



SAM Meets STEM

# Specific Image Compression Though Discrete Cosine Transform

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## Motivation

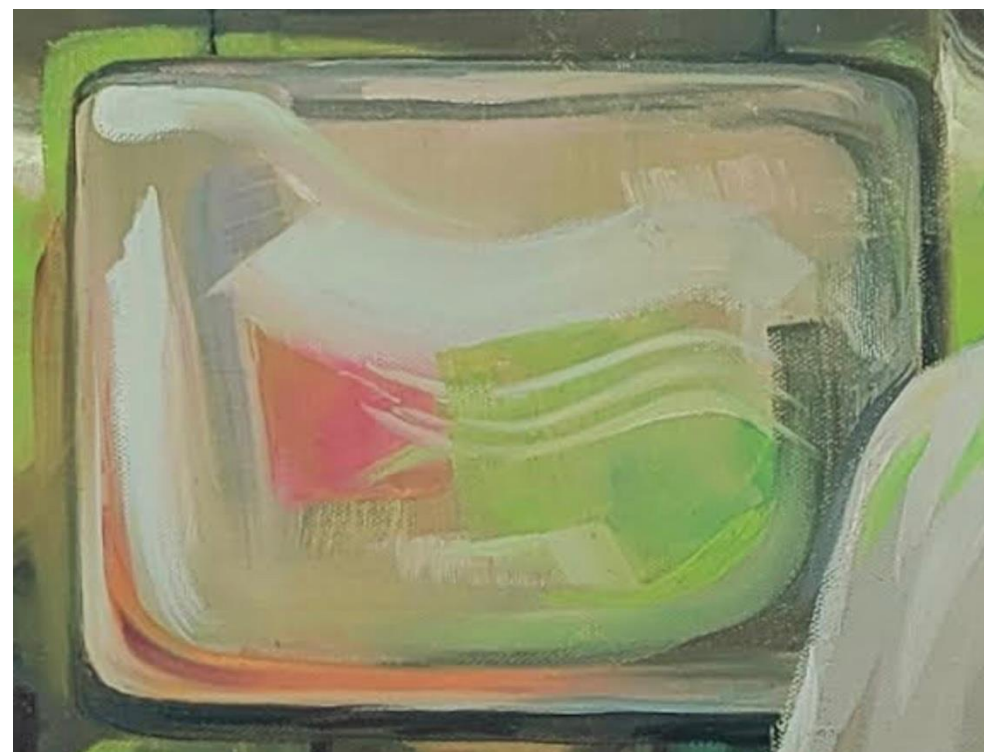
- ❖ Art is a series of processes, including but not limited to the creation aspect
- ❖ In digital age, art is more often to be created or displayed digitally
- ❖ Some key attributes of art works are inevitably lost during the traditional digitalization process and/or compression/decompression process.
- ❖ A technology/method is needed to easily store, upload and transfer digitalized art works without losing the qualities that makes the work unique.

## Project description

- ❖ A Discrete Cosine Transform (DCT) matrix is used for image processing
- ❖ DCT matrix is edited to take an original image, decompress it, and recompress it to a target file size while not losing quality.
- ❖ Example



Traditional



DCT

- ❖ At first glance, the images processed with DCT don't show a significant difference compared to those processed using traditional methods. However, when zooming in and examining the details closely, DCT maximally preserves the elements of the original image, presenting the intent of the original more clearly

## Problem Statement

- ❖ With the rise of Digital communication, Art is no longer being sent back and forth physically, being replaced by digital photographs
- ❖ This applies to submitting artworks, for exhibits, competitions, etc. A lot of digital exhibitions or portfolio submissions, such as the College Board Digital Portfolio, can only handle images up to a certain file size
- ❖ Accommodating this low threshold sacrifices image quality, which is very important in art and display

## Bio

Alexis Liu is a senior at Denmark High School . She has a strong interest and passion for art. She is actively involved in a variety of art activities both in school and in the community. Her digital artwork won the 2024 Scholastic Art and Writing Awards, and she has been selected for the Forsyth County Art Honor program for three consecutive years.

Alexis applied her passion for art to community charity and volunteering. She co-founded Open Arms, a non-profit organization for children with special needs. She was elected as a 21 Century Leader Youth Ambassador for 2024-2025. Recently she just finished another artwork for her school, the decoration spirit wall by the baseball field in Denmark High (photos below).

