Proposal: due Monday, March 11, 11:59:59PM

Your proposal should consist of two to three pages and address each of the following:

1. **List of group members.**

   yuxuanz6(Yuxuan Zhou)

   klfeng2(Keven Feng)

2. **Project description and goals:** Describe the problem you plan to solve and give a basic outline of what you propose to implement. You can change later as you go along, but try to think this through as much as possible in advance. Identify the desired final outcome and pose maximum and minimum goals.

   Description: Recently people have implemented the ability to create synthetic videos of a person saying things they never really said. This technology is known as Deepfake which could be done by changing the real person's face into a fake face. This technology is based on GANs. We would like to implement this technology and compile it into an application which can be used by individuals for personal use. In addition, we would also like to implement a detector which can be used to find fake videos to try and protect against malicious use of this software.

   Goals:
   - Min: Application that can create deep fake images and a detector for fake images
     - Deep fake image => many images => <attack/defend>
   - Max: Application that can create a deep fake video and a detector for fake videos
     - Deep fake video(1 min) => Change face <attack/defend> no real time
   - Bonus : Application that can create a deep fake video as the video is being recorded
     - Deep fake image/video => Change face <attack/defend> real time

3. **Member roles:** Indicate which project component each group member will be responsible for and how the group will interact.

   yuxuanz6(Yuxuan Zhou) => Mainly coding & product & market

   klfeng2(Keven Feng) => Mainly research & paper

4. **Resources:** Specify what data you plan to use -- ***include examples of images and any required annotations.*** What is your implementation platform? Do you plan to use any outside code and how do you plan to build on it? Be specific and give pointers to all relevant resources.
   Datasets: Source images for training and tuning or Deepfake algorithm
   - CelebFaces Attributes (CelebA) Dataset: Get celebrity images
   - Face Forensics: Dataset for image forgery
   - http://yacvid.hayko.at/index.php(242,248,249,255,294,296,297)

   Platforms:
   - Colaboratory

- Jupiter + EWS
- Google AutoML

Outside code: Code relevant to our project that we will reference

- https://github.com/deepfakes/faceswap-playground
- https://github.com/nashory/gans-awesome-applications
- https://github.com/iperov/DeepFaceLab

Plan to build:

- Start from simple outside code, read and understand
- Change the face in one single image to many images<little + Midterm>
- Detect fake face images <little + Midterm>
- Change the face in the video<mainly>
- Detect fake face in the video<mainly>

5. **Reservations:** Try to anticipate which part of the implementation or testing may prove the most difficult. Possible stumbling blocks shouldn't necessarily prevent you from attempting a more ambitious project, but you should make sure that you have a realistic "minimum" goal that can be accomplished.

   The most difficult part: Tuning the GAN to have high accuracy for many different datasets.

   Minimum Goal: Create a synthetic image face using a real image face and have the difference between the synthetic and real image be < 5%.Also create a detector that can determine if a image is a synthetic with > 70% accuracy.

   Note: Both digitals such as 5% and 70% are initial estimated numbers that we will try to realize, based on the real top research situations, we might make changes later.

   Relationship to your background: Describe how your proposed project relates to your background or level of knowledge. Which techniques, software packages, etc., are you already familiar with, and which ones will be new to you? If the project is related to your dissertation or RA work, describe the relationship and the amount of overlap. *Grading of your project will be relative to your background. That is, we will take into account not only the absolute outcomes of your project, but how much new material you have had to master and how successfully you have mastered it.*

   Background:
   yuxuanz6(Yuxuan Zhou) -- Master of ECE MENG, no GANs exp; software developer industrial exp; Online courses, youtube channels for GANs.
   klfeng2(Keven Feng) -- Master of ECE MS, GANs was subtopic in Machine Learning course, medium experience with Python and Tensorflow
   New materials need to learn:
   1. Deep Learning
   2. GANs Models
   3. Dataset matching
   4. Product & Market
   5. Real time deep fake