

# Sketch-Gen

## *Neural Representation of Sketch Drawing*

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Project Heads	1) Sumanth reddy K V 2) Amey Shimpi 3) Prasanna 4) Jagadish
Mentees	1) 2) Leave this empty for now

[ Project Mentors → 4th Years; Project Heads → 3rd Years; Mentees → 2nd years;]

## Aim

This Project aims to generate text and hand-drawn sketches of animals, objects etc by using deep learning architectures such as Generative Recurrent Neural Networks and Autoencoders and design a Web App to provide interface to the users. The project strives to achieve the purpose of helping children to learn drawing, teaching artists to draw complex shapes by showing the sequence of motor actions.

## Methodology

- Teaching juniors about the deep learning architectures used in this project and providing them with tasks to assess their understanding on the concepts.
- Creating a custom dataset where users can add their own data for better and more user friendly experience.
- Begin the coding of the Recurrent Neural Network using Autoencoders and obtain the optimum accuracy.

- Evaluate the model designed on the test data and check for improvements in performance by optimizing the loss and shrinking code size.
- Start integrating the model into an app which acts as an interactive interface between the user and the model.

## Timeline

Checkpoint No.	Deadline	Goal/Objective	Comments (if any)
1	*31st September, 2020	Creating the custom dataset and help juniors understand the DL concepts in this project	If the recruitments are delayed, then 1.5 months after recruitments
2	*30th November, 2020	Finish the coding part of the project	None
3	*End of February, 2021	Integrating the model into a web app	None
4	*By mid-March ,2021	Test the final project (the app) and look for improvements	None

## Literature Review

### Introduction

Sketch-Gen presents a generative recurrent neural network (RNN) capable of producing sketches of common objects, with the goal of training a machine to draw and generalize abstract concepts in a manner similar to humans. It is able to construct stroke-based drawings of common objects in vector format. The model is trained on human-drawn images of different classes.

As a first step towards this goal, we train our model on a dataset of hand-drawn sketches, each represented as a sequence of motor actions controlling a pen: which direction to move, when to lift the pen up, and when to stop drawing. In doing so, we

created a model that potentially has many applications, from assisting the creative process of an artist, to helping teach students how to draw.

## References

[1]<https://ai.googleblog.com/2017/04/teaching-machines-to-draw.html?m=1>

- This is the main project-idea. This is an open source Google AI project which talks about generation of hand drawn sketches. The project builds up on this idea by generating text from handwritten inputs and integrating the whole model design into a web app.

[2] <https://arxiv.org/pdf/1808.03314.pdf>

- The goal of this paper is to explain the fundamentals of the Recurrent Neural Networks(RNN) and LSTM(Long Short term Memory) which will be extensively used in the project. It discusses the basics of RNN, its uses and its field of applications and how they are beneficial for this project

[3]<https://towardsdatascience.com/understanding-encoder-decoder-sequence-to-sequence-model-679e04af4346>

- This article talks about the sequence to sequence autoencoder used in the project and how they function. It talks about what encoders,decoders are.

[4]<https://towardsdatascience.com/deploying-a-keras-deep-learning-model-as-a-web-application-in-p-fc0f2354a7ff>

- Since we will be deploying our model into a web app, this article gives information about how it is implemented using Python and the languages used in the process. It shows how the output is displayed along with a sample code for doing the same.

## Bill of Materials

SI No.	Name of component	Cost of component	Quantity Required	Total Cost
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1	None			
2	None			
3	None			
4	None			Grand Total: