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SATELLITE IMAGE STITCHING

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ABSTRACT

Satellite Images are images that are taken by imaging satellites which are usually of earth and are mostly sold to and used by Mapping services like Apple Maps and Google Maps. Even though there are many technological advancements in this world, we still are not able to take a seamless picture of the Earth. Not Being able to process so much data, not being able to store this information we cannot just take one - one continuous image of the Earth or a part of Earth or some other place or planet.

So looking at this problem one thing comes to mind that is Merging or we can say Stitching. Stitching together small peices of images in a way so that they seem seamless or like a mosaic. Well since the Earth is so big and also if we look at two images there are many pixels of information or even thousands or millions of pixels that have to be cross checked in order to merge two images seamlessly and to do so we need processing power. Right now we were just talking about two images what about merging too many images, images that depict a particular area or a part of Earth or the whole Earth model itself (like the one in Google Earth) all this takes a lot of space and a loads of processing to be done and so obviously this can't be done manually.

This is when our project comes into action providing a review which helps a user stitch images together into a seamless mosaic also giving information about its limitations and merits.

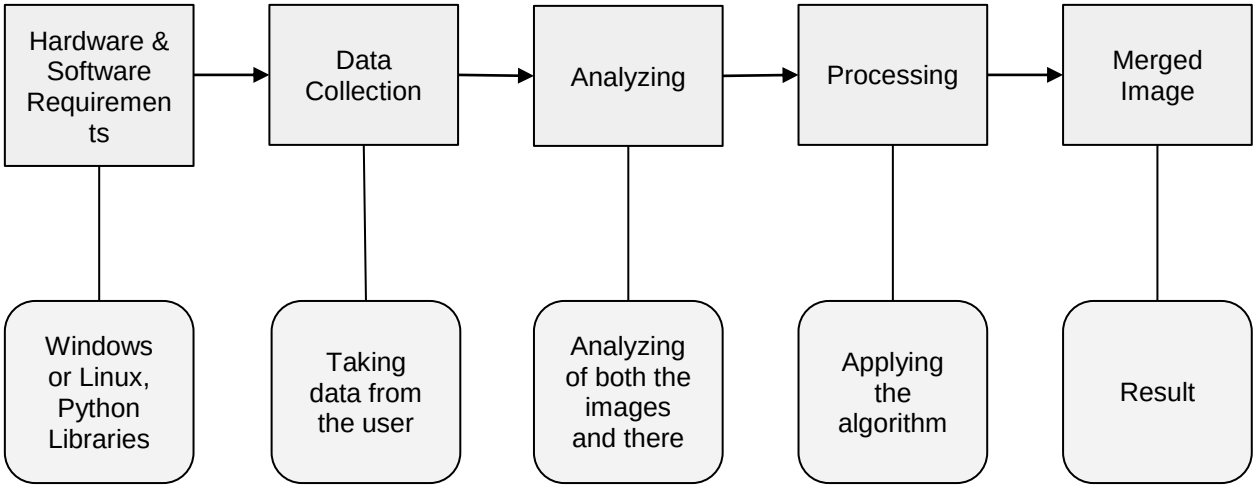
Keywords: Satellite Images, Stitching, Merging, Seamless Mosaic.

I. INTRODUCTION

The process in which images can be integrated and combined to form a single image is called Image Stitching. In Image Stitching common areas or overlapping of two or more images are used in domains like viewing critical areas, to identify the high resolution images into digital form, medical images and helps in applications of 3D alliteration that's used in real world problems. Satellite images have many uses, like in Remote Sensing Satellite Images, or in Study of Urban Geography, in the management of Disaster Recoveries, and application in the military.

II. METHODOLOGY

First, the team held a lengthy discussion about the topic. discussing the topic's openings and closures. Following a discussion of the project's fundamental topics, the project's components were split based on each member's capabilities. A proper report was then prepared, and each element's integrity was checked. Parts of the project included a review of the current system, in which all the websites were examined and their functionalities were documented. Also, a technology stack was selected, and front and back end integration was carried out.



