"SMART SYSTEM FOR AGRICULTURE MONITORING"

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Abstract –*As the name suggests, "Farm monitoring system", this product not only just monitors the farm related data for either the farmer or the owners who appoint certain farmers to do the field work for them and the real production is sold by the owner. What this product does is that it keeps a real time track of all the crop health data and predicts measures to be adopted by the owner/farmer. The need of the hour is to make farming more efficient and worth the raw materials that are supplied to the crops. This is where the product helps the most. It can just notify a farmer or the owner about the real time health like, soil moisture or rain related data. So that precautionary measures can be taken effectively.*

Key Words: **Soil temperature sensor, camera module, Rain sensor, Sound module**.

1. INTRODUCTION

According to the necessity of the agriculture, not just as an occupation but also as a business, is that it surely needs a strategy or a pattern to cultivate to at least have a profit out of the money. Here we use such sensor-based systems which have been investigated earlier, one of the key innovations to be explored in this project is the combination of these sensors systems with a service-driven business model to increase their ease of use and to amplify the gains that can be realized via an integrated system. The goal is to give a farmer a more complete picture of the current and historic crop status in order to foster better informed decision making. It is expected that such decisions will benefit both farming and irrigation by saving time and resources.

Factors such as the diversity of conditions which vary depending on location (for example weather, presence of insects, and disease) combined with the inability to predict the future characteristics of the environment during the different seasons over time complicate the decision making process and require specialized knowledge. This project is an attempt to bring some of these micro-environmental sources of information into the decision making process of farmers.

1.1 Information Needs in Agriculture.

The goal is to investigate the previously implemented systems and to find the most suitable technologies that can be applied to focus our research and to build a suitable and valuable system. Since it is not possible to make a hypothesis from the beginning and then justify this hypothesis at the end, the deductive method is not applicable. Since this study will examine wireless sensor network architectures and applications in the agricultural sector - a qualitative method will be used. This method will give us a better understanding of why and how the process should be designed. More specifically, the work can be split into the four following parts:

1. Environmental monitoring
2. Precision agriculture
3. Machine and process control
4. Facility automation
5. Traceability systems (radio-frequency identification)

1.2 Agriculture Apps

We undertook a thorough search to identify mobile agriculture apps, looking at both the literature and the internet. While there are likely more agricultural apps available than what we found, we have found some examples of mobile agriculture apps. Which are:

1. Agriculture information apps
2. Business apps
3. Conference apps
4. Diseases apps
5. Farm managemenr apps
6. Location based apps
7. Weather apps
8. Market data apps

2. Hardware Description

2.1 Arduino Yun

Arduino Yun board is a microcontroller board which is based on the ATmega32u4 and the Atheros AR9331. The Atheros processor supports a Linux distribution based on Open Write whose name is Linino OS. The board is having built-in Ethernet in it and Wi-Fi support as well as a USB-A port, micro-SD card slot, 20 digital input/output pins, a 16 MHz crystal oscillator, a micro USB connection, an ICSP header, and a 3 reset buttons.

Fig -1: Arduino Yun Board

Specification:

PWM Channels	7
Analog Input Channels	12
DC Current per I/O Pin	40mA
DC Current for 3.3V Pin	50mA
Flash Memory	32KB
SRAM	2.5KB
EEPROM	1KB
Clock Speed	16MHz
Operating Voltage	5V
Input Voltage	5V
Digital I/O Pins	20

2.2 Bridge

The Bridge library makes communication between the two processors, giving Arduino sketches the ability to run shell scripts, communicate with network interfaces, and receive information from the AR933 processor in it.

