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Block Chain Application for Tagging Farm Produces

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Abstract
The agricultural sector has a variety of reasons why manual labor is required. The farmers who grow fruits and vegetables for us face many challenges today. The fact that it is very difficult to determine the soil moisture of the land and many more parameters without the physical presence of farmers at the agricultural farm. Agricultural applications of blockchain technology are gaining attention. Smart agriculture has discussed the use of blockchain-based Internet of Things (IOT) systems to secure, monitor, and analyze agricultural data in response to the need for smart peer-to-peer systems. Agricultural data can be shared more securely, immutably, transparently, and decentralized with the use of blockchain technology. As a result of the project, we will be able to present a complete picture of farm cultivation, as well as an updated IoT.With the help of these projects, farmers get much relief in farm cultivation and the growth of crops will be not affected by these conditions.

1. INTRODUCTION
Agriculture accounts for about 70 percent of the Indian economy. Agricultural production in India is diverse, ranging from impoverished village farms to developed farms that utilize modern agricultural technologies. This model uses a moisture and pH sensor to monitor soil properties, such as moisture and pH, in real-time. A variety of field operations can be controlled remotely by Remote Sensing, allowing energy to be used more efficiently. In addition to smart agriculture, healthcare transportation, and other areas of farming, it is applied to a number of other areas as well. Through the use of advanced computer technologies, such as image processing, farmers can be able to detect diseases at an early or preliminary stage when they scan their targeted leaves. Their knowledge of disease control solutions will be enhanced as a result of this. Image processing in Python to detect leaf spot disease.

2.MODULE DESCRIPTION
2.1.Selection of methods and metrics
Different classifiers can be used to detect plant diseases, and a multitude of techniques have been used in the past. Convolutional Neural Networks (CNNs) and K-nearest Neighbors (KNNs) were used to detect these objects in this thesis. For the predictions made by the classifiers, Local Interpreter Model-agnostic Explanations (LIME) were used as an XAI methodology. The aforementioned models were evaluated based on accuracy, precision, recall, and the F1-score. The results of each classifier's evaluation using the same four evaluation metrics were used to identify the best model for disease detection in tomato leaves.

2.2.Proposing of the Data set
A unique label is also assigned to every plant image. This is a crucial step for any machine learning model as it determines the performance and results of the model. According to this report, the following steps were taken to ensure that the models produced optimal results: First, the images were read and re sized, and then NP was used to convert them into arrays (Array). Plagiarizer() determines the E value. Finalize the process by dividing the training and test sets of the plant village data set 75:25.

2.3.Configuration Of the Classification Models

In this study, CNNs were employed to identify plant illnesses. The first block consists of a convolution layer with 32 filters, each measuring 3 x 3, and Rule was employed as the activation function. As a next step, we performed batch normalization, choosing a Max Pooling layer and adding a dropout layer with 25% drop-out. During the convergence process, batch normalization was applied to speed up convergence. It is typically applied after each layer to normalize the output of the prior layer and enable autonomous learning for each layer. By randomly turning off specific portions of the neurons, the dropout layer prevents the model from fitting too closely. When specific segments of the neurons are turned off, the model performs better during learning and is able to avoid generalizing to your test data set.

2.4.Classification & Detection of Diseases

In picture segmentation, an image is divided into various parts that are similar or have the same features. One can use a variety of techniques, such as K-means clustering, transforming the RGB image into a HIS model, etc., to segment an RGB image. An object is classified into K classes based on K-means clustering based on its features.The total squares of the distance between the object and the cluster must be kept to a minimum in order to classify things. Lastly, classifiers are used to train and test datasets. A classifier may be based on fuzzy logic, neural networks, support vector machines (SVM), k-nearest neighbours, etc. Leaf diseases are detected and classified using these methods.

3.HARDWARE DESCRIPTION

3.1.POWER SUPPLY

An adapter transfers the attributes of one electrical device to another that is otherwise incompatible. Other electrical connectors merely adapt the physical form of one connector to another by altering its power or signal attributes. Power plugs can be connected to AC power sockets of different regions by using an electric power adaptor, which provides connections for disparate contact arrangements without affecting voltage.

