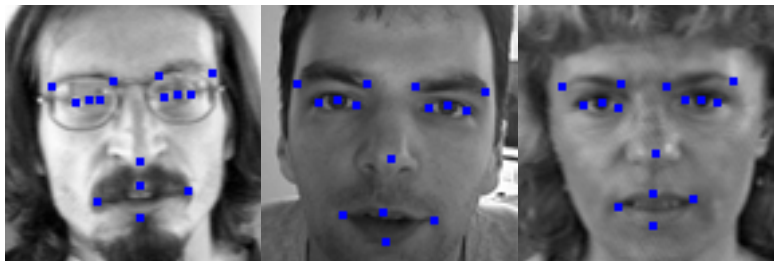


Machine Learning Practical Lab

Facial Keypoint Detection

Jan Wuzyk and Elizabeth Baker

We want to detect the location of 15 key features on faces.
We are given 7049 training images, but only 2140 have full data.



Some things that facial keypoint detection can be used for are:

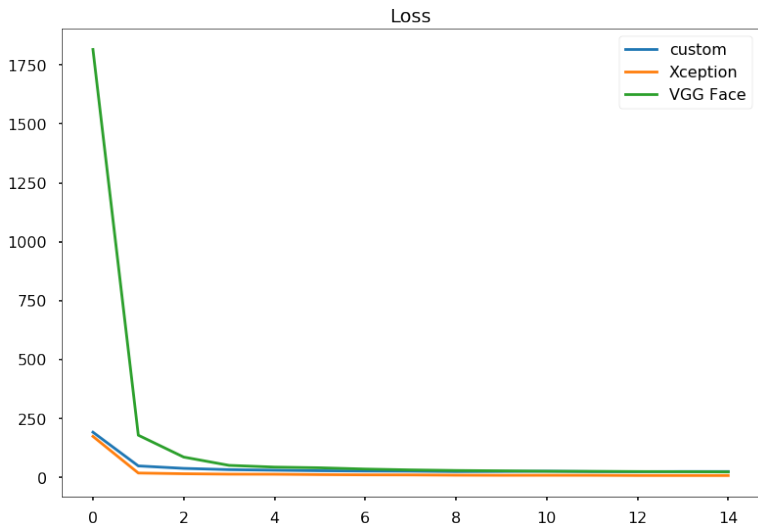
- ▶ Facial recognition
- ▶ Analysing facial expressions
- ▶ Finding faces in videos and photos

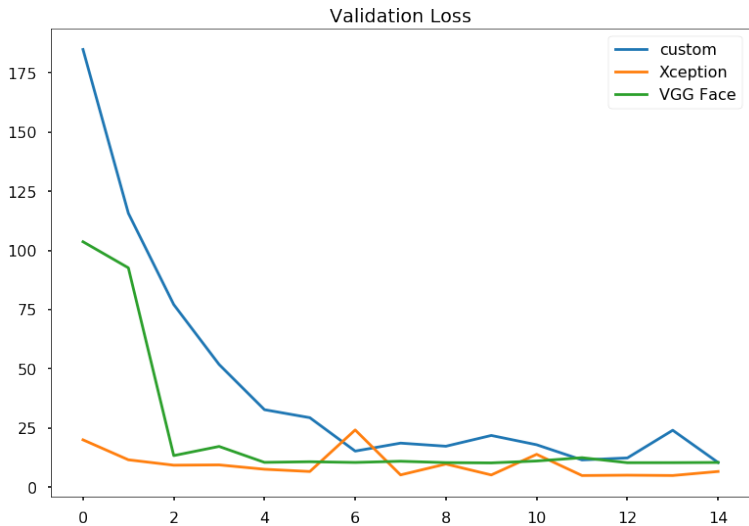
Or apps that make you bald...



Figure: (Via BaldBooth)

- ▶ Custom Made
- ▶ Using transfer learning
 - ▶ Xception
 - ▶ VGGFace
- ▶ Early stopping
- ▶ Ensemble





