Automated Farming Vehicle

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***Abstract*- In 21 century Farming is the best part of human need and requirements, which is playing the ultimate role for survive of this world. There are a quite few agriculture machineries available today for each and every aspect of farming.**

Index Terms- IoT, L239D, Raspberry pi

IOT based smart farming is very easily operate many things easily like:-

- Livestock monitoring
- Precision farming
- Farming drones
- Light
- Humidity
- Temperature
- Soil moisture

Our existing model is automated vehicle .cars are connected with the IOT connected cars are basically cars equipped with internet access or wireless LAN. Which provide drivers with additional benefits. This includes automatic notification of crashes, notification of speeding, voice commands, contextual help/offers, parking assistance, engine control and much more.

In our model, the Cost for the performing the particular task is predictable by making the parameter static. User just give the parameter to the vehicle and vehicle started their work. When it reaches the target state it automatically stop. Due to this, efficiency of the vehicle will increase and cost is affordable [1]. For example, for ploughing the field, we give the parameter of field (length and breadth) vehicle will start the from starting point and start at end point.

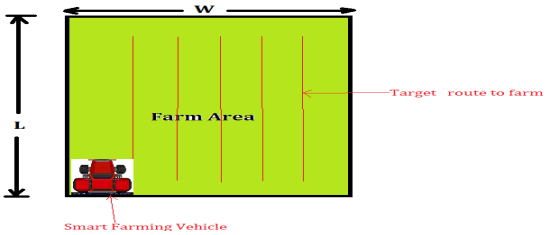

Fig no- 1 Farming field route assumption

1.INTRODUCTION

The internet of things, or IOT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to human or human-to-computer interaction.

The internet of things has the power to change out word [2]. IOT will play an important role in the future and there is expected to be a significant amount of cash flowing through the market in the up-coming years. Over half of major new business processes and systems will incorporate IOT elements by 2020. In corporate business model is rapidly increasing as the cost of instrumenting physical things with sensors and connecting them to other things devices; systems and people continues to drop [3].

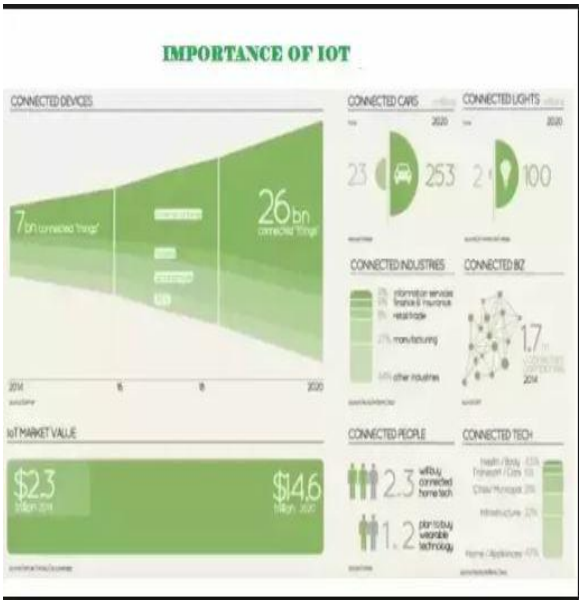

Fig no-2 Importance of IOT

The Arduino is a microcontroller. A microcontroller is just one tiny part of a computer. The Arduino can be programmed in C, but cannot run an operating system. On the other hand, theRasperry Pi and PCDuino are computers, those devices can run an operating system alone. The Arduino is simply perfect for electronics projects and prototyping. You can easy connect some LED's, sensors, motors into the board directly. With their user friendly board it easy to do that.

The Raspberry Pi is a complete minicomputer. It needs an operating system to work. All the Storage is provided from a SD card. You can connect this to your network with an Ethernet Cable.

Beagle Bone Black It's similar to a Raspberry Pi but It's more powerful, Based on the TI Sitara AM335x, an application processor SoC containing an ARM Cortex-A8 core. You have more pins to control. They recently won "2013 Top Embedded Innovator award".

The Raspberry Pi 3 B+ has four built-in USB ports that provide enough connectivity for a mouse, keyboard or anything else that you feel the Rasberry Pi needs. But if you want to add even more, you can still use a USB hub. Keep in mind, it is recommended that you use a powered hub so as not to overtax the onboard voltage regulator. Powering the Raspberry Pi 3 B+ is easy.