3.2.ESP32 MODULE

Wi-Fi and dual-mode Bluetooth are combined onto a single tiny chip by the ESP32 series of low-cost, low-power microcontrollers. The ESP32 series from Ten Silica includes integrated antenna switches, RF baluns, power amplifiers, low-noise receive amplifiers, filters, and power management modules in addition to dual-core or single-core Xtensa, Xtensa LX7, or RISC-V microprocessors. As part of its 40-nm manufacturing process, ESP32 was developed and manufactured by Espressif Systems, a Chinese company based in Shanghai. The ESP8266 microcontroller is replaced by this device.

3.3.PH SENSOR

As an indicator of the acidity or alkalinity of a solution, a pH sensor measures the concentration of hydrogen ions (PH) in a solution.The device can be used to measure not only the pH of liquids, but also the moisture levels, and the light intensity of them. An inbuilt meter is included with the pH sensor, allowing it to measure the intensity of light. Getting digital input is done by connecting the pH sensor to the board.

3.4.PUMP MOTOR

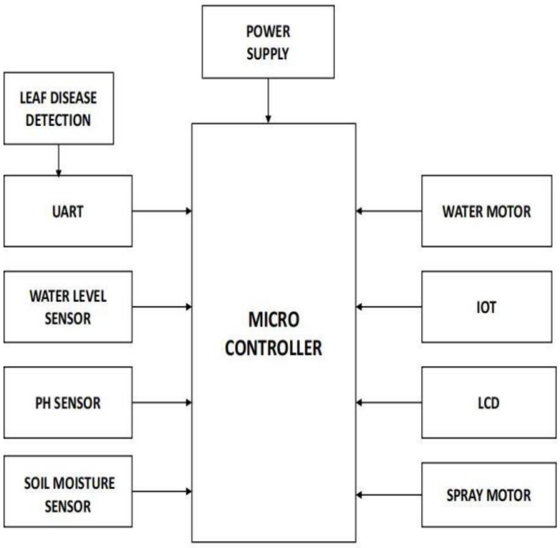
DC MOTORs are used to move fluids through pumps. A DC motor is a device that converts direct current electrical energy into mechanical energy. A DC motor is a device that rotates a current-carrying conductor by generating torque by placing the conductor in a magnetic field.Due to the torque produced by the magnetic field, the conductor begins to rotate when placed in this field. Motor action is a term used to describe this process.

3.5.LCD

A display for E-blocks has been designed using LCD technology. An alphanumeric LCD display with 16 characters and two lines is connected to the device via a single 9-way D-type connector. By doing so, the device can be connected to the I/O ports of most E-Blocks. In the user guide below, we describe how to send data to the LCD display in serial format. Additionally, a power supply of 5V is required for the display. If the voltage is exceeded, the device may be damaged. A 5V fixed regulated power supply or the E-blocks Multipogrammer are the best options for generating 5V.

3.6.WATER LEVEL SENSOR

A floating type of plastic is used for the water level sensor, which is connected to the microcontroller and floats in water in order to sense the level of water. As soon as the water level on land reaches its maximum, the floating type sensor will float in the water until it reaches the top edge. This is used as an indication that the water is full. The microcontroller is also notified by a low level of water on land. Our microcontroller is programmed with the ability to send all of the data to a particular person using a GSM protocol that can be controlled remotely.



