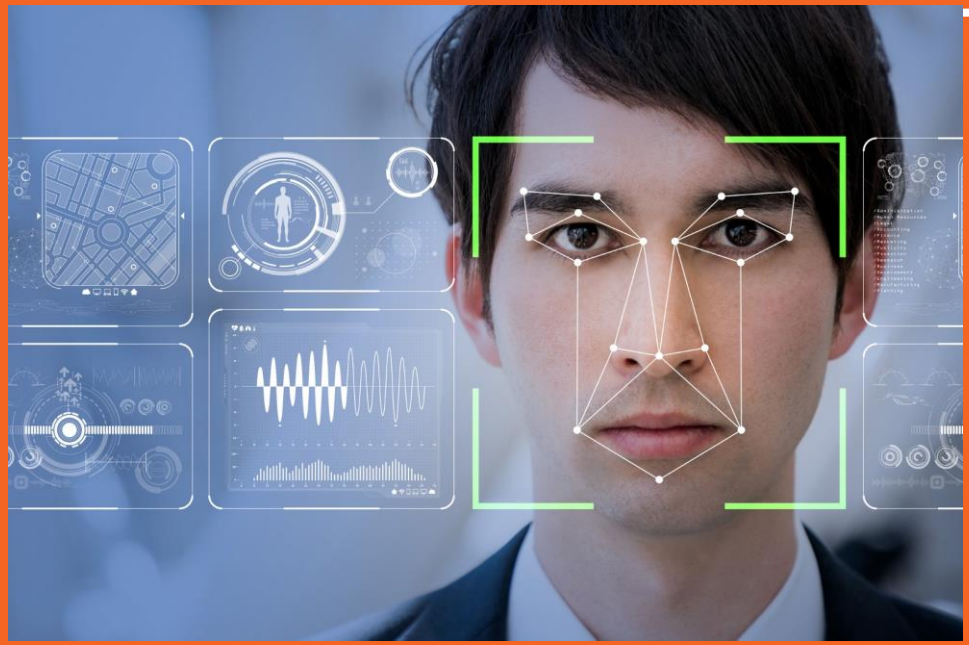
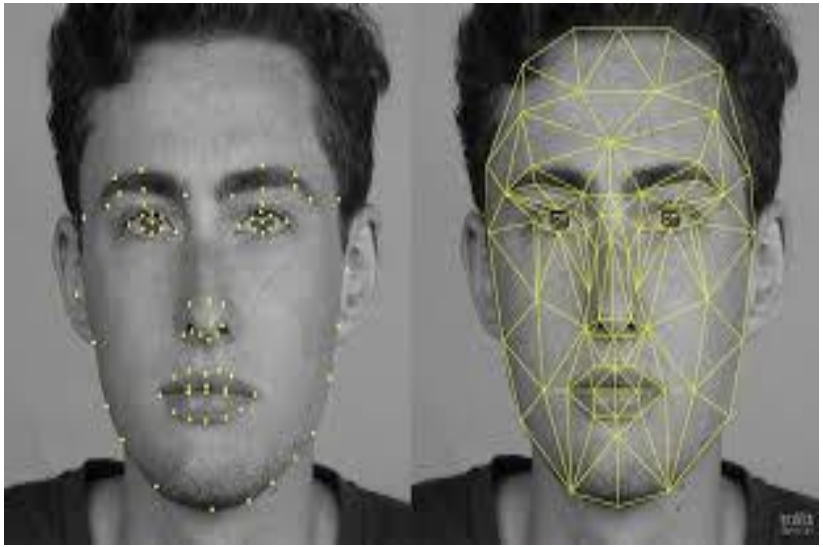
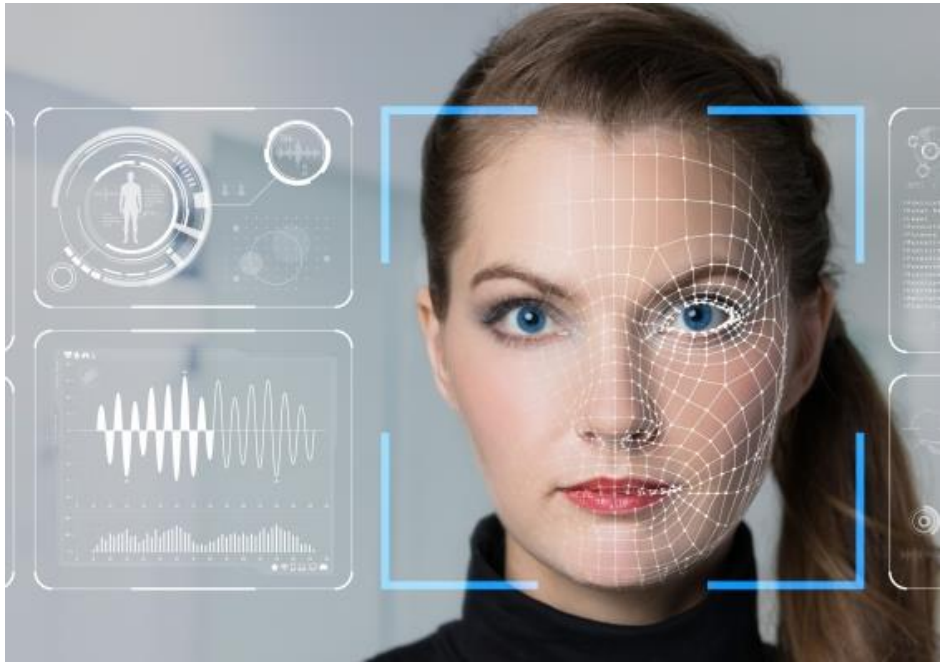


