Application of IOT in Supply Chain Management of Agricultural products

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Abstract- Supply Chain Management (SCM) is the central theme in today's global industries. SCM is the management of flow of goods and services. SCM includes movement and storage of raw materials and goods from one place to another place. It is termed as design, planning, execution, control and monitoring of goods. It controls the product flow, information flow and financial flow. Supply Chain Management of agricultural products, whose establishment of traceability is important but the lack of appropriate information technology supported in the past. Agricultural supply chain traceability should be established to provide guarantee with the development of the internet of things. Automatic identification and global tracking of agricultural products. In this system, farmer gets complete information of the whole life cycle of the product. Thus transparency is maintained by optimizing the supply chain. A great value to the farmer community can be given by connecting them and their product directly in the SCM.

Keywords — Internet of Things (IoT), Supply Chain Management (SCM), global tracking, traceability

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I. ITRODUCTION

Agriculture is the foundation of national economy, only the agricultural development is good, the entire national economy can steadily forward. The economic development of our country's history suggested that, only given a great development of agriculture and rural economy, the whole national economy can go to prosperity. Our country is an agricultural country of production and consumption.

Supply chain management (SCM) means related to the agricultural products is of great importance. IOT will effectively solve the safety problems of these products by providing proper tracking information. Since agricultural products have crucial importance, the farmer should be given a proper knowledge to know about his product. A supply chain is a network of facilities that procures raw materials, transforms them into intermediate sub assemblies and final products and then delivers the products to customers through a distribution system.

The most challenge of supply chain management is how to maintain a visible level of warehousing. In order to minimize the uncertainty among the supply chain, members in supply chain network would like to see information what they want. However, this kind of uncertainty will make firms to use safer amount of warehousing or other non-ideal management method

The development and regularity of agricultural means of production are directly related with the production of food, farmer's income and the order of market. It plays a vital role in ensuring the quality and quantity of agricultural products.

Here we have designed a website for farmer and manager. Using the Radio Frequency identification (RFID) technology, we rack the agricultural products at every stage of supply chain management, The RFID tag is attached to the product container and scanned against RFID reader and ESP8266 at every stage of SCM. Once the tag is scanned that tag id is uploaded to the database. The product information will be uploaded by the farmer through the manager.

II. EXISTING SYSTEMS

Surveys of the existing systems are as follows.

A. Radio frequency identification (RFID) is the technology that uses an RFID tag on objects or people, so that they can be identified, tracked and managed automatically. Existing positioning technology such as global positioning system (GPS) are not available indoors as the terminal cannot get the signal from the satellites. To enhance the availability of the positioning system of indoors, the development of RFID positioning system for locating objects or people have become a hot topic in recent research. GPS is mainly used for outdoor tracking. This deals with the process of goods which is used to be tracked in both indoor and also outdoor environment, and to monitor the goods with the IOT anywhere and at any time.

B. Some characteristics in this paper are: -

An AIOT(Internet of Agricultural things) which proposes Service Oriented Architecture(SOA), where a central application service support platform to hole big volume data storage and handle information processing for the agricultural industry.

A IOT fuse the sensed data from the supply chains of fresh vegetables to show an intuitive view for users including end customers

With the support of centralized server, A IOT can help users including end customers, effectively verifies the trust-worthiness, and then make the decision of buying.

C.A review of the state of the art technologies and strategies that constitute the IoT and how that applies to 'Farm to Fork'. The technologies proposed are RFID, WSN (wireless sensor network), Cloud computing, Data analytics. Primarily tracking, tracing, monitoring have been a major area of focus for the IoT solutions. The enormous data generated from the sensors can be utilized in building information network for decision making and effective management. This is feasible through integration of cloud computing tools with the IoT devices.

These technologies are being adopted in the industry for assuring food safety and quality along every link of the food supply chain. Besides, the essence of IoT is in data driven models that can provide business values.

D. This paper argues that in order to ensure quality and safety of fresh agricultural products, on the one hand, we need to do a good job monitoring the safety of fresh agricultural products from the source, establish fresh agricultural products, quality tracking, tracing and retrospective mechanism and system so that when security problems in fresh agricultural products (particularly safety issues which threaten the life and health of consumers) appear , we can recall of the products in question timely and rapidly, and investigate the offending responsibility of relevant persons and departments; On the other hand, we need to establish overall quality control and tracing system from the origin to the market so that we can monitor and manage the key links of fresh agricultural products such as producing area conditions, production processes, product testing, and packing box logo, further enhance the food safety awareness and sense of accountability of the majority of producers.

