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Implementation of An IOT based food protection in Warehouse

Gopal Krishna B V, Heena kousar, Shravani V, Soniya P

Department of Computer Science and Engineering, vidya vikas Engineering and Technology. Mysore.

Abstract: The Agriculture sector is the backbone of the Indian economy server security. Security no more in terms of sub-resources only although also agricultural products such as ragi, wheat, rice and corn, use security also protection at the actual initial stage, like protection from attacks of rodents, in grain stores. Such challenges should also be taken into consideration. Protecting systems that are being used nowadays are not smart and adequate to provide within a real time warning after sensing the query. The integration of traditional methodology with the latest technologies since the Internet of things along with Wireless Sensor interface can lead to agricultural modernization. Keeping this scenario in our mind we have designed, tested and analyzed an 'Internet of Things' based device that is proficient in analyzing the sensed information and then transmitting it to the user. Here device can be controlled and also monitored from remote section which can be implemented in agricultural fields, grain stores, and cold stores for security object. Here paper is oriented to accentuate the methods to solve such problems like the identification of rodents to crops and delivering real-time warning planted on information study and processing without human intervention.

Raspberry Pi; Wireless Sensor Network (WSN), Sensors;

I. INTRODUCTION

Developing countries, also which are using traditional warehouse facilities for staple food crops, can't preserve the system, leading to a 20-30% loss of farming products such as rice, corn, wheat, ragi. Available solutions target only insects, pests and grain bug. Thes rodent is borne diseases Agricultural products use arms and protection at the extremely initial stage, like protection from attack of rodents in grain stores. Automating the maintenance and security process is of huge importance. In the past years, information also communication technologies introduced in agriculture, have continued improving food production and also transport. However, the integration of these technologies is not yet used for security device. Lack of information transference and data analyzing can be solved by the integration of IoT with currently available protection devices inside the order to achieve active food preservation and productivity.

A. Internet of Things

In 1999, Kevin Ashton proposed the term" IoT" to refer to interconnected mechanism. It is a major tech revolution in information also communication technology with updated infrastructure and networks where all the connected devices can identify also impart with any other. Shortly, according to Gartner, about 25b recognize devices are expected to be a sector of this computable network by the year

2020. In such a way is agriculture can be vast areas to integrate IoT with distributed autonomous sensors to monitor the environmental condition of grain stores and to analyze details also pass the information to a remote user.

B. Wireless Sensor

Network Wireless Sensor Network abbreviated Wireless Sensor Network is a distributed collection of small devices, capable of economic processing also allow wireless communication. As the implementation of wireless communication technologies in industrial areas is basic due to inaccessibility to a remote location at every time, to transmit the report produced by sensors along for controlling them. So, to achieve interoperability between devices in industrial areas, configuration also implementation of a wireless communication system is done. The structure of the description is as follows. In literature study, includes theoretical contribution also investigation of current security devices and technologies. Also discusses the research and development methodology of the device in which we present our architectonic and design modules, the data transmitted in them. Existing examples of how our device operates and the statistics of efficiency. Also finally, concludes the paper.

C. Aim

The main aim of this project is Lack of information transmission and data analysis can be solved by integration of internet of things with currently available smart devices in order to achieve efficient food preservation for food consumption in future. Although the food crop loss and debilitation of diseases are due to various rodents, while this project proposes a unique design to analyze data provided by of security device, thus accessing damages to post harvest crops stored at warehouse often destroyed by rodents, fire, variation in temperature, moisture and humidity .

