INS approach with pertained models and web based interactive evaluation (HSMW_TUC)

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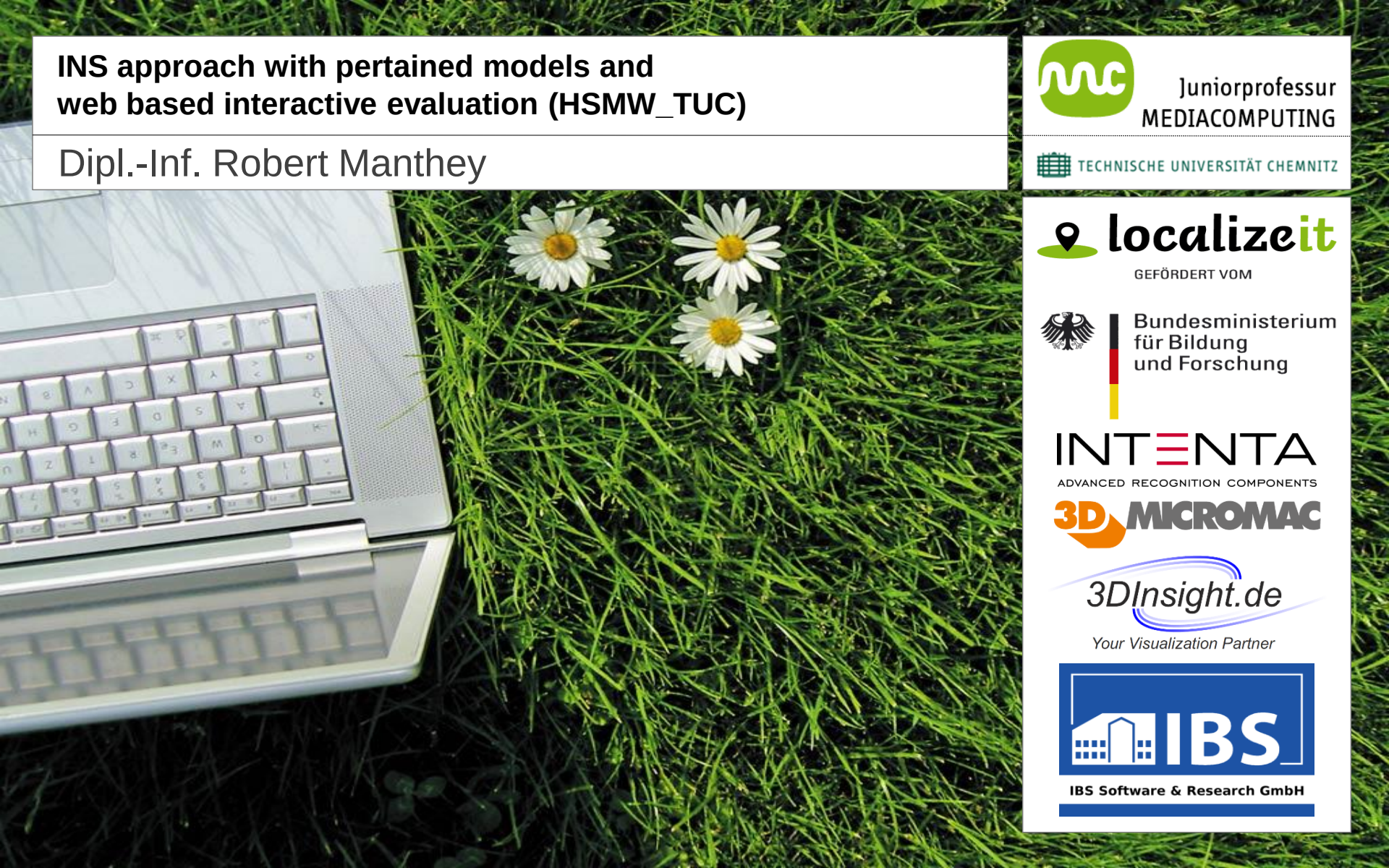