3.7.SOIL MOISTURE SENSOR

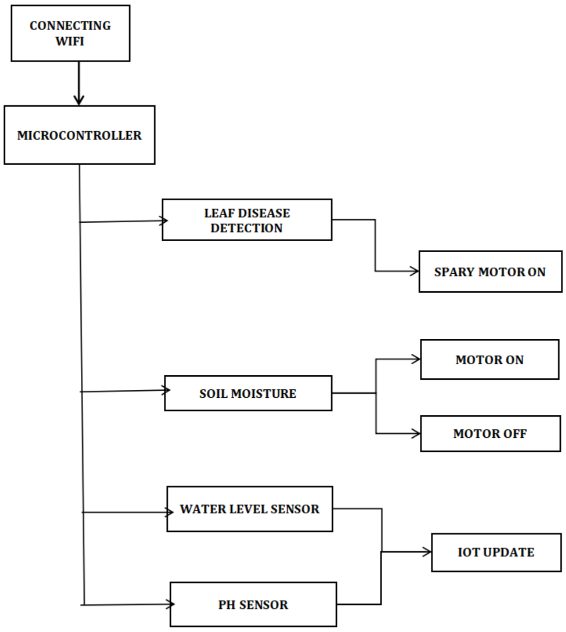
Testing the moisture level can be done with this sensor. A high level of module output is displayed when soil is deficient in water, and a low level is displayed when soil is abundant in water. An automatic watering technique can be used to water the flowering plant or any other plant that requires automatic watering. Analog outputs are more accurate than digital outputs when a module has dual outputs. The volumetric water content of the soil can be determined using soil moisture sensors or other properties of the soil, such as electrical resistance, dielectric constant, or neutron interactions.

3.8.UART

Asynchronous receivers and transmitters are known as UARTs. Instead of a protocol like SPI or I2C, this is a physical circuit inside a microcontroller or standalone IC. Serial data is generally transmitted and received using UARTs. Data buses provide data to UARTs that transmit data. Through the data bus, other devices, such as processors, memories, and microcontrollers, send data to the UART. The transmitting UART receives the data from the data bus during parallel transmission. Parallel data received from the bus is compressed by adding a start bit, a parity bit, and a stop bit by the transmitting UART. Data packets are then output serially to the TX pin bit by bit. A UART receiving data packets reads their contents bit by bit on their RX pins. UARTs that receive data convert the data into parallel format and remove stop, parity, and start bits. Parallel transmission of data packets takes place between the UART and the data bus at the receiver. Messages transmitted via the UART are organized into packets. There are a small number of bits that make up a packet, including a start bit, five to nine data bits, an optional parity bit, and one to two stop bits, depending on which UART you are using.

3.9.IOT

A network of everyday objects governed by electronics, software, sensors, and connectivity that enables data exchange is called the Internet of Things (IoT). Information can be passed between things using a little networked computer. Object control (especially) and information gathering (typically object status and other sensory data) can be done by a networked computer (especially object control). It doesn't matter if it's a light bulb, a toaster, a refrigerator, a flower pot, a watch, a fan, a train, an automobile, or anything else around you, it's all possible. Everywhere around us will be permeated by computers-ubiquitous embedded computing devices, unique to themselves, and interconnected with one another. The Internet of Things is taking off due to a number of low-cost, networkable microcontroller modules.



4.SOFTWARE DESCRIPTION

4.1.ARDUINO IDE

Hardware and software make Arduino an easy-to-use open-source electronics platform. A motor can be activated, an LED turned on, or a tweet can be published via Arduino boards. Inputs can be turned into outputs using Arduino boards - that is, they can automatically turn on a motor, turn on an LED, and publish something on Twitter.

4.2.EMBEDDED C

Standard C and embedded hardware and application architectures often differ in terms of performance. This is the purpose of Embedded C. In addition to providing primitives commonly available on DSP processors, Embedded C extends the C language with signal-processing primitives. Fixed-point data type and named address space are supported by Embedded C due to their portability. Various DSP-C manufacturers have been using DSP-C since 1998 in their compilers as an industry-designed extension to C. DSP manufacturers and embedded-application designers were consulted when developing DSP-C.

