Statistical Methods in AI	Date:	*20/03/2019*
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Project Proposal

46. Generative Neural Network based Image Compression

1 Github link

Generative Neural Network based Image compression

2 Team Members

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2. Shreyas H.N (2018201059)

3. Ankit Pant (2018201035)

4. K.A. Meghashree (2018201055)

3 Main Goals

1. Extracting Latent vectors from Images using Generative adversarial networks

2. Compressing the image using the extracted latent vectors

3. Analyze the compression performance using different loss functions

4. Compare the performance of the model on different standard datasets.

4 Problem Definition

The project aims on achieving image compression by extracting latent vectors using Generative Adversarial Networks and comparing the performance with existing compression techniques. The GAN is trained using images from a certain dataset (for certainity in distribution) with standard objective function of GAN and extract the Latent vectors of the images of certain distribution of that dataset. Then these latent vectors are used to recognize the semantic information of images of the dataset and compress the image. Different objective functions are used for GAN and different loss functions for comparing and analyzing the compression performance with standard

compression techniques. The performance of model is analyzed for different hyper-parameters fed to it. Finally, the model is trained on other standard datasets like MNIST, CIFAR10, Nature etc. and perform a comparative evaluation of the model.

5 Result of the Project

The result of the project is an image compression software that, if prior trained on like images, can reduce the size of the image based on the latent vectors extracted from the image using Generative Adversarial Networks. The result also contains a comparative study of various objective functions of GANs and loss functions of compression algorithms. The study also includes the performance of the model on other standard datasets.

6 Task Split

Literature Study	
Generative Adversarial Networks	Everyone
Latest advancements on compression using Generative models	Tarun
Semantic Data extraction in Image compression	Shreyas
Various GAN objective functions and Image compression loss functions	Ankit
Alternatives to GAN (for compression)	Megha
Domain specific dataset exploration and feasibility analysis	Shreyas
Familiarizing with GANs by generating images based on MNIST dataset	Everyone
Data Handling	
Data preprocessing (Making images train ready)	Megha
Saving weights and image visualization after each layer/epoch	Shreyas
Model	
Encoder	Shreyas, Tarun
Generator	Ankit, Shreyas
Discriminator	Megha, Ankit
Training	
Objective Functions	Ankit,Tarun
Hyperparameter Tuning	Megha
Compression	Everyone
Performance analysis	Everyone

7 Milestones

23/03/2019	Basic GAN image generation using MNIST dataset
25/03/2019	Literature study report
29/03/2019,30/03/2019	Model implementation
03/04/2019	Training
05/04/2019	Image compression using the model
10/04/2019	Training and analysis on different GAN Objective Functions
17/04/2019	Evaluating model different datasets
19/04/2019	Report/Project completion