

# Project Proposal - SinGan for transferring drawings to photo-realistic images

Philippe Ganshof  
Ecole normale supérieure Paris-Saclay  
92220 Cachan  
philippe.ganshof@hotmail.com

## Abstract

*In this project proposal, we present our project and the main steps we will follow during our work. The project we intend to do uses paper [1] from topic A proposed on Moodle.*

## 1. Introduction

SinGan is an unconditional generative model introduced by T.R.Shaham and al in [1]. As explained in the paper, the model is trained on a single training example and capture the internal distribution of patches, within the image. The authors propose several applications such as super-resolution, harmonisation. We decided for this project to focus our attention on the Paint-to-Image application. The paper proposes three different examples to show the efficiency of SinGan for transferring simple drawings to photo-realistic images. However, the drawings are made in such a way that the orientation, scale and shape is more or less preserved on both images. It does not allow us to see the limits of the model for this task. In our project, we are going to investigate more in-depth the abilities of SinGan to reproduce the content of an image.

We intend to do this work by putting ourselves in the shoes of an architect that would like to create a new building based on existing buildings. The following question can be naturally asked: "Can a real architect use SinGan as a tool for creating new buildings?".

We are going to proceed by selecting several images from the website *Unsplash* [2], regrouping more than 100k images of constructions as a source for our training examples. Inputs will be drawn using the application *Youidraw Painter* accessible from here [3]. Using both websites will automatically lead us to encounter some issues with SinGan. We hope to understand these problems and come up with an improved version of this model.

## 2. Plan of Work

As a first step, we are going to understand the model's structure presented in paper [1] as well as the codes given by the authors on github [4]. The first page of the report will mainly consist of a synthesised version of the model in the form of a scheme. As this work is the building block of our project, we expect to take between 2 and 3 weeks to complete this task.

In the second part of the project, we are going to implement in a first time some results of the paper to ensure that we do not encounter practical issues with the code taken from [4]. Only after this part, we will start experimenting with new training examples from *Unsplash*. We expect to take between 1 and 2 weeks to go through the following tasks:

- Find interesting examples using transformations mentioned in the introduction and explain why they are useful for the project.
- Propose some modifications of the model's architecture and if the time allows it, compare with SinGan on different training examples.

As a conclusion, we will debate on the question that has been asked in the introduction.

## References

- [1] T.R.Shaham, T.Dekel, T.Michaeli, SinGan: Learning a Generative Model from a Single Natural Image, LarXiv:1905.01164v2 [cs.CV] 4 Sep 2019
- [2] Unsplash, <https://unsplash.com/s/photos/modern-architecture>
- [3] Youidraw Painter <https://www.youidraw.com/apps/painter/>
- [4] Implementation of SinGan, <https://github.com/tamarott/SinGAN>