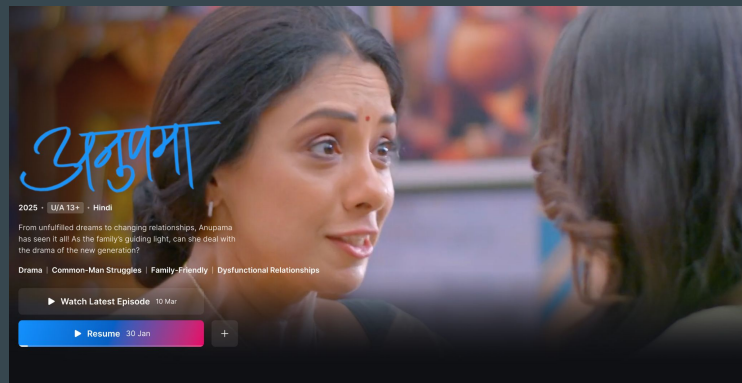# Internship Presentation

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Shoppable Ads

Step 1: Collecting video data

- Daily soaps
- Video episodes from hotstar
- Identified key frames, tried different methods:
    - Scene change detection
    - Identify people, skip duplicate scenes
- Extract and store frames
    - Scene change detection: 3 min per video
    - Identifying duplicate frames and skipping: 30 min per video

Used: Python, yt-dlp, OpenCV, YOLO

Step 2: Object detection model: YOLOv8

Uses YOLOv8 (neural network) to predict bounding boxes and class probabilities for objects in an image

Limitations:

- Limited set of output classes:

Object		
person		
remote		
potted plant		
bottle		
orange		
banana		
vase		
chair		
wine glass		
spoon		
fork		
tie		
book		
tv		
couch		
dining table		
cup		
suitcase		
clock		
refrigerator		
bed		
microwave		
cell phone		
cake		

```
1  {
2    "class": {
3      "0": "person",
4      "1": "bicycle",
5      "2": "car",
6      "3": "motorcycle",
7      "4": "airplane",
8      "5": "bus",
9      "6": "train",
10     "7": "truck",
11     "8": "boat",
12     "9": "traffic light",
13     "10": "fire hydrant",
14     "11": "stop sign",
15     "12": "parking meter",
16     "13": "bench",
17     "14": "bird"
```
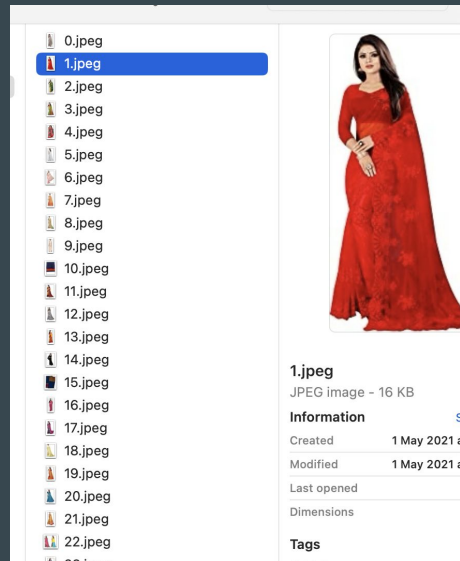
Other methods of object detection

- Fine tune YOLO on fashion dataset, use it to detect objects from video frames
    - Problems:
        - Fashion dataset contains clean images
        - Unable to identify those in video frames since those are real world images

- Use other CNN/ResNet models for detecting objects
    - Problems:
        - Trained on fashion dataset clean images
        - 79% classification accuracy on clean dataset
        - Unable to classify video frame images correctly

Step 3: Collect Fashion dataset

- Collect sample fashion dataset available online
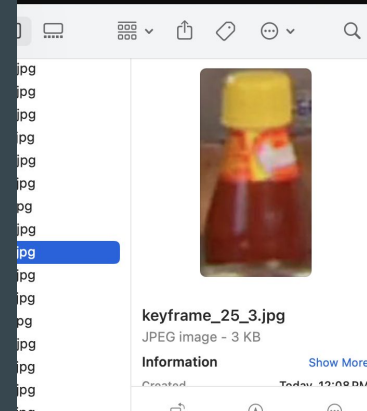   - Includes images, product descriptions, class labels

{

"Image_url":"https://m.media-amazon.com/images/I/71NZQ-aaASL._AC_UL320_.jpg",

"image_path": "images/test/0.jpeg",

"brand": "TANTUJA BENGAL HANDLOOM",

"product_title": "(A Govt. of West Bengal Enterprises) Handloom Cotton Ethnic Wear For Women's-011H8B9699/BB 12 Black",

"class_label": "saree"

}

Step 4: Matching video frame objects to products

- Calculate and store text embeddings from product description using CLIP in memory
- For each frame (in episode)
    - Detect object using YOLO
    - Filter it to use only objects identified as person - since need to classify clothes
    - Crop person
    - Calculate image embeddings
    - Find closest match to text embedding using cosine similarity
    - Output closest product match

Results

detected_ob	best_match_product	similarity_score
0	Women's Satin Silk Printed Square Scarf Dupatta (110 * 110 cm, Multi)	0.3839727493061492
1	Men's Tweed Woollen Bandhgala Waistcoat Brown Checkered Sadri/Nehru Jacket for Winter	0.4028809138914979
2	Women's Satin Silk Printed Square Scarf Dupatta (110 * 110 cm, Multi)	0.4141686465814113
3	mens Extras size (s14_indo_p)	0.11335704550820594
4	Boys Sherwani Set Full Sleeve Nehru Collared Gold Tone Sherwani Jacket and The Chalk White Plain Churidar.	0.3116147563310788
5	Men Gold-Coloured & Copper-Toned Self Design Sherwani Set	0.11681270412359639
6	Indo pants For Men (UP-RI-516)	0.08839291

```
      ✓  8.3s


0: 384x640 5 persons, 1 couch, 1 tv, 72.6ms
Speed: 7.9ms preprocess, 72.6ms inference, 11.2ms postprocess per image at shape (1, 3, 384, 640)
Results saved to matched_results.csv
   detected_object_index                         best_match_product  \
0                      0  Women's Satin Silk Printed Square Scarf Dupatt...
1                      1  Men's Tweed Woollen Bandhgala Waistcoat Brown ...
2                      2  Women's Satin Silk Printed Square Scarf Dupatt...
3                      3                     mens Extras size (s14_indo_p)
4                      4  Boys Sherwani Set Full Sleeve Nehru Collared G...
5                      5  Men Gold-Coloured &amp; Copper-Toned Self Desi...
6                      6                     Indo pants For Men (UP-RI-516)

   similarity_score
0          0.383973
1          0.402881
2          0.414169
3          0.113357
4          0.311615
5          0.116813
6          0.088393
```