Fig no-3 Raspberry pi 3+

2. NEED OF SMART FARMING

As smart technologies make headway across industries, the agriculture sector is not to be left behind. The smart farming developed latest technologies such as micro controllers, cloud – or web – based platform, cameras, sensors, and smart devices, sensors, and cameras are implemented to help farmers understand their land condition better. The smart agriculture engages advanced technologies such as Big Data, GPS, IOT and connected devices. Smart agriculture helps in automated farming, collection of data from the field and then analyses it so that the farmer can make accurate decision order to grow high quality crop. The field data are collected with the help of sensors, cameras, micro controllers, and actuators. Then the collected data are transferred via internet to the operator or the farmer for decision making [4].

3. EXISTING SMART FARMING VEHICLE

Our existing vehicle named KUBOTO launches autonomous tractor. The rise of autonomous vehicle has reached the agricultural sector as well. Yet another manufacture of farming machinery tractors has decided to include in their offer a state of art vehicle are utilizing the solution applied in autonomous cars.

The tractor kuboto SLA6OA, presented in 2017, which is equipped with a 60- horse power motor unit was the first model on offer from the Japanese farming equipment manufacture to be this far advanced. The proper functioning of the tractor will be ensure by sensors and cameras [5].

Kuboto has also introduced into the market the technology allowing for more precision in farming activities- "Farm pilot".

The GPS – based device could help reduce labor cost, as well as settled to position of machines and better organize work in the fields. Crop harvesting is quite expedited by the use of autonomous machines. Additionally, the farmers are able to save money otherwise spent on employing extra workers [5], [6].

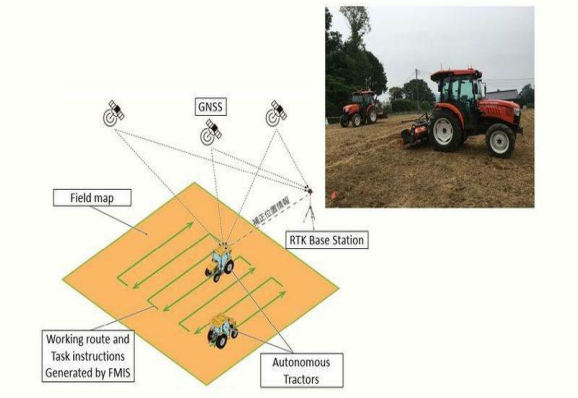

Fig no 4- Existing model working and approach of autonomous tractor [5]

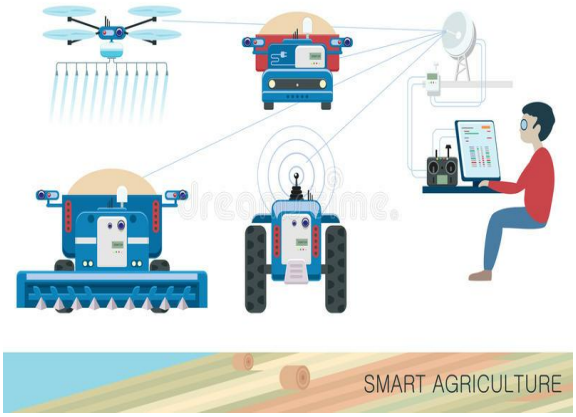

Fig no-5 Pictorial view how smart agriculture done [6]

4. PROPOSED RESEARCH WORK

Our proposed research work based on three parts:

