

CONCORDIA UNIVERSITY

COMP 432 Machine Learning

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# Regenerating JPEG Compressed Images

Project Proposal

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# 1 Overview

The main goal of this project is to restore quality in compressed JPEG image files using machine learning techniques. In particular two different approaches will be used, compared and evaluated. A Convolutional Neural Network (CNN) and a Generative Adversarial Network (GAN). Below is an outline of an image throughout the process. Starting with the original image to the regenerated image.



Figure 1: Original Img



Figure 2: Compressed Img



Figure 3: Regenerated Img

## 1.1 Data

All data items for this project will be of an image type (jpeg). An image dataset such as the Flickr 8k dataset will be used (subject to change). Data preprocessing will involve compressing images down to a standard size and resolution before training the neural network. Fig 4 shows a schematic of the proposed pipeline.

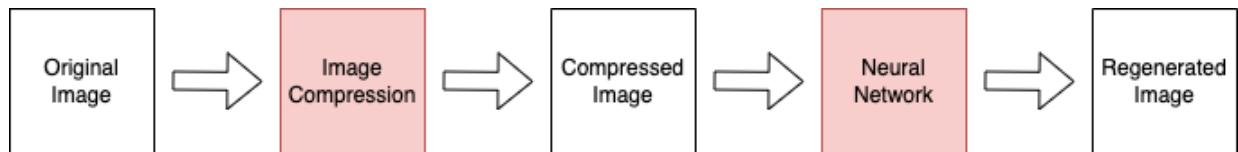


Figure 4: Data flow schematic

## 1.2 Evaluation

For a problem like this, minimizing the mean squared error (MSE) is not the best choice. This is because MSE does not express the human preception of image similarity too well. Mean squared error measures the pixel wise intensity difference between images - but not the structural contents within an image. Which is why for this problem an alternative score will be used to measure the model performance.

Structural Similarity Index (SSIM) is the proposed metric on which the models will be evaluated.

## 1.3 Work Division

Table 1 below outlines a 5 week breakdown of the tasks that will be carried out. Note that this is subject to change.

Week	Task
1	Research Work
2	Programming (CNN)
3	Programming (GAN)
4	Build Report
5	Presentation

Table 1: 5 week task breakdown

## 1.4 Expected Libraries

Library	Function
Pandas	Data Manipulation & Handling
SciKit Image	Image Manipulation
TensorFlow	Machine Learning
PyTorch	Machine Learning

Table 2: Expected libraries and their function