**PROJECT TITLE**

3D scanner implemented UAVs or Drones

**SUBMITTED BY:**

1 . T.R.Arvind Kumar - 183109 (ECE)

2 . K.N.Parameshwaran - 183003 (ECE)

3 . H.Deeraj Sharma - 183301 (ECE)

**PROJECT GUIDE:**

DR .Mohan kumar (ASP)\ECE

**PROJECT ABSTRACT:**

3D scanning is the process of analyzing real world environments and objects to collect data on its shape along with its dimensions. There are various methods of 3D scanning including photogrammetry , contact 3D scanning , Time Of Flight scanning , Triangulation scanning ,etc. Each and every method has its own advantages and disadvantages.

The main objective of our project is to create 3D maps of real life environments and objects which can be then used for :-

* 3D modeling
* 3D printings
* in creating “Virtual Reality Environments “,
* Reverse Engineering
* Construction and Infrastructures etc.

**OBJECTIVE OF THE IDEA :**-

To make a 3D object and environment scanner using LIDAR sensor( distance measuring ) along with camera and map the distance value into 3D image . And implement them in UAVs or drones .

**APPLICATIONS** :-

\* If implemented in UAVs it can be used in search and rescue operations to find the person and to know about the location and 3D information of the place .

\* Can be used to 3D map any environment or place or object.

\* In reverse engineering to recreate any objects

\* In 3D printings and 3D models , renders etc.

\* Can be used to virtually recreate any place along with its dimensions for later purposes .

\* In constructions and infrastructure to virtually create the room in 3D

**PROBLEM STATEMENT :**

To design a 3D scanner that has the capability from scanning an object to scanning an environment ( eg. room or house ) . The scanned results are stored in image format incorporated with the depth of the object .

**EXISTING MODEL AND LIMITATIONS:**

Existing models are either limited to scan just only an object or only the environment . And also the existing methods either use photogrammetry or distance plotting ( point clouds ) . In photogrammetry it is hard to find the dimensions and depth . in distance plotting it is challenging to create the mesh of the object using point clouds .

**PROPOSED MODEL:**

* We intend to create a new model of 3D scanning that can incorporate distance ( depth ) values within the normal image .
* And to create 3D models of objects ( which can then be used in 3D printing ) using our 3D scanner setup .
* And also to live feed the results of our scanner placed in UAVs to our receiver to map the environment which when used in search and rescue will boost the time taken for rescuing .

### Environment scan :-

The Lidar scanner is mounted on a rotating table or over a drone, which allows us to have a 360° view of our environment . It is rotated in such a manner that it takes a specified amount of points for one rotation. After one rotation the height of the Lidar is increased or it is elevated to get a complete panoramic data of the environment. The x,y,z coordinates are then transmitted , saved and retrieved using softwares like blender or meshlab for 3D rendering of the environment.

### Object scan:-

In this case the LIDAR sensor is placed on a height adjustable platform , so that after each revolution the height is increased which allows us to scan the whole size of the object. The object is rotated at specific time to match the number of scans from the Lidar. This too gives us the x,y,z coordinates. Which is then saved and uploaded using meshlab or blender to create the model of the object.

**COMPONENTS AND BUDGET:**

5mp camera – 530/- (2,595/- for night vision )

Or 8mp camera ( Raspberry pi v2 ) – 2,000/-

4\*30 firmware brushless motors - 4\*1300 = 5,200/-

Raspberry pi as microcontroller – 4,000/-

Sixfab 4g/LTE shield for pi – 2,774/-

Drone body – 1,000/- (appx.)

Lidar sensor – 3,700/-

Stepper motors – 200 steps \* 2 ( provided by our dept. )

Towerpro mg995 servo motor – 450/-

Toatal budget = 17,124 + camera price

**REFERENCE** : Web Resources