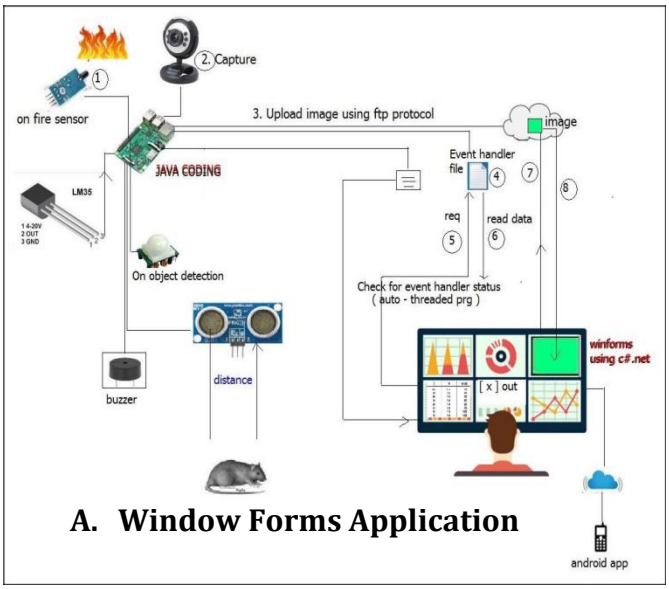
II. Implementation

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage. In achieving a successful new system and in giving the user, the confidence that the new system will work and be effective.

The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evolution of changeover methods.

III.Implementation of proposed methodology

In our proposed system we are making use of Internet of Things (IoT), Security, Raspberry Pi, Sensors and Wireless Sensor Network (WSN). The sensory information are analyzed in order to activate electronic devices and raspberry pi is used as a server to analyze data and transmit information to user.



A. Window Forms Application

Windows Forms is the new platform for Microsoft Windows application development, based on the .NET Framework. This framework provides a clear, object-oriented, extensible set of classes that enable you to develop rich Windows applications. Additionally, Windows Forms can act as the local user interface in a multi-tier distributed solution.

Windows Forms (Win Forms) is a graphical (GUI) class library included as a part of Microsoft.Net Framework, providing a platform to write rich client applications for desktop, laptop, and tablet PCs. While it is seen as a replacement for the earlier and more complex C++ based Microsoft Foundation Class Library, it does not offer a comparable paradigm and only acts as a platform for the user interface tier in a multi-tier solution.

B. Android Studio

Android has several accessibility-focused features baked into the platform, which make it easy to optimize your application for those with visual or physical disabilities. However, it's not always obvious what the correct optimizations are, or the easiest way to leverage the framework toward this purpose. This lesson shows you how to implement the strategies and platform features that make for a great accessibility-enabled Android application.

Android Studio is based on the Java IDE called IntelliJ. If you've worked with other products by JetBrains (developer of IntelliJ), such as RedMine, PyCharm, PhpStorm, WebStorm, or AppCode, we will find ourself at home. All IntelliJ products share the same shell IDE, which we'll see as soon as we open up Android Studio.

C. IoT based M2M Frame Work

The **Internet of things** (**IoT**) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.

IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to areas such as smart cities.

D. JAVA

Java Platform is a computing platform for development and deployment of portable code for embedded and mobile devices (micro-controllers, sensors, gateways, mobile phones, personal digital assistants, TV set-top boxes, printers). Java ME was formerly known as **Java 2 Platform.** The platform uses the object-oriented Java programming language. It is part of the Java software-platform family. Originally developed under the Java Community Process as JSR 68, the different flavours of Java ME have evolved in separate JSRs. Sun provides a reference implementation of the specification, but has tended not to provide free binary implementations of its Java ME runtime environment for mobile devices, rather relying on third parties to provide their own.

E. Google Cloud Messaging

Google Cloud Messaging (GCM) is a free service that enables developers to send messages between servers and client apps. This includes downstream messages from servers to client apps, and upstream messages from client apps to servers.

For example, a lightweight downstream message could inform a client app that there is new data to be fetched from the server, as in the case of a "new email" notification. For use cases such as instant messaging, a GCM message can transfer up to 4kb of payload to the client app. The GCM service handles all aspects of queuing of messages and delivery to and from the target client app. Here's how these components interact:

Google **GCM Connection Servers** accept downstream messages from our app server and send them to a client app. The XMPP connection server can also accept messages sent upstream from the client app and forward them to our app server.