Face Recognition

Face Recognition

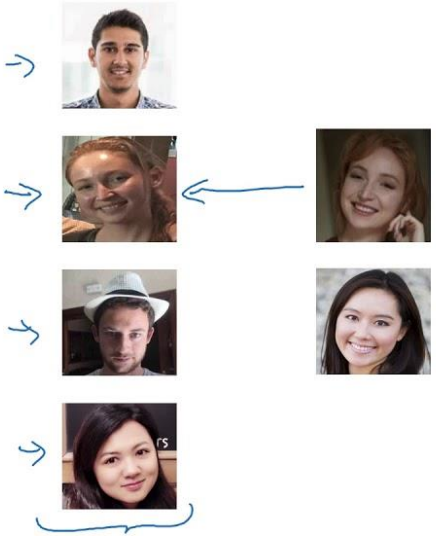




One Shot Learning

One-shot learning aims to learn information about object categories from one, or only a few, training images.

One-shot learning can be implemented using a Siamese network.

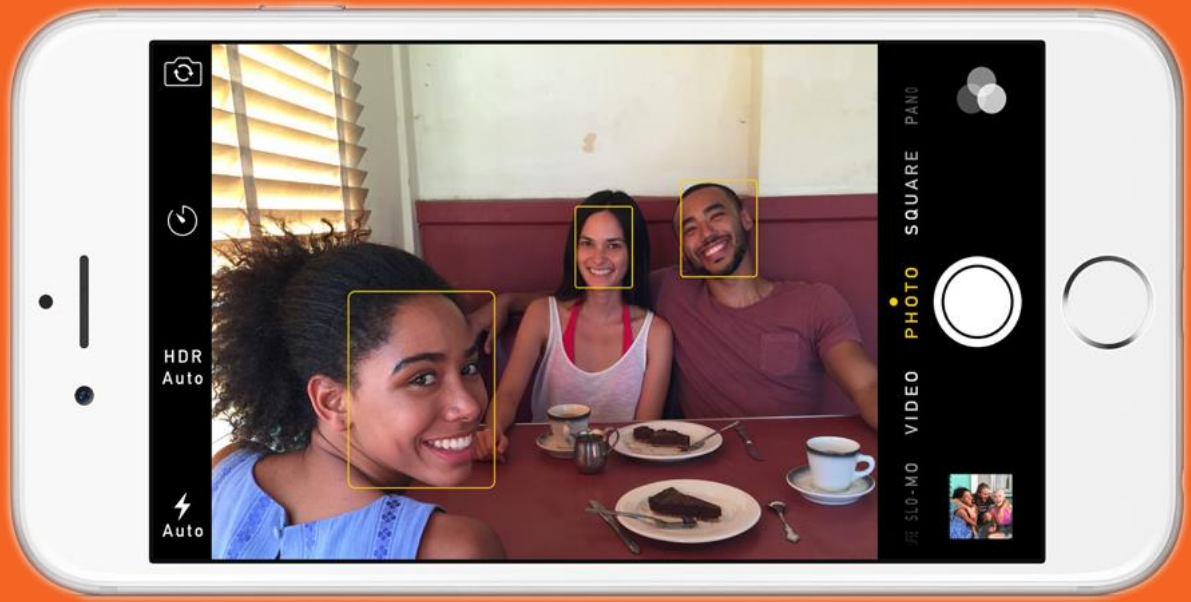


Learning from one or few examples

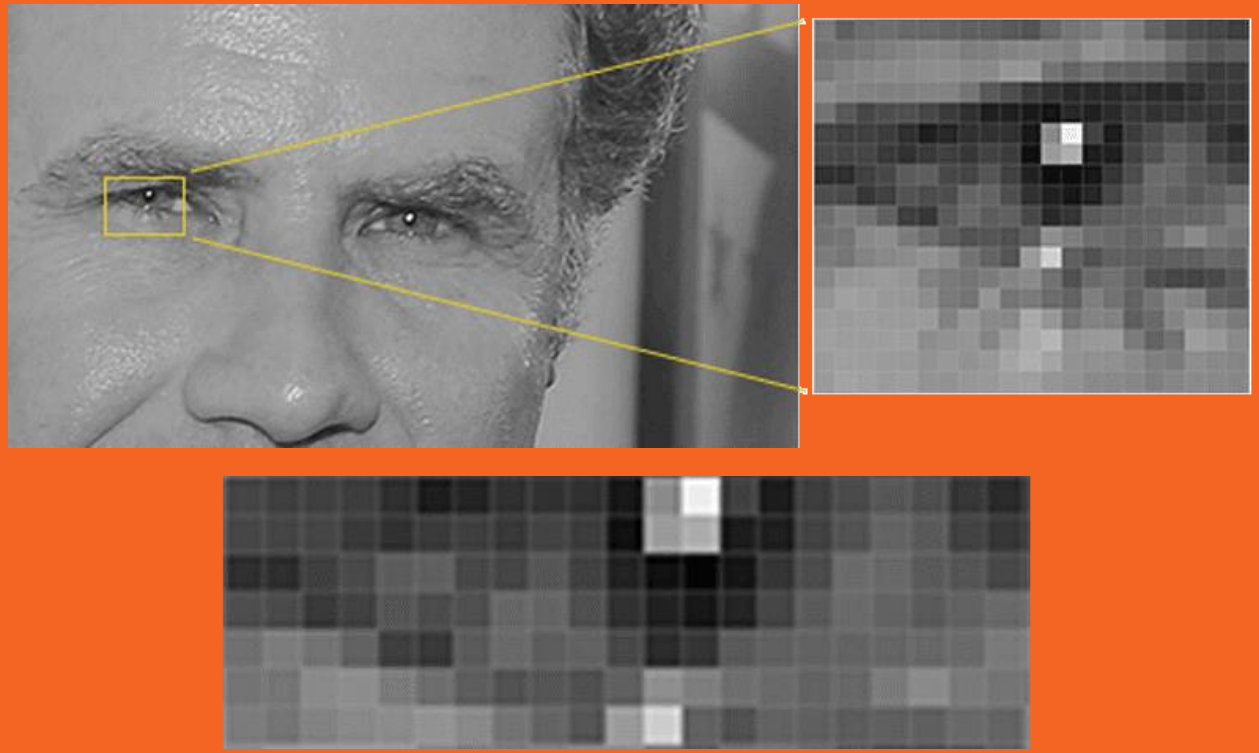
To recognize the person again

How a Facial recognition using Deep Learning works?