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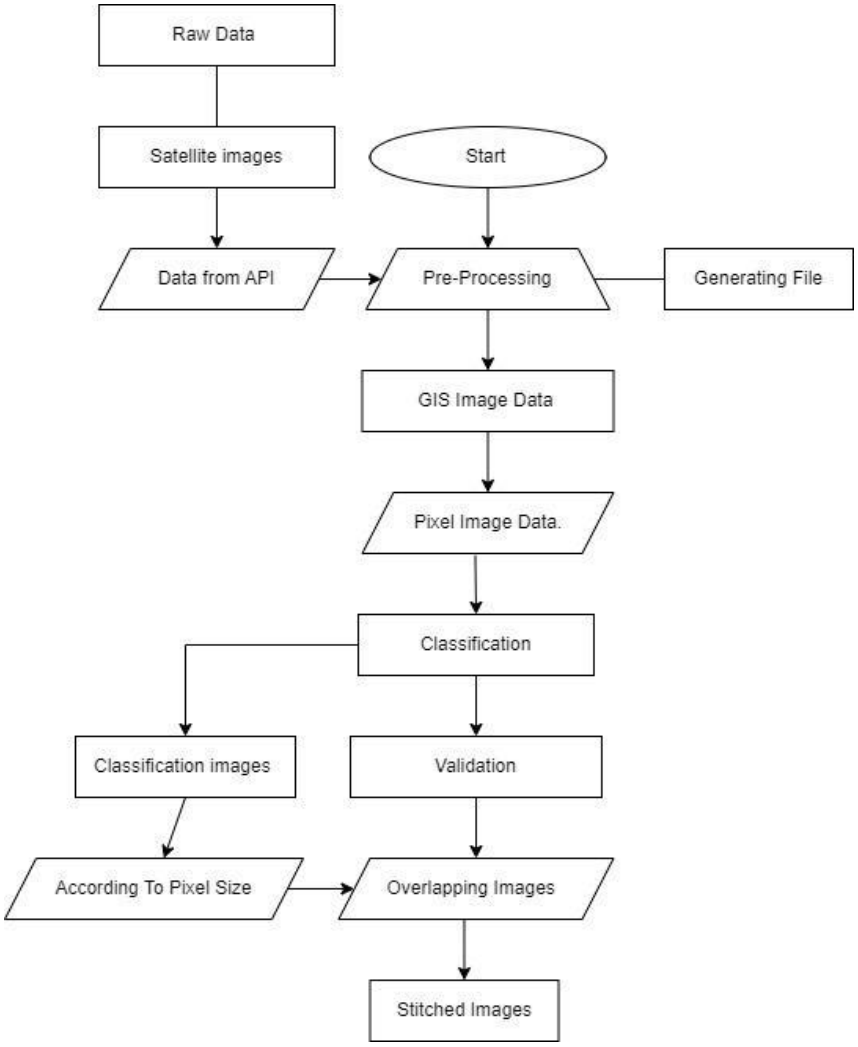
The sequence of actions that were decided to be taken can be summarized in the Above figure.



Flow Diagram

A design / flow diagram is **a visualization of a sequence of actions, movements within a system and/or decision points**. They're a detailed explanation of each step in a process, no matter the level of complexity of that process.

III. TOOLS & LIBRARIES USED

OpenCV (Open Source Computer Vision Library) is released under a BSD license and hence it's free for both academic and commercial use. It has C++, Python and Java interfaces and supports Windows, Linux, Mac OS, iOS and Android.

NumPy is a Python library used for working with arrays. It also has functions for working in the domain of linear algebra, fourier transform, and matrices. NumPy was created in 2005 by Travis Oliphant. It is an open source project and you can use it freely.

Matplotlib is a python library used to create 2D graphs and plots by using python scripts. It has a module named pyplot which makes things easy for plotting by providing features to control line styles, font properties, formatting axes etc.

Imageio is a Python library that provides an easy interface to read and write a wide range of image data, including animated images, volumetric data, and scientific formats.

IV. RESULTS

Usually the algorithm of our project works for two images (mostly due to the lack of processing power of our laptops). This is an example of images that were taken from google earth and merged using our project.

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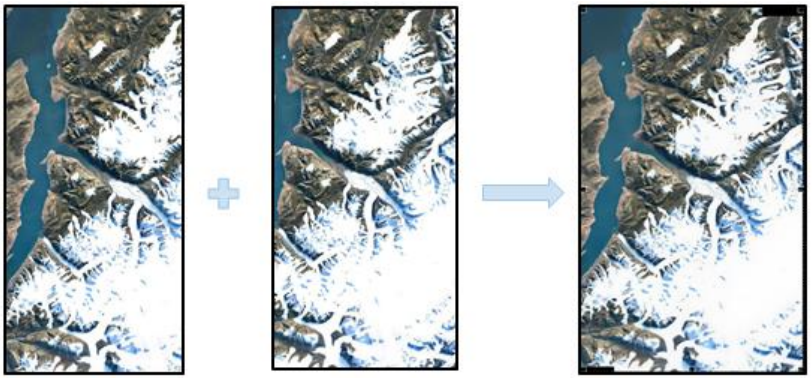

V. LIMITATIONS

- Limited coverage range in images.
- Scale and rotation of images does not change.
- The Technique is very complicated to fetch images.
- Only images that overlap each other can be merged right now.

VI. CONCLUSION

Image stitching plays a vital role in any image processing, computer vision, computer graphics, software development, and other journals. There are several challenges faced by image stitching technologies which are still unsolved so solved by using Process images according to an algorithm in combining two images. It is intended to test the performance of a map function that will work by providing an image as input to the map function presented in text format. It reads images through the two separate files system and aims to create a scalable system for large images using a map/reduce programming approach. Based on the point where the two images are most similar, we tried to solve the fusion process of complexity n4.One of the improvement points of the developed algorithm is to use an algorithm that will determine the threshold value with the black-and-white pixel balance of the images as they are converted to the bl pixel. The conversion of images to according to the threshold value of "128" appears to be a challenge to find matches and a reduction in the accuracy of finding matches on the actual images with a high white density or black density.. The algorithm developed is based on the counting of pixels. It is a success when the black color intensity of the pictures is low. But when the white density of the image is too high, it is difficult to catch the intersections. The next step is to add a preprocessing step that subtracts the overall color intensity of the images and the intersection will be able to positively affect the performance of the calculated application with reference to this step. A preprocessing step that detects edges in an image can be effective in obtaining fast and accurate results when calculating the image-to-image match.

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