Abstract
We developed a gender classifier using transfer learning with a pre-trained VGG-16 model that achieved results comparable to state-of-the-art available gender classifiers. We also employed a CycleGAN to address the issue of gender conversion. We applied hyperparameter tuning, fine tuning and transfer learning to improve the accuracy of our models. We present the gender classifier performance along with sample images from gender conversion using a CycleGAN.

Models
For the gender classifier we utilized a CNN based on the VGG-16 model. We replaced the last FC layer of a pre-trained VGG-16 with multiple FC layers that performed binary gender classification. We trained it with 50% dropout on 855k images and then subsequently fine-tuned previous convolutional blocks of the VGG-16 model for even better results.

Dataset
We used the Diversity in Faces dataset released by IBM 4 weeks ago. The dataset consists of over 960 thousand images and are labeled for craniofacial features, skin color, age as well as gender, which is the feature we utilized.

Discussion & Future Word
Both the gender classifier and CycleGAN demonstrated amazing performance. In the future we’d like to train the classifier with even more hyperparameter tuning and for a longer duration, while investigating better strategies to improve and evaluate GAN performance.

Results
We experimented with two implementations of the CycleGAN, one with TensorFlow and one with Keras. We found that the TensorFlow model worked remarkably well and we noticed significant gender attribute changes before and after the CycleGAN's alterations. Some sample results are below – the first row are real images and the second row are generated.

References