**CS552: Generative AI, Homework 4**

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**3/25/2025**

A close-up of a text

AI-generated content may be incorrect.

See Figure 1 for my results and ddpm.py for the implementation.

A collage of a person's face

AI-generated content may be incorrect.

*Figure 1: Unconditional face diffusion*

A white background with black text

AI-generated content may be incorrect.

See problem2() in ddpm.py. For each group of three columns, **x**(1) is the first photo, **x**(2) is the second photo, and **x** is the third photo. The best results can be seen when the diffusion kernel is applied 500 times in Figure 2:

A collage of different faces

AI-generated content may be incorrect.

*Figure 2: Merged faces*

A close-up of a document

AI-generated content may be incorrect.

See my implementation in ddpm.py. I had to use a very small ‘guidance scale’ for the classifier’s gradient – see below for the difference between a scale of 0.001 and 0.0005. Any values higher than that resulted in “mush” for lack of a better word. The rows of the figures correspond to ages 18, 40, 60, and 80, which I think was represented quite well.

A collage of different faces

AI-generated content may be incorrect.

*Figure 3: Classifier guidance with a scale of 0.001*

A collage of different faces

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*Figure 4: Classifier guidance with a scale of 0.0005*