



Facial Keypoint Detection

DEEP-LEARNING

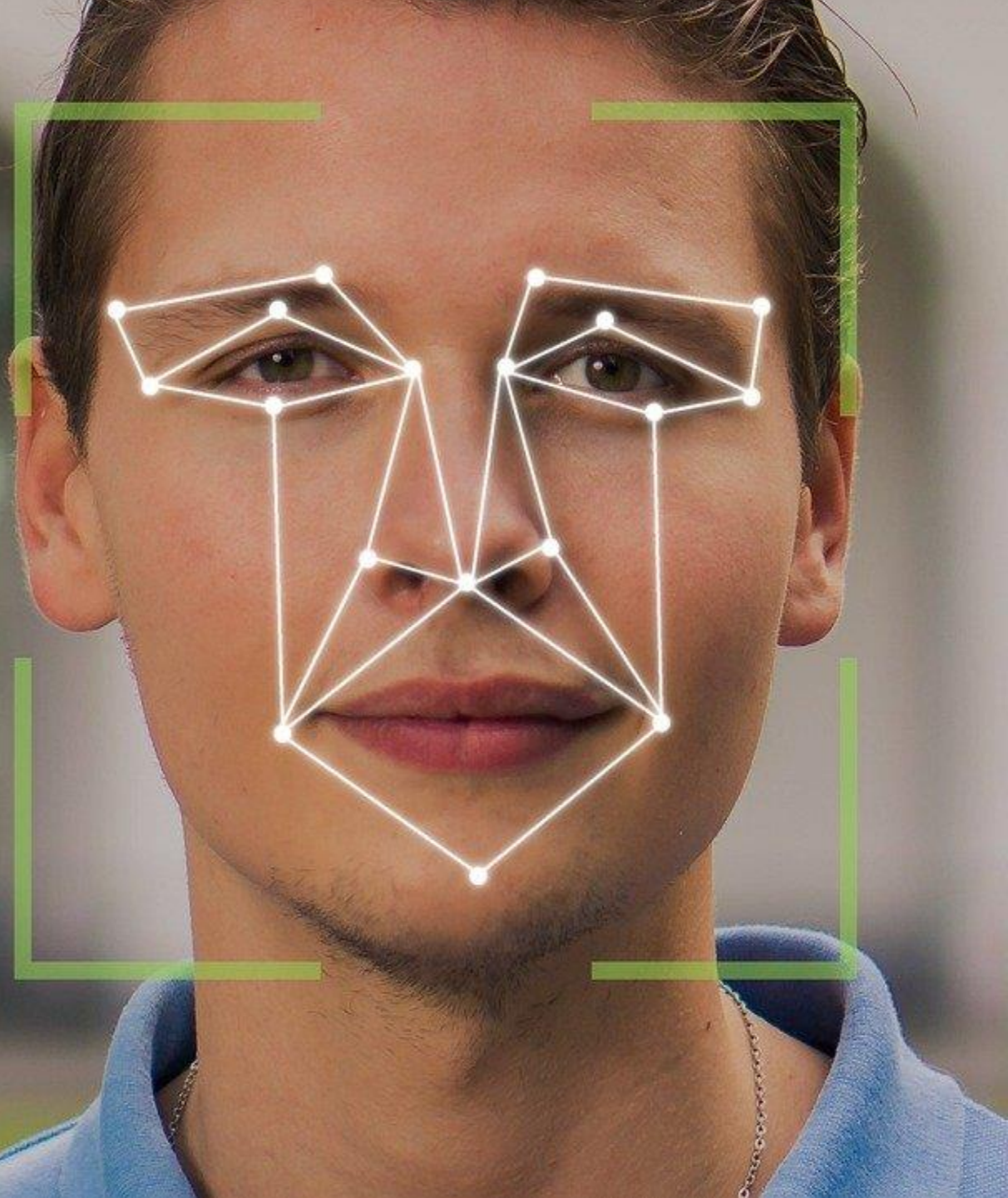
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PROCESSING



**predicting keypoint positions on
face images**

- Fully connected model
- CNN
- ResNet50



A close-up photograph of a woman's face, smiling. A white rectangular bounding box is drawn around her face. 15 specific facial landmarks are marked with small red dots. Lines connect these dots to labels in white boxes. The labels are: 'eyebrow inner end' (left), 'eyebrow outer end' (right), 'eye outer corner' (left), 'eye inner corner' (right), 'nose tip' (center), 'eye center' (right), 'mouth corner' (left), 'mouth center top tip' (left), and 'mouth center bottom tip' (bottom center).

eyebrow inner end

eyebrow outer end

eye outer corner

eye inner corner

nose tip

eye center

mouth corner

mouth center top tip

mouth center bottom tip

Data

Training:7049
Testing:1783

15 key points specified by
an (x,y) real-valued pair in
the space of pixel indices

Algorithms

**Fully connected
model + SGD**

**Pre-trained
ResNet50
model**

**CNN model+
Augmentation +
Transfer
learning(CNN base)**

Comparison

	LOSS	MAE	Accuracy
Fully connected model + SGD	0.01/0.01	0.03/0.03	0.68/0.67
Pre-trained ResNet50 model	0.0005/0.0001	0.018/0.007	0.87/0.93
CNN model+ Augmentation + Transfer learning	0.06/0.002	0.17/0.06	0.93/0.98

Tools

- Keras
 - MaxPooling2D, Conv2D , Flatten, Dropout
 - BatchNormalization
 - EarlyStopping, ReduceLROnPlateau
 - ResNet50
- Matplotlib
- Sklearn
 - Shuffle
 - train_test_split
- Numpy & Pandas
- OrderedDict



Thank you