Although there are a few systems in existence which track the before a machine can be taught to recognize an emotion, humans must be able to recognize one themselves. EPC tags are embedded in raw materials from the first link of supply chain management of fresh agricultural products (raw material supply), to record product information throughout the whole production and circulation process. This way, hence they buy products; just according to the EPC tags embedded in products consumers can conveniently get the information of fresh agricultural products throughout the whole process involving raw material supply, production, processing, circulation and sales. And then based on the information which they got, consumers can decide whether to buy products.

III.PROPOSED SYSTEM

In this paper, we propose an Application of Internet of Things (IoT) in Supply chain management of Agricultural products.

Here we have designed a website for farmer and manager. Using the Radio Frequency identification (RFID) technology, we rack the agricultural products at every stage of supply chain management, The RFID tag is attached to the product container and scanned against RFID reader and ESP8266 at every stage of SCM. Once the tag is scanned that tag id is uploaded to the database. The product information will be uploaded by the farmer through the manager.
The main objectives are:-
- Automatic identification of agricultural products.
- Global tracking and tracing of agricultural products.
- Providing the complete information of the whole life cycle of the product to the farmer.
- To achieve transparency in the system.

IV.METHODOLOGY

The overall process of the project is shown in the following figure.
The overall process consists of maintaining the supply chain management website by taking input the concerned information and storing the same in the database. Based on the database information further activities can be done. Here manager can have access to all the information about the products, farmers, etc. Similarly farmers can have access to their selling information of their product. For the purpose of tracking, RFID tags and readers are used, their entries are stored in the database as it will be needed further.
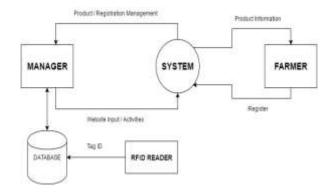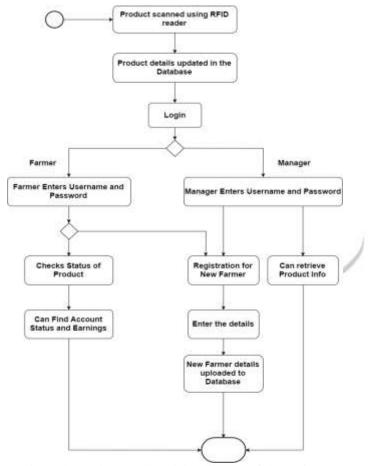
Fig.1 Overall process of the SCM

Fig. 2 shows the overall activity diagram of the project.

V. IMPLEMENTATION

Implementation consists of software and hardware implementation. In order to implement the website, we used HTML, JavaScript, and PHP and CSS languages.

Whereas to implement the hardware, we use ESP8266, RFID tags and RFID readers. The radio frequency identification system uses tags, or labels attached to the objects to be identified. The RFID tags include either the fixed or programmable logic for processing the transmission and sensor data.

Fig.3 RFID reader scanning the RFID tags

Fig3 shows the RFID tag and reader. This component is used for identification of the products automatically. Figure 4 shows the ESP8266 Wi-Fi module.

Fig.4 ESP8266 Wi-Fi module

ESP8266 is a low cost Wi-Fi chip with full TCP/IP stack Microcontroller unit capability.

VI.FUTUREWORK

Most of the future work involves as we are using RFID technology, instead of using RFID tag and RFID reader; we can use EPC technology, EPC tag and EPC reader. We can also further design a consumer website. More sensors can be added for precise monitoring of agricultural products. In future, temperature and humidity sensors can also be added check the quality of the product.

VII. CONCLUSION

We ensure a better system for supply chain management of agricultural products. We provide product information to the farmers without any middlemen. Thus, increasing the profits to farmers. Automatic identification of agricultural products and global tracking is achieved efficiently. The agricultural supply chain based on the technology of internet of things, as each step of the supply chain improve the transparency greatly. Tag RFID can automatically record the entire supply chain of agricultural products in the flow from production to final farmers. Nowadays a lot of IoT devices are available at considerably low cost, which can be widely used on an industry level. Relevant information about agricultural products can be found from tag RFID. This will face the producers directly and eliminate the fake products completely.

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