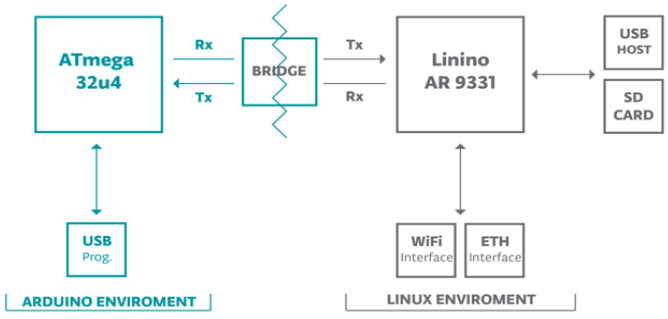

Fig -2: Bridge Architecture

Linux Microprocessor Specifications:

Processor	Atheros AR9331
Architecture	MIPS @400MHz
Operating Voltage	3.3V
Ethernet	IEEE 802.310/100Mbit/S
WiFi	IEEE802.11b/g/n
USB Type-A	2.0 Host
Card Reader	Micro-SD only
RAM	64 MB DDR2
Flash Memory	16MB
PoE compatible	802.3af card support
Length	73 mm
Width	53 mm
Weight	32 g

2.1.1 Soil Temperature sensor:

- After coming to know the soil temperature is imperative when battling pests and diseases. Since certain pests thrive in certain soil temperatures, having that information can really help you stay ahead of the game
- The sensor is a module from Sensor in a sinter metal mesh encasing.
- It is a high quality temperature sensor that is specifically designed for soil temperature measurements in extreme environments.
- In our product, it is connected to analog pin A1 of Arduino Yun.

2.1.2 Rain Sensor:

- A rain sensor or we can say a rain switch is a kind of a switching device which is activated when there is a rain fall. There are two main applications for these rain sensors.
- The first we can use is the water conservative device which is connected to an auto irrigation systemto shut down when there is an event of rainfall.
- The second application of these is used to protect interior of an automobile from rain.

2.1.3 Sound Module:

- The sound detector is small board device that combines a microphone and some types of a processing circuitry. This device provides not only an output of audio, but also provide a binary indication of the presence of sound, and also an analog representation of it's amplitude.

2.1.4 Camera Module (IP cam):

An internet protocol camera or we can say an IP camera is used as a camera for a digital video which is commonly used for surveillance or for security purpose, and which, unlike analog closed circuit television (CCTV) cameras, which can send and also receive data via a computer network and also from the internet.

It is very useful for monitoring the farm in real time and we can take photos and also record videos from anywhere.

IP cameras differ from previous generation analog cameras which transmitted video signals as a voltage, whereas IP camera images are sent using the transmission and security features of the TCP/IP protocol. Some advantages to this approach include:

- Two-way audio via a single network cable allows users to listen to and speak to the subject of the video (e.g. gas station clerk assisting a customer on how to use the pay pumps
- The use of a Wi-Fi or wireless network
- Distributed intelligence such as video analytics can be placed in the camera itself allowing the camera to analyze images.
- Secure data transmission through encryption and authentication methods such as WPA, WPA2, TKIP, AES.
- Remote accessibility allowing live video to be viewed from any device with sufficient access privileges.
- PoE Power over Ethernet to supply power through the ethernet cable and operate without a dedicated power supply.

3. CONCLUSION

This study will plan a design of a farm,mobile application framework.We have describe one conceptual model and also the system components which comprise the mobile application. This concept also provides the mobile gateway interface for supportin the mobile devices to be a device which is capable of receiving sensing information from the sensor devices. It is a kind of device which perform environmental sensing capability. This concept study aims to make mobile device gateway an integrated gateway which supports heterogeneous devices. In the proposed farm system, the received sensing information will be analyzed using smart phone devices which will generate keywords, The keywords will then be sent to the knowledge expert system for analysis. This system provides the advantages such as real-time monitoring, alerts and statistical analysis of crop conditions and environmental factors.

REFERENCES

[1] http://playground.arduino.cc/.

[2] MQ-4 Semiconductor Sensor for natural gas, Henan Hanwei Electronics Co. Ltd.

[3] mAgriculture: The application of mobile computing to the Business of Farming Gary Woodill, Ed.D. , Senior Analyst, Float mobile learning.

[4] http://developer.android.com/index.html.