Step 1: Finding the Faces

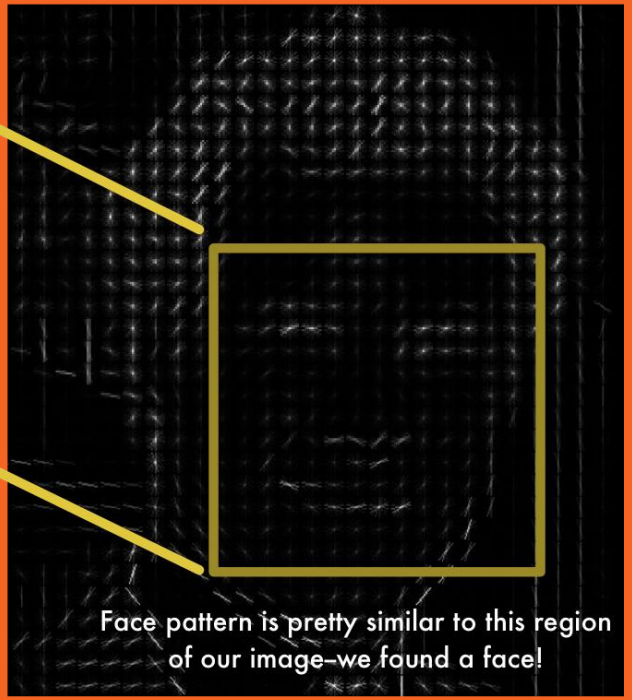


Histogram of Oriented Gradients(2005)



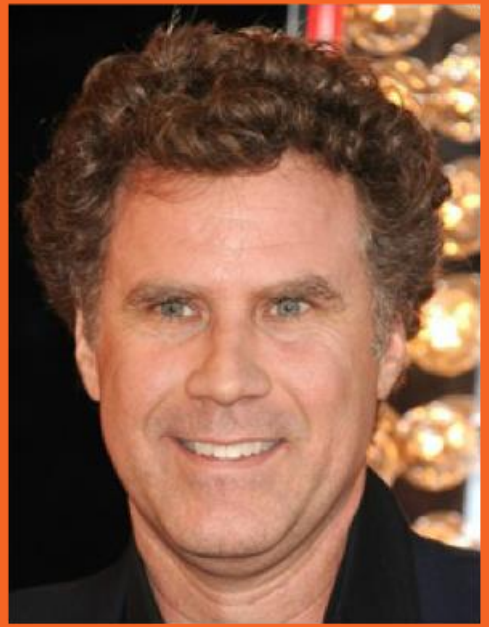
HOG face pattern generated from lots of face images

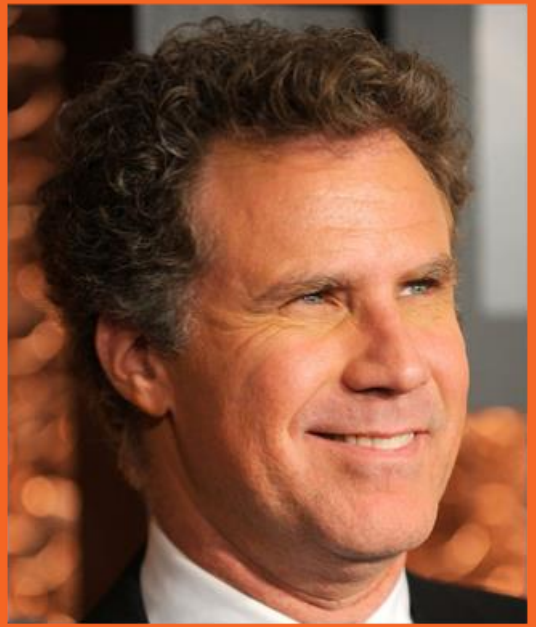
HOG version of our image



Find the part of our image that looks the most similar to a known HOG pattern that was extracted from a bunch of other training faces

Step 2: Posing and Projecting Faces





Face Landmark detection

Approach invented in 2014 by Vahid Kazemi and Josephine Sullivan

We will come up with 68 specific points (called landmarks) that exist on every face—the top of the chin, the outside edge of each eye, the inner edge of each eyebrow, etc.