- 1 – GUI Model
- 2 –Micro computer
- 3- Driver board and D.C Motors

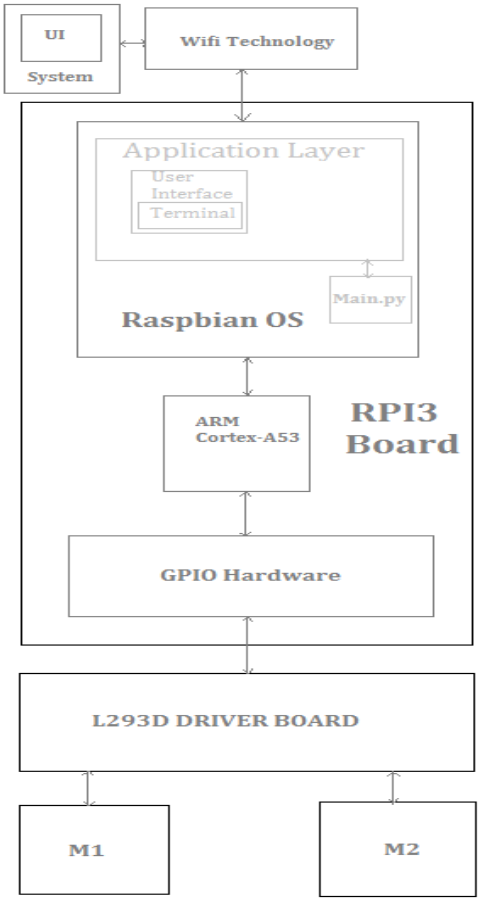

Fig no 6- Proposed Circuit Diagram of Automated Farming Vehicle

4.1- GUI Model

The application layer of our project is connected with the Wi-Fi technology with interactive user interface or terminal. Multiple option available to control the vehicle like moving forward, backward, left, right or simple terminal with multiple actions options. When any action is clicked, all control go to python script. The python script is programmed to work for particular action.

4.2- Micro Computer

A microcomputer is a small, relatively inexpensive computer with a microprocessor as its central processing unit. It includes a microprocessor, memory, and minimal input/output circuitry mounted on a single printed circuit board.

We are using Raspberry Pi 3 microcomputer to control the vehicle. Raspberry pi works on to the programmed actions.

4.3- Driver Board and D.C Motors

Stepper motor drives are specially designed to drive stepper motors, which are capable of continuous rotation with precise position control, without even feedback system. A stepper motor to be controlled with simple step and directions inputs. Driver board is connected with raspberry pi. It specifies the driver board what actually is doing when any particular actions selected. Driver board have multiple pin structure. Output generated pin is connected with the D.C motors. One is connected for forward, backward and one is for left, right.

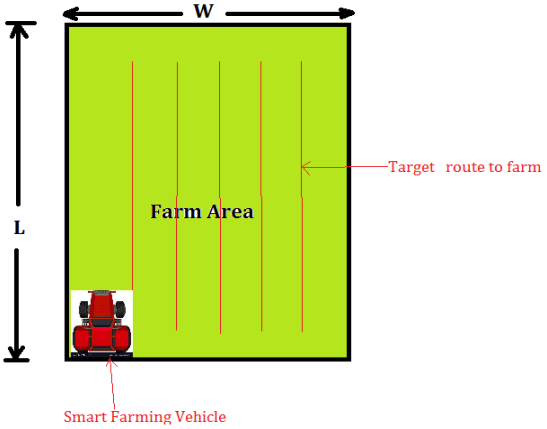

Fig no- 7 .Proposed vehicle route to farm

In our model, the Cost for the performing the particular task is predictable by making the parameter static. User just give the parameter to the vehicle and vehicle started their work. When it reaches the target state it automatically stop. Due to this, efficiency of the vehicle will increase and cost is affordable. For ex: For ploughing the field, we give the parameter of field(length and breadth) vehicle will start the from starting point and start at end point.

5. CONCLUSION

Existing model is proper functioning of the tractors will be ensure by sensors and cameras. The GPS based device could help reduce labor cost as well as settled to position of machines and better organize work in the field and crop harvesting is quite expedited by the use of autonomous machines additionally farmers save their money. Smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. As an added benefit, they also improve the quality of life for farm workers by reducing heavy labor and tedious tasks. Replacing human labor with automation is a growing trend across multiple industries, and agriculture is no exception. Most aspects of farming are exceptionally labor-intensive, with much of that labor comprised of repetitive and standardized tasks—an ideal niche for robotics and automation.

Our proposed research work is good because it can be real monitoring of the vehicle's status and operation. Tracking of the vehicle in the event of ploughing and alerts to safeguard the driver and relatives, optimization of routes and driving expenses and it can also be software updating with the possibility of changing the vehicle configuration remotely.

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