**Design of Visual Navigation System of Farmland Tracked Robot Based on Raspberry Pi**

**Alternative Title:**

**Server Controlled Farmland Surveillance Robot based on the Raspberry Pi**

**Aim:**

Aim of this project is to build a visual navigation system for farmland tracked robot based on raspberry pi and to detect the plant leaf diseases using convolutional neural network .

**Introduction:**

 Usage of robots in agriculture increases rapidly with the development of IoT technology. In agriculture field robots are used for various purposes like crop monitoring, ploughing, weeding and spraying fertilizer etc. It reduces the processing time, cost of execution and human effort when compared to traditional methods. At present, wheeled type robots are used in agriculture field which are convenient to carry load and stabled at farm track. These robots are controlled manually or by using RF remotes for short distance. This system proposes to control the robot using local socket server. Here, Raspberry Pi used as minicomputer and USB camera is attached with raspberry pi. USB camera streams the live video to local server; with the help of live video operator can easily control robot using his computer. Here, we are using the robot to classify the plant leaf diseases using convolution neural networks. Plant diseases are a major threat to plant growth and visual examination by experts has been carried out to diagnose plant diseases and biological examination is the second option, if necessary. In the proposed system deep-learning based approach used which can automatically identify the discriminative features of the diseased plant images and detect the types of plant leaf diseases with high accuracy. Image of affected leaf image captured by camera and fed to CNN model to diagnose the disease.

**Existing system:**

 Existing system proposes automatic path tracking using image processing which can differentiate path from green land. It captures the images using camera attached with robot and determines the center of the path using horizontal scanning method.

**Proposed system:**

 Existing system processed based on the difference between colors of the path. When the farm land has multiple paths at the junction or difference between farm land and path reduces, the bot will make wrong decision. We can't use existing for various type of land. This proposed system is fully controlled by user from local server. We can use it in various types of fields and various environments. It can be also used as surveillance robot. We also added plant leaf disease diagnosing feature in this system which can automatically detect the type of disease by deep-learning approach.

**Block Diagram:**

Servo

(Camera Base)

Camera

5V

Power Supply

Raspberry Pi

Server

User

PC

6V DC

Power Supply

Motor Driver

1

Motor Driver

2

4-wheel Robot setup

**Block Diagram Description:**

 In this Block Diagram, Camera is connected as input of raspberry pi which captures the images and sends to local server. With the help of video frames user can control the robot. User can control the direction of robot using keyboard and can save required frames as an image. This system is consists of two motor drivers which can control two motors each. Front motors can controlled by motor driver 1 and Back motors controlled by the Motor driver 2. External power supply is given to motor drivers to drive robot with enough speed. Servo motor is used to rotate the camera over 180◦.

**Requirements:**

**Hardware Requirements:**

* Camera
* 4-wheel robot setup
* L293D Motor driver \* 2
* Servo Motor
* Raspberry Pi
* 6V Battery

**Software Requirements:**

* Language : Embedded ‘C++’,Python
* Compiler : GCC Complier.
* OS : Linux