins.



3.3. TDS SENSOR

TDS (Total Dissolved Solids) is the measure of the total amount of solvents or salts present in the solution. The solution maybe anything but should be a liquid. Most commonly the Total Dissolved Solids of the water is measured . This gives the content of the salts present in the water. The Total Dissolved Solids of water is measured by the ppm. The ppm is known as the particles per meter. This is the commonly used measurement . The TDS sensor is used to sense the aluminum of the TDS . The TDS sensor consists of a probe which to be dig in the soil to measure.

3.4. TFT DISPLAY

TFT display is one of the common types of the LCD(Liquid-crystal display) display. The TFT which stands for Thin Film Transistor. As the name indicates Thin Film Transistor uses a technology called thin film Transistor. Comparatively this TFT display is best in the quality and in the cost wise too. TFT display is used in many places due to its clearance and the full cover view. The TFT display is majorly known for its low energy consumption.

4. WORKING OF PROPOSED METHOD:

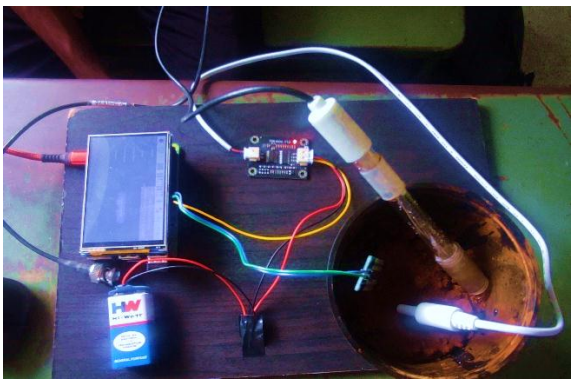
Due to huge population, farmers were demanded to produce more cultivation to maintain that population. Therefore, to produce more cultivation, they were using fastest growing fertilizer which may produce more production of fruits and vegetables but at the same time it produces equal amount of health issues to human body. Due to fastest growing, the pH level of fruits and vegetables will be imbalanced and if we eat that imbalanced of fruits and vegetables, our body pH will also become imbalanced and results in various health issues.

To overcome this problem, Organic food grading system of fruits and vegetables is used to determine the balanced pH of fruits and vegetables during their growing period. TDS sensor is used to determine the presence of nitrogen (N), phosphorus (P), and potassium (K) in the soil.

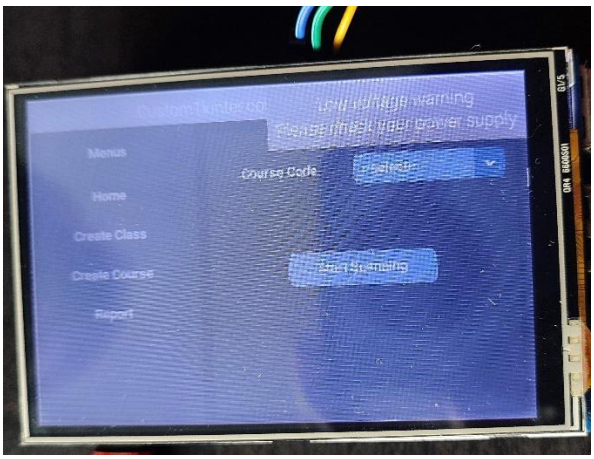
With the help of this sensor, we can determine the pH level of soil. And soil moister sensor is also used to determine the moisture level of the soil This sensor is connected to rasberrypi, and the information is stored in the database of that farmers website. Depending on the pH of that land, the grading system will be allocated.

5. RESULT: -

The results can be displayed in TFT display.



OUTPUT:



6. CONCLUSION: -

By using this project, we will maintain our body pH level in balanced condition and increase in the production of organic fruits and vegetables. As the pH level of fruits and vegetables are balanced, the pH of a human body will also become balanced and reduction from various health issues. The pH level of fruits and vegetables is displayed in TFT display.

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