India Innovation Challenge Design Contest 2019

IICDC 2019 PROPOSAL

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Tile of the Idea	:	***Smart AGRI-BOT***

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1.1 ABSTRACT:

Integrating modern technologies with traditional agriculture methods paves way for more productivity and efficiency. Robotics and Internet of Things are two growing technologies. Adapting these two technologies, a robot is built to address one of the main problems faced by farmers; labors. The robot is designed to do common activities like ploughing, seed sowing, water supply and weeds killing. The robot is also equipped with a surveillance system to detect early stages of disease attacking the crops. Data analytics can be used in future to give suggestions and preventive measures to be taken in controlling the diseases.

Keywords: *Smart Agriculture Robot, Early Detection of Crop Diseases, Automatic Ploughing Robot*

1.2 MARKET ANALYSIS

A. EXECUTIVE SUMMARY:

Smart AGRI-BOT is a robot designed for assisting farmers in agricultural activities in context to Indian Agricultural Environment. It is designed to minimize the labor cost and equipment cost for farmers and in addition to increase the overall productivity of the crop. The robot has the ability to perform the elementary functions like ploughing, seed sowing, weed removal etc. involved crop cultivation. It is also equipped with a high-resolution camera to make a surveillance of the crop for any disease attack, which helps the farmers to take necessary preventive measures to arrest the spread od diseases further. This early stage identification helps them from losing the entire crop.

B. BUSINESS DESCRIPTION AND MISSION:

The mission of this project is to promote and improve modern agricultural practice in Indian Farmers who are used with Traditional Farming methods. The use of technologies such as Robotics, Internet of Things, Data Analytics can help them from spending more in maintaining the crop.

C.PRODUCT OR SERVICE:

This is an integrated product where the robotic part help farmers with their day-to-day activities like ploughing, seed sowing, weed removal and water supply. The product also has an image sensing system which captures the images of the crop and sends them to cloud for data analysis. This is provided in-order to find whether the crop is suffering from any diseases or not.

D.MARKETING STRATEGY:

According the present studies, IOT and data analytics can bring major changes in the agriculture sector. Indian Government is very keen in digital transformation, many schemes and subsidies are given by government of India to promote “Digital India”. Agriculture contributes to more than 70% of India’s Economic, we can expect a major support from the government of India.

The marketing plan is to conduct seminars and live product demonstration panchayat wise all over India, to educate the farmers about modern agriculture practice and the specialties of Smart AGRI-BOT and its uses.

E. COMPETITORS ANALYSIS:

Agriculture plays a major role in India and thus many companies in Agri-product manufacturing like, Mahindra and Mahindra, Tractors and Farm Equipment Limited, Escorts Agri machinery, Sonalika, John Deere India Private Limited etc… to a name a few have their presence in product categories. Agri App, Iffco Kisan, Agri Media Video, FarmBee etc. are some companies who provide service as there product to Indian Farmers.

F. OPPURTUNITIES:

The product line of competitors mentioned above have been analyzed and found to lack two things namely connected machinery products and Preventive measures Service. This is the gap Smart AGRI-BOT will tap out, it will create its own market, as so far, no market is available readily to offer a product and a service together.

G. THREATS:

Smart AGRI-BOT activities can be mainly categorized based on their functional activities as Robotic system, Image Acquisition system, and Data Analytics. Thus, have their own thread in each category to a certain extend. Robotic parts are subjected to mechanical wear-tear, failure to change parts at correct time may lead malfunctions. Image acquisition relays on the camera, lights and visibilities may affect the image acquisitions which may, result in poor identification. Data analyses needs more data-sets for training and so its precision will improve, as the number of samples increases.

2.0 TECHNICAL DETAILS:

A) PRODUCT BRIEF

The robot is designed using non rusting materials and water-proof electronics packages. The Robot is a four-wheel drive, powered from solar system and 12V DC battery. It has two robotic arms to spray Herbicide locally and two forks to do ploughing and a camera for image acquisitions.

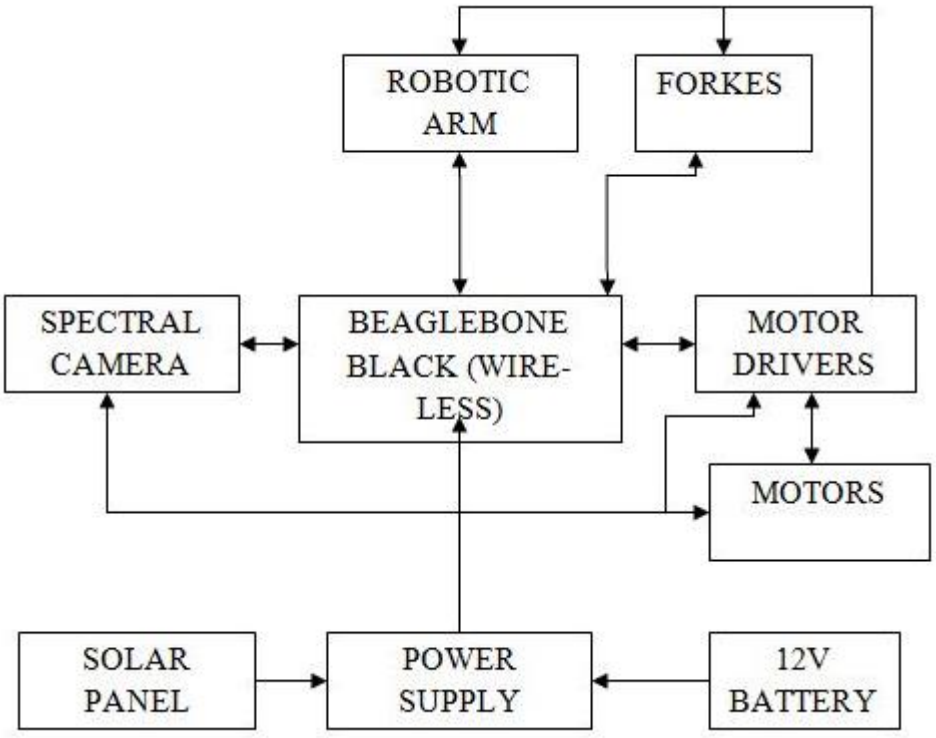
B) MAIN COMPONENTS

The main components of the robot are Beagle Bone Black Wireless, Spectral Camera, custom-made forks and robotic arms, 12V DC battery, 12V Solar Panel and motor drivers for various sub-systems.

The Beagle Bone Black was chosen to be the main controlling processor based on the following criteria's,

- 512MB DDR3 RAM, 4GB 8-bit eMMC on-board flash storage
- 3D graphics accelerator
- 2x PRU 32-bit microcontrollers
- onboard 2.4 GHz Wi-Fi and Bluetooth connection
- HDMI
- 2x 46 pin headers

C) BLOCK DIAGRAM



D) INNOVATIVENESS OF THE PROPOSED SOLUTION

The main innovation of this proposal is that a single robot that can assist in day-to-day activities of a farmer to maintain his crop and help him to find diseases in the early stages itself. Thus, proving to be a product as well lending service to the farmers to have dual benefits. Specifically designed in context for Indian Farmers; easy operational switches and rugged build quality for long lasting.

E) IMPACT OF THE PROPOSED SOLUTION

The proposed solution will have major impact with small farmers. Even those who can't afford tractors can have this robot. As the robot is going to assist in daily activities, relaying on labors for a work to be done will get reduced.