Image Reflection Suppression using Convex Optimization

Convex Optimization Course Project

Team Members

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Why this project?

The paper that we are referring gives an approach on how to suppress reflections in an image using convex optimisation. Novelty of this approach are :

- The proposed model is convex. The solution is guaranteed to be the global optimal of the model.
- The optimal solution is in closed form and doesn't rely on iterative algorithms.
- Proposed method doesn't require any external dataset or training time as in the neural network approaches.

Motivation

The problem statement of this project solves a practical problem of supressing reflections in an image using Convex Optimisation. Mathematical modelling of such problem will help pre-process other Image dependent algorithms. It also gives an insight on how image processing related problems are mathematically modelled, which has many further applications.

Plan of Action

Our aim for this project will be understanding the mathematical modelling of this problem. Following steps will be followed for concluding our project work.

- Use the reference Research Papers mentioned below to understand the mathematical modelling of the problem.
- Understand the method of using Discrete Cosine Transform to solve the problem.
- Implement the problem into Convex Optimisation. Identify constraints, Objective function and Variable clearly.
- Try to Implementation of aforementioned problem statement.

References

[1] Y. Yang, W. Ma, Y. Zheng, J. -F. Cai and W. Xu, "Fast Single Image Reflection Suppression via Convex Optimization," 2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2019, pp. 8133-8141, doi: 10.1109/CVPR.2019.00833.

[2] N. Arvanitopoulos Darginis, R. Achanta, and S. S usstrunk. Single image reflection suppression. In IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2017), number EPFL-CONF-227363, 2017.