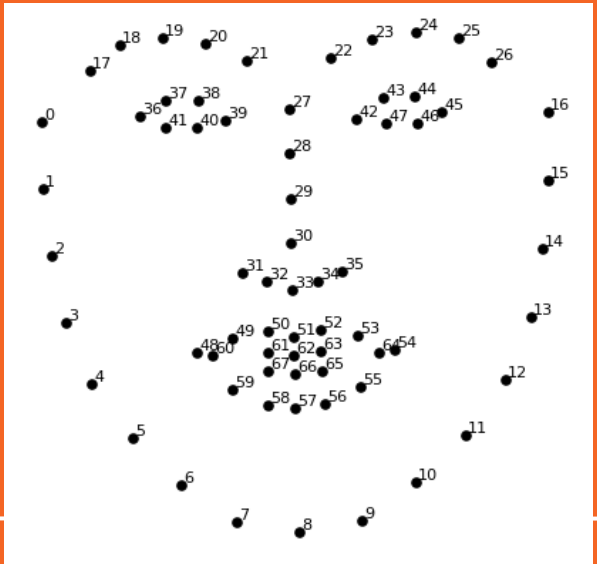
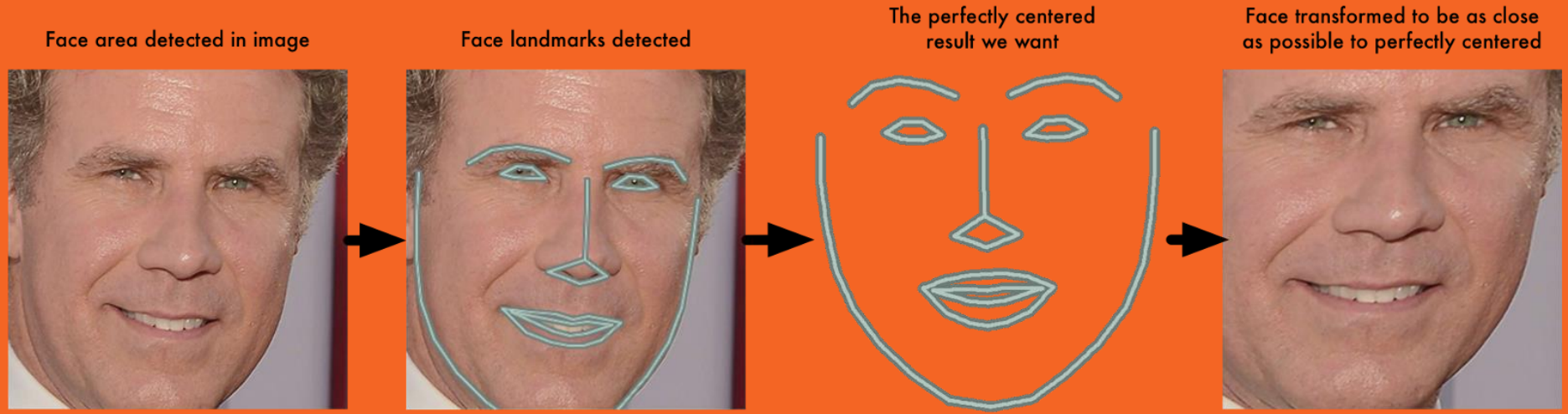


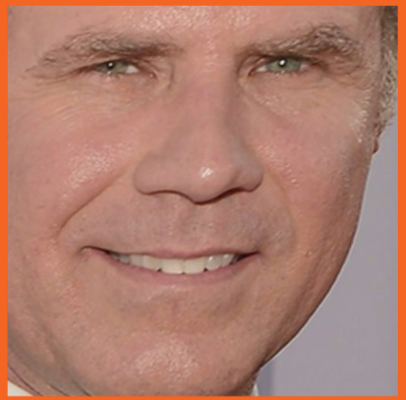
Image Augmentation



Now as we know here eyes, mouth,etc are, we'll simply rotate, scale and shear the image so that the eyes and mouth are centered as best as possible.
Using basic image transformations like rotation and scale that preserve parallel lines (called affine transformations)

