Jetson TX1 is capable of delivering the performance and power efficiency needed for the latest visual computing applications. It's built around the revolutionary NVIDIA Maxwell™ architecture with 256 CUDA cores delivering over 1 TeraFLOPs of performance. 64-bit CPUs, 4K video encode and decode capabilities, and a camera interface capable of 1400 MPix/s make this the best system for embedded deep learning, computer vision, graphics, and GPU computing.

Basic idea-

First the drone takes the image of a field. It then sends this image to the rover which according to the given image marks 20 (can be changed) random points on the given image and takes the shortest route connecting all the points. When it reaches each of these points, it takes soil samples. Which can be later be compared to data for identifying which kind of crop can be grown there.

Detailed plan-

The drone is supposed to take flight from the rover to a certain height make imaginary markings and take an image (camera) such that the rover is at the edge of the imaginary area and it itself is the middle. This image is then sent to the rover(this makes use of the Jetson tx1’s WiFi module). The rover first checks the image for obstacles or cliffs and marks the imaginary points. It then creates the shortest path possible. The rover selects its path using the images from the drone as well as the camera mounted on it. After all the points in the field are covered and the rover leaves the imaginary lines, the drone lands on the rover .

WiFi frequency band selection-

There are two preferred bands 2.4GHz and 5GHz. The advantages of 2.4GHz are that it can transmit for a longer distance and can better handle obstacles. 5GHz being an unregulated type will not have noise problems but cannot handles obstacles as well as 2.4GHz, it can transfer data at faster rates but at shorter distances. Therefore the preferred would be 2.4GHz dual channel since it will be an open field without any other devices in the surrounding but if there are the dual channel will handle such a case.

Terrain and obstacle detection-

It is done by the co-ordination between the images taken by the drone and the camera and sensors on the rover. The drone first takes the image (as explained above) and transfers it to the rover which it uses as map and the location of the rover is judged by the use of the continuous images taken by the drone. By this the rover defines its path to reach each point and then the edge of the field.

Path travelled-

The path travelled by the rover is judged by the photos taken by the drone and the location identification done by the rover’s camera. Using the height of the drone the image is scaled and the distance to be travelled is calculated as the rover moves.