CAPSTONE PROJECT PROPOSAL

**Project Title :** Doodle Recognition System – 4-doodle (art game)

**Course Name :** CAPSTONE TERM II

**Course Code :** 202041.23309-AIDI-2005-01

**Course Facilitator :** Marcos Bittencourt

**Student Names and IDs:** Anish Sharma – 100767348

Dhairavi Patel– 100771583

Karamjit Singh – 100767214

Yogeshkumar Patel – 100767342

**Group Number :** 14

**Date of Submission :** January 24, 2020.

# Executive Summary

Doodle recognition has significant impact in computer vision and pattern recognition, particularly in relation to the handling of noisy datasets. We will be generating a Doodle Recognition Application for this capstone project. The users will be able to doodle on the screen and the application will classify the doodle(s) into one or more of the 345 categories. While the user is drawing, an advanced neural network attempts to deduce the category of the object, and its prognostications improve as the user adds more and more detail. For the purposes of this project, we choose to focus on the classification of the completed doodles in their entirety.

# Rationale Statement

Computers possessing the capability to comprehend quick line drawings will allow for broader forms of expression and communication. These days children love to play on gadgets, and they get familiar with them faster than elders. But the children waste their most of time in doing non-productive activities and just use these devices for fun. So, we came up with an idea to develop a Doodle Recognition game for them. While this is not only a way to meet fun with art, this also encourages creativity in children and help them utilise their time on learning. This game will challenge children to reach the optimum level of basics of drawing as well as help them understand the difference between the various objects, for instance – they will not only learn to draw an apple but also learn how apple look like and how this is different from orange. The objective of the game is simple to teach the children, challenge them to improve and reach next level, and help them utilise their time in doing productive things rather wasting time on other non-productive things.

# Key Evaluation Metrics

We evaluate our methods not only with raw accuracy but also with a scoring metric that is more lenient of incorrect predictions.

* **Raw Accuracy** – Raw accuracy is a good measure of a model’s performance; it penalizes harshly for an incorrect prediction (wrong predictions receive 0 points and right predictions receive 1 point). Since we have so many categories, including some that are extremely similar such as “cake” and “birthday cake”.
* **Scoring Accuracy** - scoring metric that is more lenient of incorrect predictions. Thus, predictions are evaluated using Mean Average Precision @ 3 (MAP@3): MAP@3 = 1 U X U u=1 min X (n,3) k=1 P(k) where U is the number of drawings in the test set, P(k) is the precision at cut-off k, and n is the number of predictions per drawing. Put more intuitively, the equation considers the top 3 predictions (P1, P2, P3) that the model makes for a given drawing. It then assigns a score of 1 if Pi is the correct label for the image and a score of 0 if the correct label is not in the top 3 guesses. Note that MAP@1 is equivalent to single prediction accuracy.

# Result

The resulted solution would look like the image given below. As it is shown in the image that 4-doodle game not only predicts the images but also show how the intended drawing should look like. This is a combined way of fun and learning. Hence, this is going to be an interactive solution to bring drawing and gaming on a single platform.