- On our **App Server**, we implement the HTTP and/or XMPP protocol to communicate with the GCM connection server(s). App servers send downstream messages to a GCM connection server; the connection server enqueues and stores the message, and then sends it to the client app. If we implement XMPP, our app server can receive messages sent from the client app.
- The **Client App** is a GCM-enabled client app. To receive and send GCM messages, this app must register with GCM and get a unique identifier called a registration token.

IV. Implementation Methodology Of The Project with Modules

The project is implemented in modular approach. Each module is coded as per the requirements and tested and this process is iterated till the all the modules have been thoroughly implemented. **Modules**

1. Sensors

- URD sensor:
  - An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves.
- PIR sensor:
  - A passive infrared **sensor** (**PIR sensor**) is an electronic **sensor** that measures infrared (IR) light radiating from objects in its field of view. They are most often used in **PIR**-based motion detectors.
- Temperature sensor:
  - A temperature is an objective comparative measurement of hot or exist for measuring temperature, the most common being Celsius.
- Fire sensor:
  - A flame detector is a sensor designed to detect and respond to the presence of a flame or fire. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system.

2. Web Camera /interface

- Current IP based CCTV security cameras require network connectivity for monitoring from remote location.
- Capture The Pictures and Notify to desktop user.

3. **Buzzer/Signal/alarm**
   - Make Sound Frequently and Taking Action.

4. **Motion**
   - Several generations of Raspberry Pi have been released. Memory Range From 256 MB To 1 GB RAM. Have On Board Wi-Fi 802 ,11n And Bluetooth.

5. **Notify**

   Desktop user receives the notification and captured image of the event detected by the sensor. If the desktop user is out of desk it sends the notification to the mobile user.

V. Implementation of Overview

The actual scenario of this project is to preserve and protect food grains at various warehouse from problems like attacks of rodents to stored grains due to fire, increase or decrease in the threshold value of temperature, moisture, humidity. Hence delivering real time notification based on information analysis and processing without human intervention is required.

This application can be controlled and monitored from remote location and it can be implemented at several warehouse for security purpose. The lack of information transmission and data analyzing has been solved by integrations of internet of things with currently available smart devices in order to achieve efficient food preservation and productivity for further consumption.

VI. CONCLUSION

IoT is widely used in collecting information and connecting devices. The system is designed for classifying of rodents in grain stores. After analyzing also collecting the data, an algorithm is designed to provide accuracy in informing the user and simulation of the repeller. All the results are calculated by taking any readings. Tense testing is done in an area of 10 square meters with a device placed at the corner. Once PIR sensor recognized heat it starts webcam and URD sensor, along with it, the device sends random no. of notifications based upon timestamp to a user. For future enhancement, the device will inherit a grid of sensor panels existing PIR sensors and URD sensors. The device can incorporate pattern perception techniques for machine learning and to recognize objects also categorize them into rodents, human beings, and mammals, also sensor fusion can be done to increase the operative of device. Improving these perspectives of the device, Is can be used in distinguish areas. This project can undergo further research to improve the user device and its value areas. We have opted to implement this system as a security solution in the farming sector i.e. grain stores, cold stores, and farms.

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AUTHORS PROFILE

Gopal Krishna B V is a Student, currently pursuing 8th sem engineering in computer science from Vidya vikas institute of engineering and technology, Mysore, India.

Heena kousar is a Student, currently pursuing 8th SEM engineering in computer science from Vidya vikas institute of engineering and technology, Mysore, India.

Shravani.V is a Student, currently pursuing 8th sem engineering in computer science from Vidya vikas institute of engineering and technology ,Mysore ,India.

Soniya.P is a Student, currently pursuing 8th sem engineering in computer science from Vidya vikas institute of engineering and technology ,Mysore ,India.