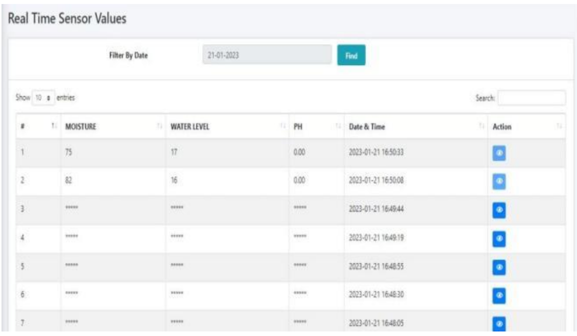
4.3.PYTHON

Guido van Rossum created Python in 1991 and it has gained wide use throughout the world for general-purpose programming. In addition to its emphasis on code readability, Python also features an intuitive syntax. With languages like C++ or Java, programmers have the option of expressing concepts using fewer lines of code. Instead of curly brackets or keywords, whitespace indentation is used to delimit code blocks. Small and large programs can both be written with the language'sconstructs.Python has a dynamic type system and automatic memory management, among other features. It supports object-oriented programming, imperative programming, functional programming, and procedural programming, among others. The standard library is extensive and comprehensive.

5.OUTPUT

Sensor ID	Moisture	Waterlevel	PH
148502	75	17	0.00
148501	82	16	0.00
148500	52	20	0.00

(a) web app



(b)web page

6. CONCLUSION

Farmers can easily gather information about crops and make significant changes wherever necessary using IoT for smart farming. Blockchain technology and IoT cultivation will benefit everyone involved. This innovative concept of smart farming must be introduced by landowners to increase production and make it more efficient. By handling IoT and blockchain concepts carefully, buyers and sellers will maintain a successful relationship, and their needs will be met. IoT cultivation will be highly effective using blockchain technology, benefiting all parties involved. Agricultural monitoring using blockchain technology will be effective in the future and can be used anywhere. It is possible to detect diseases earlier or at an early stage through the use of advanced computer technology, such as image processing, helping farmers to control them more effectively.

7.REFERENCES

1. ZibinZheng, ShaoanXie, Hong-Ning Dai, Xiangping Chen, Huaimin Wang, “An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends”, 2017 IEEE International Congress on Big Data (BigData Congress),2017.
2. Sachchidan and Singh, Nirmala Singh,“Blockchain: Future of financial and cyber security”, 2016 2nd International Conference on Contemporary Computing and Informatics (IC3I),2016.
3. Siddharth Rajput; Archana Singh; SmitiKhurana; Tushar Bansal; SanyuktaShreshtha, “Blockchain Technology and Cryptocurrencies”, 2019 Amity International Conference on Artificial Intelligence (AICAI).
4. F. Tian "An agri-food supply chain traceability system for china based on RFID and blockchain technology" Proc. of the ICSSSM. IEEE pp.1-6 2016.

5. Miguel Pincheira Caro; Muhammad Salek Ali; Massimo Vecchio; RaffaeleGiaffreda," Blockchain-based traceability in Agri-Food Supply chain management: A practical implementation",2018.
6. S. P. Mohanty, D. P. Hughes, and M. Salathé, ''Using deep learning for image-based plant disease detection,'' Frontiers Plant Sci., vol. p.1419, Sep.2016.
7. M.Brahimi,K.Boukhalfa,and.Moussaoui,''Deep learning for tomato diseases: Classification and symptoms visualization,'' Appl. Artif. Intell., vol. 31, no. 4, pp.299–315,2017.
8. E. C. Too, L. Yujian, S. Njuki, and L.Yingchun, ''A comparative study of fine-tuning deep learning models for plant disease identification,'' Comput. Electron. Agric., vol.161,pp.272–279,Jun.2019.
9. O. O. Abayomi-Alli, R. Damaševičius, S.Misra, and R. Maskeliunas, ˜ ''Cassava disease recognition from low-quality images using enhanced data augmentation model and deep learning,'' Exp. Syst., vol. 38, no. 7, Nov. 2021,Art.no.e12746.
10. L. Bi and G. Hu, ''Improving image-based plant disease classification with generative adversarial network under limited training set,'' Frontiers Plant Sci., vol. 11, p. 1945, Dec.2020