# Idea/Approach Details

**Organization Name** : ISRO

**PS Number** : NM381

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

**Team Name** : 1D345

**Team Leader Name** : Prayag Bhatnagar

**College Code** : U-0923

# 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:**

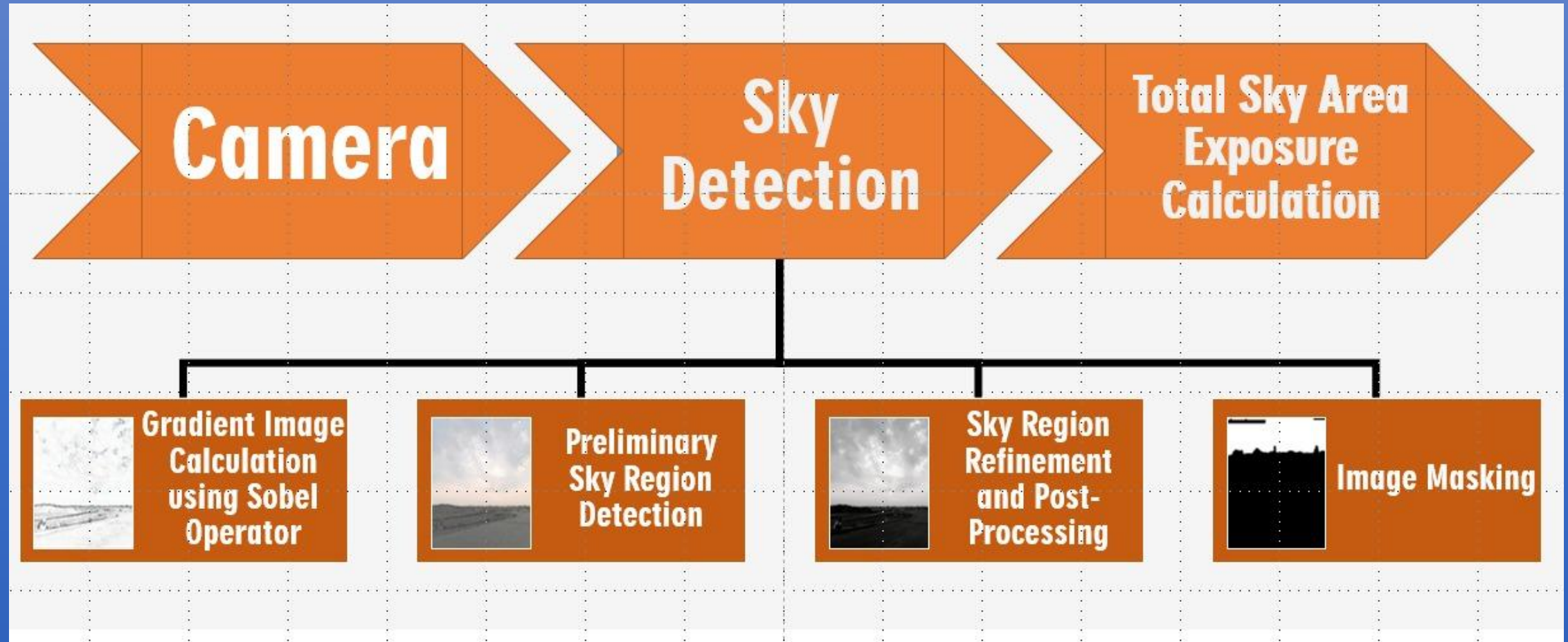**Pycharm : Text Editor**

**External Libraries used:**

OpenCV   for Image processing tasks i.e thresholding, masking, grey-scale conversion etc.
Numpy, Scipy for mathematical modelling of the Image

**Languages used** : Python

# Idea / Approach details



**Camera** → **Sky Detection** → **Total Sky Area Exposure Calculation**

- Gradient Image Calculation using Sobel Operator
- Preliminary Sky Region Detection
- Sky Region Refinement and Post-Processing
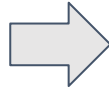- Image Masking

## Dependencies / Show stopper:

1. Hardware for capturing Images i.e a camera
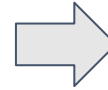2. Cannot be used from inside water or another medium besides air.
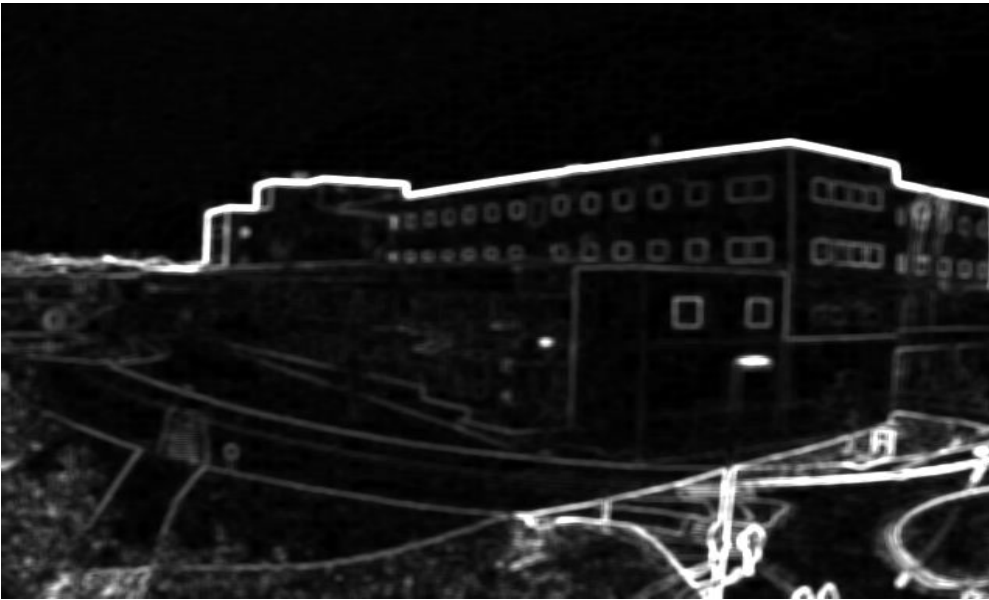
# Example:



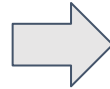Original Image

Gray-scaled
Image for
preprocessing

Gradient Image
(Marking all the
edges)

# Example Cont.



Blurred Image (to remove
unwanted noise

Masked Image