University of Bradford

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TREE CENSUS

School of Electrical Engineering & Computer Science

Introduction

- *What is happening?*

  To aid urban and rural forest management, an automated system capable of counting trees from images is proposed.

- *Why is it happening?*

  Trees play a significant role in the balance of our ecosystem.

  Trees are integral to understand the flora and fauna of an area.

  Lofty announcement of 10 billion trees plantation drive in Pakistan.

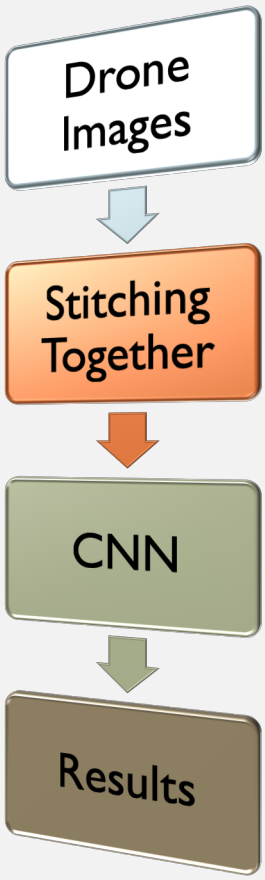
- *How is it happening?*

  A quadcopter drone equipped with a 5 MegaPixels camera is used to collect the images of an area.

  The images are stitched together to form an aerial panorama.

  The aerial panorama is given as input to the deep neural network for tree detection.

  Detected trees are displayed in a bounding box with an estimated count.

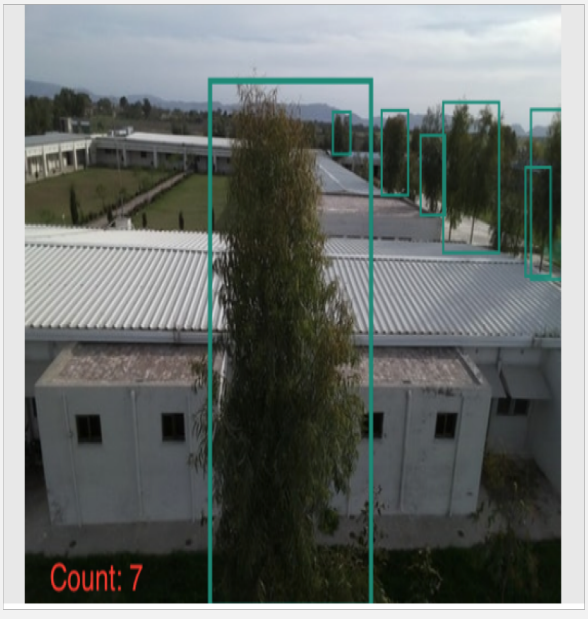


Technological Solution

- A machine learning based approach is adopted to classify trees.
- Classification of trees is performed on panorama.
- Panorama is made from aerial imagery captured by drone.
- Aerial imagery is stitched together using OpenCV and python.
- Convolutional neural network used is ResNet trained on ImageNet dataset in Python.
- A dataset of 800 images is self annotated and used for training/testing of model.
- Transfer learning, tinkering with the last layer, is employed to train CNN model.
- The CNN is hosted on a cloud to provide remote processing

Applications

- Urban and Rural Forest Management
- Disaster management
- Urban and Rural Planning
- Re-tweaking the model to detect and count custom object e.g. cars.
- Tagging trees



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