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# Computer Vision Project Pre-Proposal

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## 1 Main Idea

The main goal of the project would be to automatically detect and remove image artifacts that cause obstruction/occlusion. We will be primarily focusing on glares, reflections, stains, and similar obstructions to restore images. Since, the task would require to generate image patches for regions after removing glare, we will need generators. We plan to use image glare/reflection removal approaches that use adversarial paradigms to reconstruct the image.

## 2 Data

We plan on using the following data:

1. GLARE Dataset: A dataset of images of traffic signs in sun glare [https://github.com/nicholascg/glare\\_dataset](https://github.com/nicholascg/glare_dataset)
2. CEILNet Dataset: A dataset of images with reflection. <https://github.com/fqncchina/CEILNet>

## 3 Computational Resources

Our personal machines are not capable enough to perform deep learning training, so we plan to use Google Colab to develop and run our experiments. If there's a possibility of getting access to institute GPU compute resources that would be better and would allow us to focus more on the project and less on the logistics.

## 4 Example Algorithms

The following algorithms and methods could be used to remove artefacts and impurities:

1. **Generators:** Artefacts could be identified using image processing techniques (like edge/boundary detection) and masked. The area that has been masked can be filled in using generator networks, which have been trained on a dataset of similar images.
2. **Separation using multiple frames of a motion pictures:** In addition to generative approaches, if given a series of shifted frames from a motion picture, we could separate the layer of artefact and the underlying undisturbed image by applying transformations.
3. **Ghosting Cues:** In addition to generative approaches, if given a single input image, we could extract an artefact layer using shifted, secondary reflections (called ghosting cues) formed in the image. This layer could then be used to identify, segregate, and extract the artefact and underlying sharp image.

## References

We shall refer more sources as we go forward. These are just those that helped us in forming an initial algorithm approach and finding sample datasets.

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- Kun Gai, Zhenwei Shi, & Changshui Zhang (2012). *Blind Separation of Superimposed Moving Images Using Image Statistics*. IEEE transactions on pattern analysis and machine intelligence, 34(1), 19–32. <https://doi.org/10.1109/TPAMI.2011.87>.
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