Powerful Generative Steganography With Generative Adversarial Networks

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Powerful
Generative
Steganography
With Generative
Adversarial
Networks

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Introduction

Literature Review
SWE

Problem
Statement

Problem
Statement

Objectives

Methodology

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Scope

Scope

Scope

Significance Of
The Study

Work Plan

Budget

Introduction

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▶ What is Steganography?
  ▶ simmon's prisoners.
  ▶ Hiding Information in plain sight.

Introduction

▶ What is a GAN?

Figure: GAN

$$\min_{G} \max_{D} V(D, G) = E_{x\ p_{data}(x)}[logD(x)] + E_{z\ p_z(z)}[log(1 - D(G(z)))].$$

Introduction

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► Imperceptibility

Introduction

- Imperceptibility
- Robustness

Introduction

- ▶ Imperceptibility
- ▶ Robustness
- ▶ payload capacity

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Literature Review

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Different approaches to steganography

- ▶ cover modification
- ▶ cover synthesis: Fridrich, K.-C. Wu & Wang

Literature Review

Volkhonskiy, Shi, Dong,Tang,Hayes

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Literature Review

Ke

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Literature Review

Hu

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Literature Review

Zhang

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Problem Statement

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Observed problems:

- ▶ Instability of Training
- ▶ Slow convergence
- ▶ Inadequately realistic image generation

Problem Statement

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Observed problems:

► Instability of Training

► Slow convergence

► Inadequately realistic image generation

"This is mainly associated to the GAN technique used in the framework."

Objectives

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Design and implement a powerful generative steganographic framework using a most suitable GAN.

Objectives

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Specific objectives:

▶ Improve stability of Training and convergence speed.

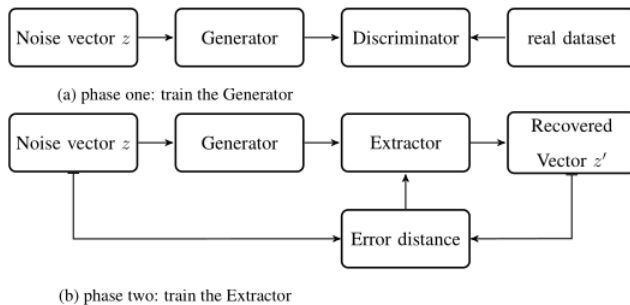▶ Generate more realistic image.

▶ Maintain state of the art security.

Methodology

(a) phase one: train the Generator

(b) phase two: train the Extractor

Figure: System Architecture

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Methodology

Choice of GAN:

- ▶ BEGAN
- ▶ RGAN
- ▶ WGAN-DIV
- ▶ WGAN-GP

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Methodology

Choice of dataset:

▶ CelebA

▶ LFW

▶ Food101

▶ MNIST

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Methodology

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Choice of dataset:

- ▶ Visual instpection
- ▶ Inception score
- ▶ Visual Turing test
- ▶ MOS

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▶ Robustness

Scope

- Robustness
- Passive Adversary

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Scope

- Robustness
- Passive Adversary
- Payload Capacity

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Scope

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- ▶ Robustness
- ▶ Passive Adversary
- ▶ Payload Capacity
- ▶ Imperceptibility

Significance Of The Study

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The main problem in generative steganography

Imperceptibility

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THANK YOU