Step 3: Encoding Faces

Input Image



128 Measurements Generated from Image

0.097496084868908	0.045223236083984	-0.1281466782093	0.032084941864014
0.12529824674129	0.060309179127216	0.17521631717682	0.020976085215807
0.030809439718723	-0.01981477253139	0.10801389068365	-0.00052163278451189
0.036050599068403	0.065554238855839	0.0731306001544	-0.1318951100111
-0.097486883401871	0.1226262897253	-0.029626874253154	-0.0059557510539889
-0.0066401711665094	0.036750309169292	-0.15958009660244	0.043374512344599
-0.14131525158882	0.14114324748516	-0.031351584941149	-0.053343612700701
-0.048540540039539	-0.061901587992907	-0.15042643249035	0.078198105096817
-0.12567175924778	-0.10568545013666	-0.12728653848171	-0.076289616525173
-0.061418771743774	-0.074287034571171	-0.065365232527256	0.12369467318058
0.046741496771574	0.0061761881224811	0.14746543765068	0.056418422609568
-0.12113650143147	-0.21055991947651	0.0041091227903962	0.089727647602558
0.061606746166945	0.11345765739679	0.021352224051952	-0.0085843298584223
0.061989940702915	0.19372203946114	-0.086726233363152	-0.022388197481632
0.10904195904732	0.084853030741215	0.09463594853878	0.020696049556136
-0.019414527341723	0.0064811296761036	0.21180312335491	-0.050584398210049
0.15245945751667	-0.16582328081131	-0.035577941685915	-0.072376452386379
-0.12216668576002	-0.0072777755558491	-0.036901291459799	-0.034365277737379
0.083934605121613	-0.059730969369411	-0.070026844739914	-0.045013956725597
0.087945111095905	0.11478432267904	-0.089621491730213	-0.013955107890069
-0.021407851949334	0.14841195940971	0.078333757817745	-0.17898085713387
-0.018298890441656	0.049525424838066	0.13227833807468	-0.072600327432156
-0.011014151386917	-0.051016297191381	-0.14132921397686	0.0050511928275228
0.0093679334968328	-0.062812767922878	-0.13407498598099	-0.014829395338893
0.058139257133007	0.0048638740554452	-0.039491076022387	-0.043765489012003
-0.024210374802351	-0.11443792283535	0.071997955441475	-0.012062266469002
-0.057223934680223	0.014683869667351	0.05228154733777	0.012774495407939
0.023535015061498	-0.081752359867096	-0.031709920614958	0.069833360612392
-0.0098039731383324	0.037022035568953	0.11009479314089	0.11638788878918
0.020220354199409	0.12788131833076	0.18632389605045	-0.015336792916059
0.0040337680839002	-0.094398014247417	-0.11768248677254	0.10281457751989
0.051597066223621	-0.10034311562777	-0.040977258235216	-0.082041338086128

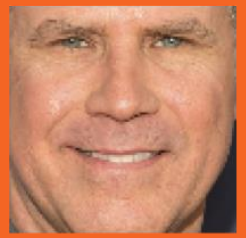
A single 'triplet' training step:

[-0.23, -0.54, ..., 0.27]

Picture of Chad Smith

Test picture of Will Ferrell

Another picture of Will Ferrell



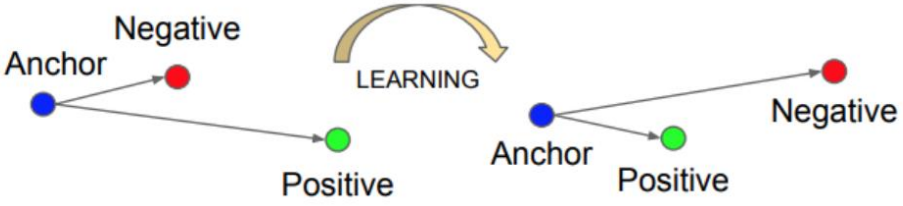
128 measurements generated by neural net

128 measurements generated by neural net

128 measurements generated by neural net

Compare results

Tweak neural net slightly so that the measurements for the two Will Farrell pictures are closer and the Chad Smith measurements are further away




CHANNEL
NEWS TEAM

Network architecture : ResNet-34
From the Deep Residual Learning for Image Recognition paper by He et al.,

Uses pre trained model by Davis King trained on a dataset of ~3 million images.

Our face recognition dataset

Limitations of Image Facial Recognition