Clothing recommender webapp
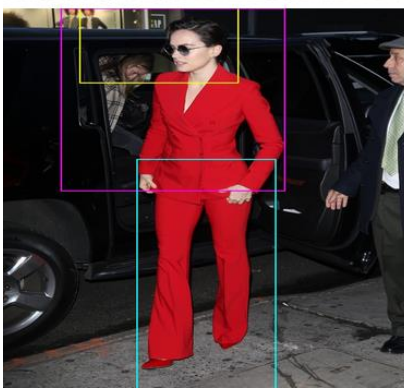
LEE, Sum Yin Sonny   20571794
TANG, Yubo   20567884
BARRAUD, Romain   20551110

The challenge

Agenda
- Demo
- Value Proposition
- Architecture & functional flow
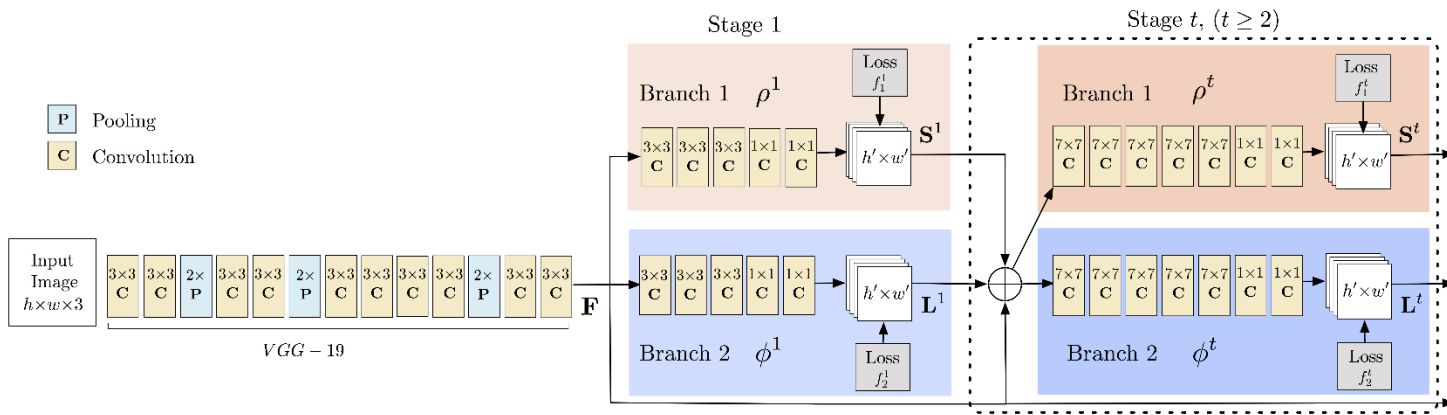- Models

1. Demo

2. Value proposition

- Customers no longer want to search for clothes

- Offering personalized clothing recommendations would
  - Increase immediate sales
  - Enhance satisfaction
  - Create a differentiator

- The solution
  - An easy-to-use app
  - You upload a photo and get recommendations
  - You click and buy

