Background

- Steganography is the practice of concealing information.
- Generative Adversarial Networks (GANs) use pairs of neural networks that seek opposing subcomponents of a goal.
- GANs have shown promise for applications in image steganography.

Objectives

- Explore usage of GANs in audio steganography
- Implement “generator-discriminator” pair for steganographic cover generation
- Integrate a third network with the GAN to recover data
- Use perceptual representation to qualify quality of generated and recovered data
- Use mean squared error to quantify quality of recovered data

Research Challenges

- Network convergence and stability:
  - GAN generator and discriminator have delicate balance
  - Requires careful selection of hyperparameters
- Audio transparency and non-locality
- Coding environment:
  - Reliance on Google Colaboratory environment
  - Limited computation time, memory, RAM, and resources

Acknowledgement

We would like to thank our advisor, Professor Kristin Dana for her guidance, insight, and support.

Methodology

- Compile two audio datasets to serve as covers and as encoded payloads.
- Extract mel spectrogram feature from audio samples.
- Train system on cover and payload datasets.
- Optimize reconstruction error and generator performance.
- Tune parameters until network convergence

Methodology Diagram

Results

- Ability to generate samples that are highly similar to cover set and ability to reconstruct payload with high fidelity were achieved.
- Future work will allow for manipulation of more complex audio samples.

Discussion

References