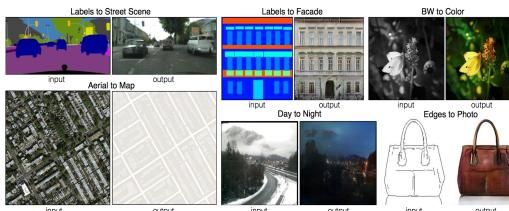
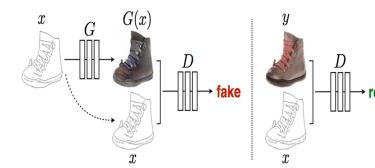


# Generate faces from attributes and landmarks with Conditional GAN (cGAN)

**INSPIRED BY THE PAPER:** Phillip I.Jun-Yan Z , Tinghui Z, Alexei A. E. Image-to-Image Translation with Conditional Adversarial Networks. 2009.



The paper tries to develop a common framework for all these automatic image-to-image translation tasks



## Conditional GANs:

learn a mapping from observed image  $x$  and random noise vector  $z$  to  $y$ ,  $G : \{x, z\} \rightarrow y$ .

## Generator G:

trained to produce outputs that cannot be distinguished from "real" images.

## Discriminator D:

trained to discriminate the generator's "true" and "fakes".

## OUR PROJECT: generating faces with the cGAN

**Dataset:** celebrity face. <http://mmlab.ie.cuhk.edu.hk/projects/CelebA.html>

It contains over 200000 images of faces. Every face has 40 binary attributes (male/female, beard/nobeard ...) and 5 landmarks (position of eyes nose and mouth), which are taken as input by the generator.

**Experiment 1: value of  $\lambda L$  in the generator loss function:  $G = \text{argmin max } L \text{ cGAN}(G, D) + \lambda L \text{ L1}(G)$**



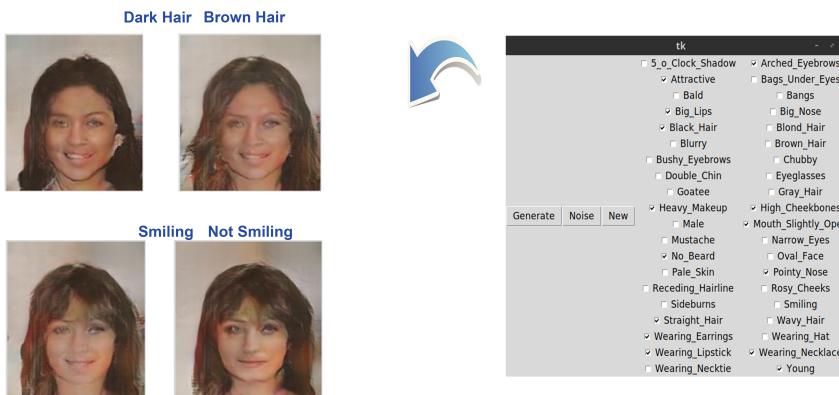
**Experiment 2: Increase randomness in the output**

Images created with the same inputs and varying noise are nearly identical, because the network learns to ignore the noise. The paper suggests using dropout-layers to introduce more randomness in the model. We trained a model with dropout-layers in the generator with drop-out rate 0.2. The images have more variation but are also more blurry



## OUR FACE GENERATING TOOL: generating faces with different attributes

We implemented a small tool. The users can generate faces with manually defined attributes (e.g smiling, dark\_hair...)



## Generated faces with different attributes



Would you like to try our little face generating tool?

CHECK OUR CODE OUT: [https://github.com/jguenthoer/cgan\\_deeplearninglab](https://github.com/jguenthoer/cgan_deeplearninglab)