3. Architecture & functional flow
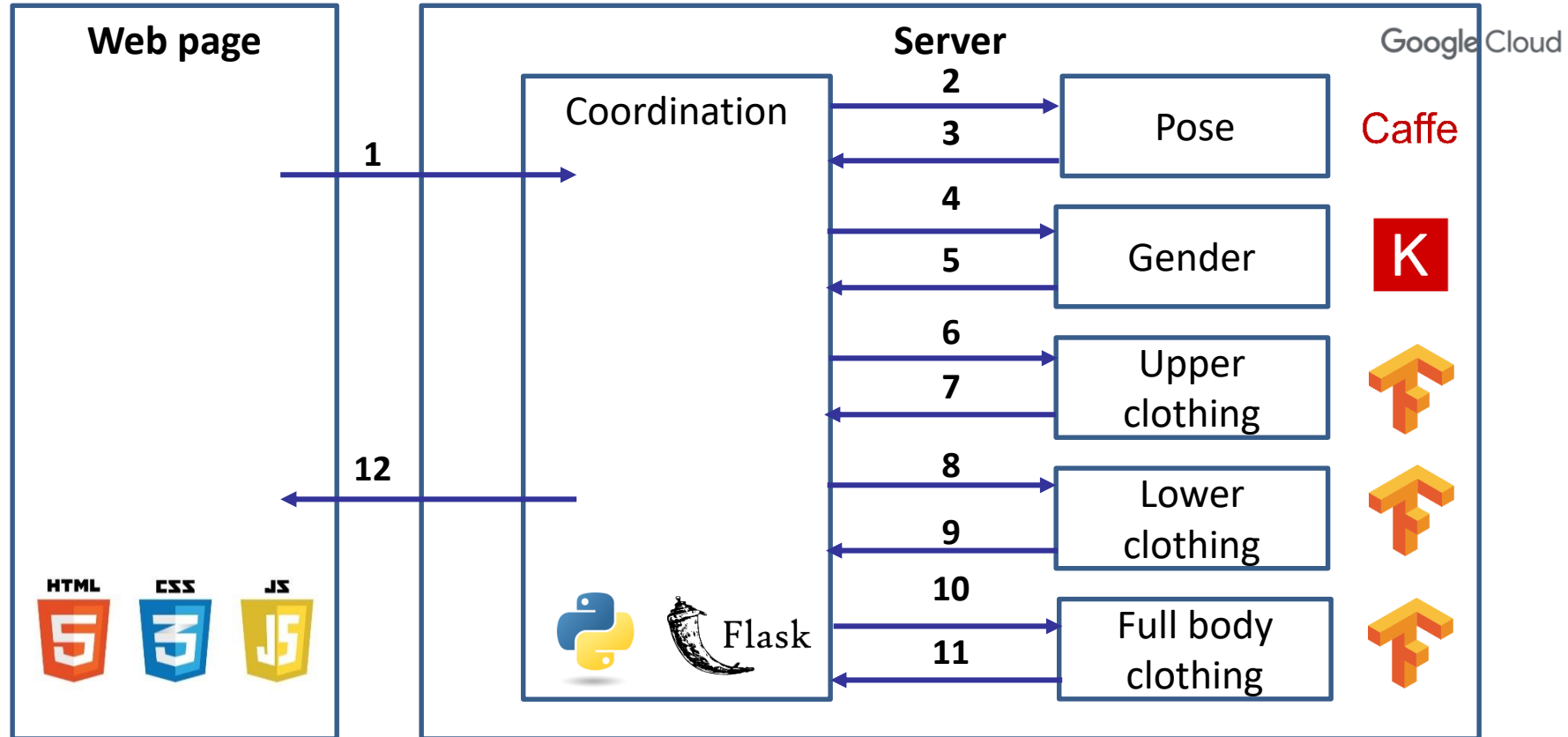
4.1 Models – Pose Detection (Transfer Learning)

- Already trained Posenet network
- Built with Caffe
- Based on VGG19
- Adapted to return bounding boxes instead of points
- Custom heuristic for unusual poses and missing points

4.2 Models – Gender classification (Network from scratch)

- Famous UKT Face dataset for Age, Gender and Ethnicity
- 20,000+ samples of faces in the wild and close-up
- Accuracy on test set: 88%


```
Model: "sequential_1"

Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 148, 148, 256)     2560
_____
activation_1 (Activation)    (None, 148, 148, 256)     0
_____
max_pooling2d_1 (MaxPooling2 (None, 74, 74, 256)       0
_____
conv2d_2 (Conv2D)            (None, 72, 72, 256)       590080
_____
activation_2 (Activation)    (None, 72, 72, 256)       0
_____
max_pooling2d_2 (MaxPooling2 (None, 36, 36, 256)       0
_____
flatten_1 (Flatten)          (None, 331776)            0
_____
dense_1 (Dense)              (None, 64)                21233728
_____
dense_2 (Dense)              (None, 1)                 65
_____
activation_3 (Activation)    (None, 1)                 0
=================================================================
Total params: 21,826,433
Trainable params: 21,826,433
Non-trainable params: 0
```
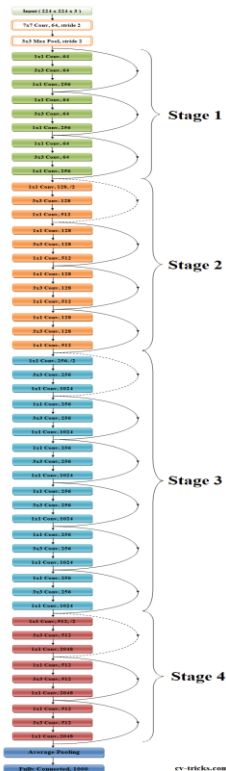
4.3 Models – Clothes (Transfer Learning with fine-tuning)

- 3 models based on Resnet50 and 12-layer deep tuning
- Deep Fashion dataset - 289,000 images across 46 clothes categories
- Heavily imbalanced, from 200 to 76,000 records per category
  - Removal of small categories and subsamples of larges ones
  - → 11 categories ranging from 2,500 to 10,000 records
  - → Further split between upper (4 cat.), lower (3 cat.) and full body (3 cat.)
- Accuracy: upper 75%, lower 87%, and full body almost 100%

Resnet50

Category	# Records
Shorts	10000
Tee	10000
Jacket	10000
Sweater	10000
Dress	10000
Skirt	10000
Blazer	7495
Jeans	7076
Jumpsuit	6153
Kimono	2294

Thank you &

Happy shopping!