Idea / Approach Details

Organization Name: ISRO

PS Number : NM381

Problem Statement : App for identification of sky regions in a photo

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Idea / Approach details

The idea is to use sky region identification using image processing. The objective is to mask the sky area in white and other area in black. The implementation is achieved through image processing using OpenCV. The scope of this idea includes, but is not limited to:

- 1. Vision-based ground robot navigation: This can replace payload of external hardware used for LIDAR and SONAR technologies used for navigation while also minimizing cost.
- 2. Identifying solar potential: This can be used to identify total sky exposure at a certain area which hence can be correlated with the potential for harvesting solar energy from that place.
- 3. Obstacle avoidance for unmanned aerial vehicles: Drones etc. can use this for differentiating "free space" i.e sky with obstacles.

Technology stack:

• IDEs Used: Pycharm -Text Editor, Android Studio

GUI: XML

Backend: Python, Java

DataBase : Firebase

External Libraries used:

OpenCV for Image processing tasks i.e. thresholding, masking, grey-scale conversion etc.

Numpy, Scipy for mathematical modelling of the Image.

Kivy – for mobile application with natural user interface.

Scikit-image – for image filtering.

Architecture Diagram Image to be stored If image is clear **DATABASE** proper image Entry Point **Application** Loading Image to be Click Image startup processed if not **USER INTERFACE** Super imposed horizontal and vertical Horizontal edges **Edge-detection** Gradient **Image Filtering** (using Sobel image operator) Vertical edges **IMAGE PRE-PROCESSING** Images

Storing final image and sky exposure data

Mathematical

modeling of

super imposed

iimage

Super imposing

gredient and raw

image

HORIZON DETECTION

Dependencies

Greyscaling of the

new superimposed

1. Hardware for capturing Images i.e. a camera.

Black White

Segregation of sky

and land

IMAGE MASKING

2. Works only in Day Time.