Technical Assignment.

Computer Vision Engineering.

Emerging technologies, require a certain amount of exploration and experimentation before their true use cases can be discovered. Our vision is to empower enterprise using drones. However at this point in the technological adoption cycle, the true value proposition is still an unknown. Therefore, we get to do the exploration and experimentation that will hopefully come to define enterprise drone use cases.

As the data from the drone primarily consists of images and video, the largest scope for drawing analysis from drone data lies in the field of computer vision. Ideas will have to be constantly prototyped, and computer vision models will need to be continually improved so that manual effort is reduced, accuracy is increased and maximum value is derived.

We are looking for the kind of person that is very comfortable with the basics of computer vision. The kind of person that can look at an image, and predict how effective different filters and algorithms will be. Someone who can design and prototype a solution with just an idea, and a bunch of images, as well as then be able to rigorously test, improve and perfect that model.

You will get to architect broad solutions to given problems and provide true value to the end customer. New avenues will have to be explored, and maximum insight will need to be drawn from data that is provided. It will require a deep understanding of computer vision, as well as a solid grasp of how cameras work.

It's not necessarily the easiest, but it certainly the most rewarding.
If this sounds like something you'd be interested in, then go ahead with the assignment. I look forward to hearing from you.

Warm Regards,
Samarth Hattangady
Author, *This PDF*

Technical Assignment.

[Photogrammetry](#) is the process of stitching together images to form a single orthogonal mosaic. A [Ground Control Point](#) (GCP) is a physical marker placed on the ground, which can be identified from the drone images.

These GCPs then need to be detected in images, and marked. The GCP positions are then fed into the photogrammetry software in order to give the output absolute position. When done manually, the process of detecting the GCPs is extremely cumbersome and time consuming. Since the GCPs are standard, they can easily be identified and marked in the images.

The GCPs we use consist of two 65cm x 15cm white plastic strips placed perpendicular to each other to form an 'L' shape. The point in the GCP that we are looking for is the inside corner, where the two strips meet.
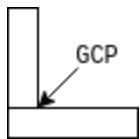
 You have been given a link to a set of images, some of which have GCPs, while some do not. Your task is to research, formulate and implement a program to detect the GCPs within an image. One image may possibly have more than one GCP in it.

We are looking for a clear, concise explanation of the workflow selected to solve the problem. Usage of flowcharts and images is recommended. Ensure that you clearly document the benefits and drawbacks of the method selected. Speed of execution is not a concern. We also expect code along with clear instructions on how to run the given code. Usage of python is recommended, but not mandatory. We intend to run your code on other data sets to see how it performs. The data you have been given has a csv with GCP locations. We expect your code to output a similar csv file.

With this kept in mind, here are some of the factors that the submission will be judged on.

We will be looking to see how well you have understood the problem from a real world point of view. We are looking to see how you design the solution, as well as how and why you selected your approach. We are also looking to see how well you understand your own solution along with its benefits and

drawbacks. Accuracy of the GCP detection is important as well. Code quality is not a strict parameter, but clear, well documented code is a plus.

We expect you to submit the code used, as well as a document detailing the research conducted prior to and during the solving of the assignment. In case you are unable to complete the assignment, please submit how much ever you were able to complete.
We would also like you to keep track of how much time was spent in solving the assignment.

I hope you enjoy solving this assignment. I wish you all the best. Waiting to hear from you.

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Yours faithfully,
Samarth Hattangady
Author, *Technical Assignment: Computer Vision Engineering*

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