

# ENGN8501 Project Proposal

## 1. Team Members

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## 2. Paper Title

Deep Convolutional Neural Network for Image Deconvolution.

## 3. Project Aims and Main Method

Implement a two-layer deep convolutional neural network to achieve non-blind image deconvolution. Improve the algorithm with changing the model to end-to-end, and automatically adjusting the parameters by comparing the results with clear pictures.

- Applying the separability theorem of the kernel to transfer the pseudo inverse kernel into a convolutional network;
- Constructing Image Deconvolution CNN (DCNN) and Outlier-rejection Deconvolution CNN (ODCNN);
- Parameter Adjustment Algorithm.

## 4. Project Timeline and Tentative Work-load Plan

- **W6 (30 Aug-05 Sept):** Understand the algorithm, search academic materials, and download the dataset.
- **B1-B2 (06 Sept-19 Sept):** Implement the algorithm of the original paper.
- **W7-W9 (20 Sept-10 Oct):** Improve the algorithm.
  - Integrate the network to an end-to-end network.
  - Implement the quantitative evaluation method of the results of image deconvolution.
  - Implement the automatic parameter adjustment method.
- **W10 (11 Oct-17 Oct):** Integrate and modify all codes and test and optimize all functions.

- **W11 (18 Oct-24 Oct):** Write the project report, prepare the presentation and record the video.

**Ziyang Chen:** implement DCNN, parameter adjustment algorithm, testing and optimizing codes, and corresponding report and presentation.

**Han Zhang:** implement ODCNN, parameter adjustment algorithm, testing and optimizing codes, and corresponding report and presentation.

## References

- [1] Li Xu, Jimmy SJ Ren, Ce Liu, Jiaya Jia. *Deep Convolutional Neural Network for Image Deconvolution*. Advances in Neural Information Processing Systems 27 (NIPS 2014).
- [2] Adrian Rosebrock, *Blur detection with OpenCV*. <https://www.pyimagesearch.com/2015/09/07/blur-detection-with-opencv/>
- [3] Peter I. Frazier. *A Tutorial on Bayesian Optimization*. arXiv:1807.02811v1 [stat.ML] 8 Jul 2018.