CS682 Proposal
Tittle: Deep Wardrobe

Group members: Hangyan Jiang (id **31757812**), Jiaming Zhao (id **31765006**).

What each person does:
Hangyan will deal with pose detection, reading existent literatures and make necessary adjustments and improvements to create an algorithm that fits our task perfectly.
Jiaming will work on style transfer based on Generative Adversarial network. He will read required paper and utilize relevant materials in class to achieve our task.

Problem to investigate: Precise virtual clothing trial using style transfer philosophy. We hope to develop an algorithm that supports real time cloth changing. We pre-train a clothing style first and during testing process, we input a video of a dynamic person, the algorithm should output in real-time the same person with pre-trained clothing on and at the same time synchronizes the person's gestures. We may also investigate and develop a virtual makeup algorithm if we have extra time.

Is the projected share with another class: No, this project will only be used for cs682

Why interesting: Virtual clothing trial can be very useful for online shopping. Style transfer outputs impressive results. The results from style transfer are vivid. The performance is great on videos, which allows people wearing on virtual clothing with different posts. Generative adversarial network (GAN) has been regarded as "the most exciting idea in the past 20 years" by Prof. Yann LeCun.

Method or algorithm: Pose detection, Generative adversarial network. We are going to use the pose detection to recognize human's body and localize head, arms, body, and legs. The existent algorithm provides an accurate detection already but we are aiming to make any improvement if possible. Then we will train a GAN to generate cloth on corresponding part of the body so that the final results may cheat human eyes.

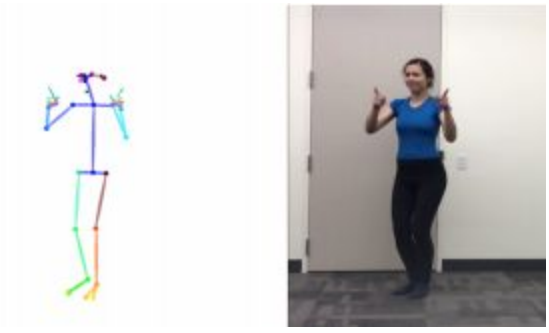

Figure from "*Everybody dance now*"

Context and Background: CVPR 2018 paper **"*Everybody dance now*"** by C. Chan *et. al.* provides us with supports to detect different parts of the body. A good performance on motion tracking enables a real time cloth replacing. The paper **"*Artistic style transfer for video*"** by M. Ruder *et. al.* produces consistent video with large motion on the screen. We will read their algorithms closely and apply them directly or borrow their ideas when developing our own algorithms for specific sub-tasks during this project.

Data we will use: Customized human body dataset for pose recognition. Customized cloth dataset for clothing replacing style transfer.

Result evaluation: Since there is no calibrated criteria for style transfer evaluation. We can only assess the test result by our "artistic attainments". A good result should first keep original human body while replacing original clothing with new ones. New cloths should have creases when the person is moving, so that it is not obvious that the output frames are imitations.