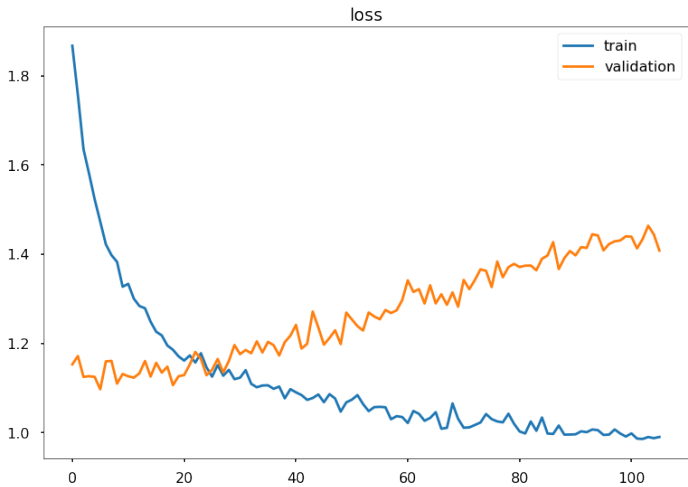
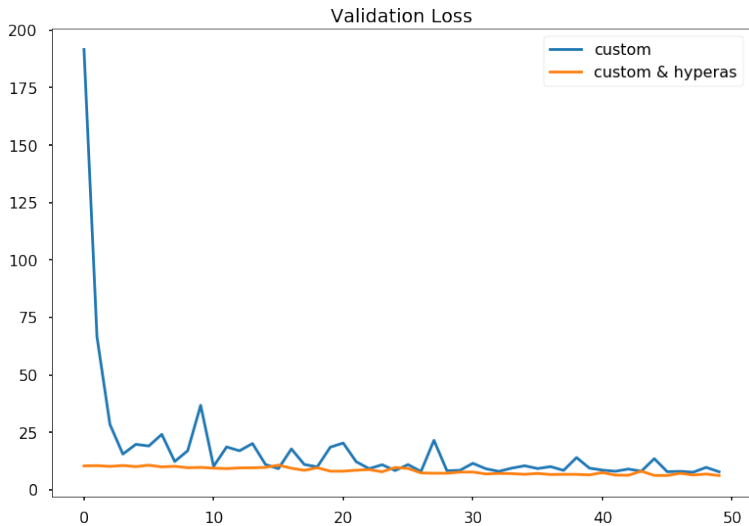


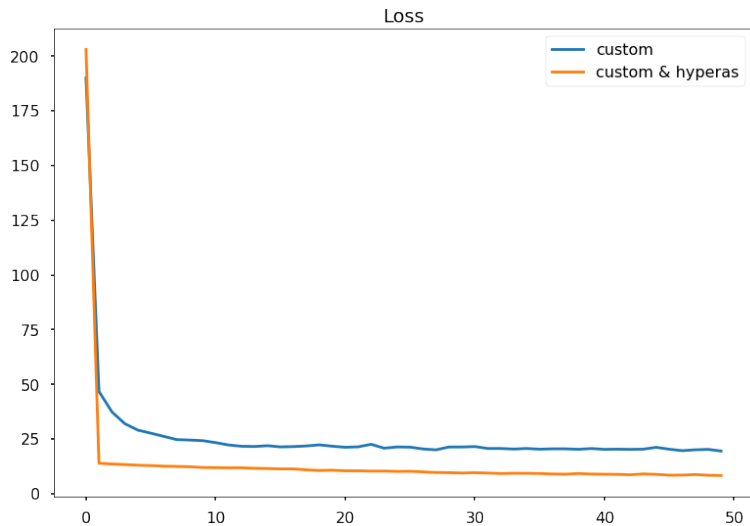
Figure: Early stopping example (on already trained custom model)

- ▶ Separating into different models
- ▶ Augmenting
 - ▶ Rotating and flipping
 - ▶ Contrast jittering



- ▶ Hyperas with Homemade Model
 - ▶ Optimizers: Adagrad, Adadelata, Adam, Nadam
 - ▶ Dropout: 1st 0.0685, 2nd 0.883, 3rd 0.621, 4th 0.283
 - ▶ Batch Size: 32, 64, 128





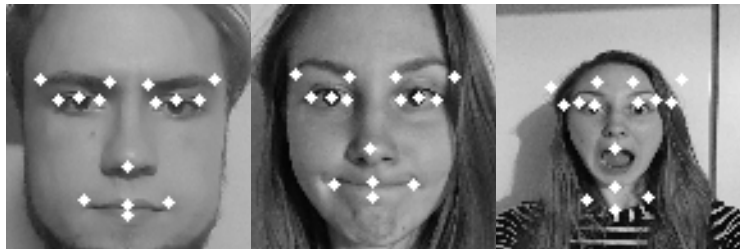


Figure: Predicted using custom model with hyperparameter tuning