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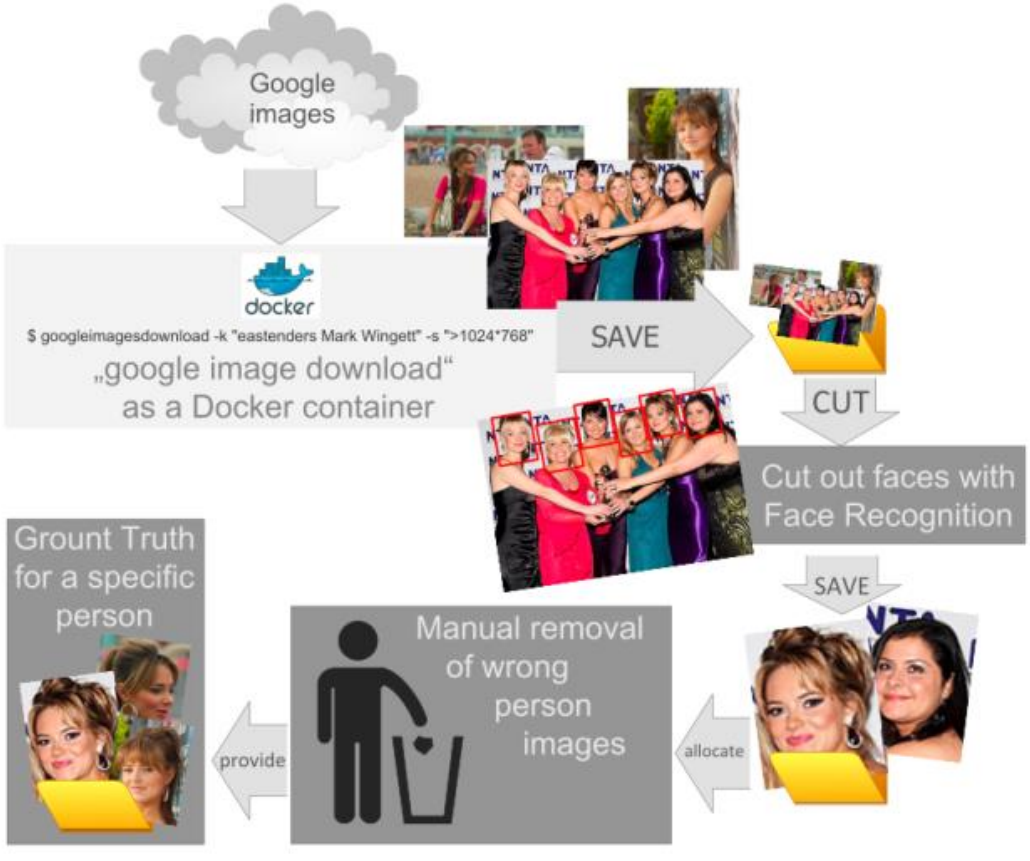
General System Design

- Focus mainly on architecture
- Docker containers
- Metadata in relational database
- Data and feature extraction through existing frameworks
- Management and data distribution through webservice, API and HTTP

Used frameworks:

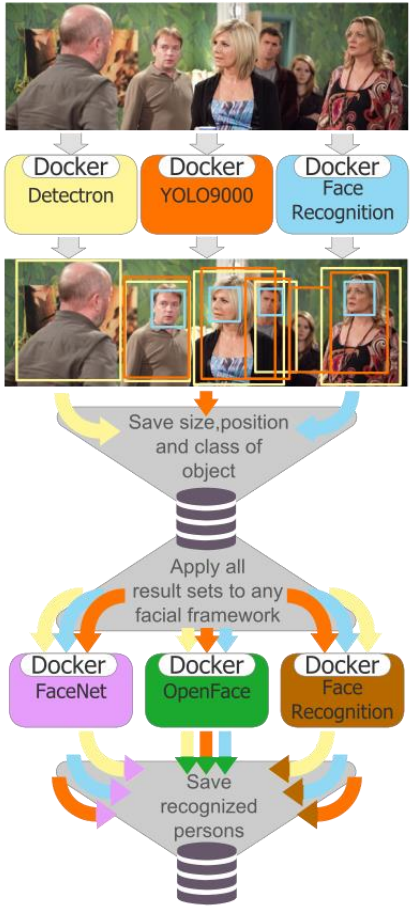
- *Places365*[1] (Locations)
- *Color Thief*[2] (Color Features)
- *Detectron*[3] (Persons&Objects)
- *Yolo9000*[4] (Persons&Objects)
- *FaceNet*[5] (Faces)
- *OpenFace*[6] (Faces)
- *FaceRecognition*[7] (Faces)
- *TuriCreate*[8] (Clustering)
- *Laravel*[9] (Web service)

Preprocessing Person Images



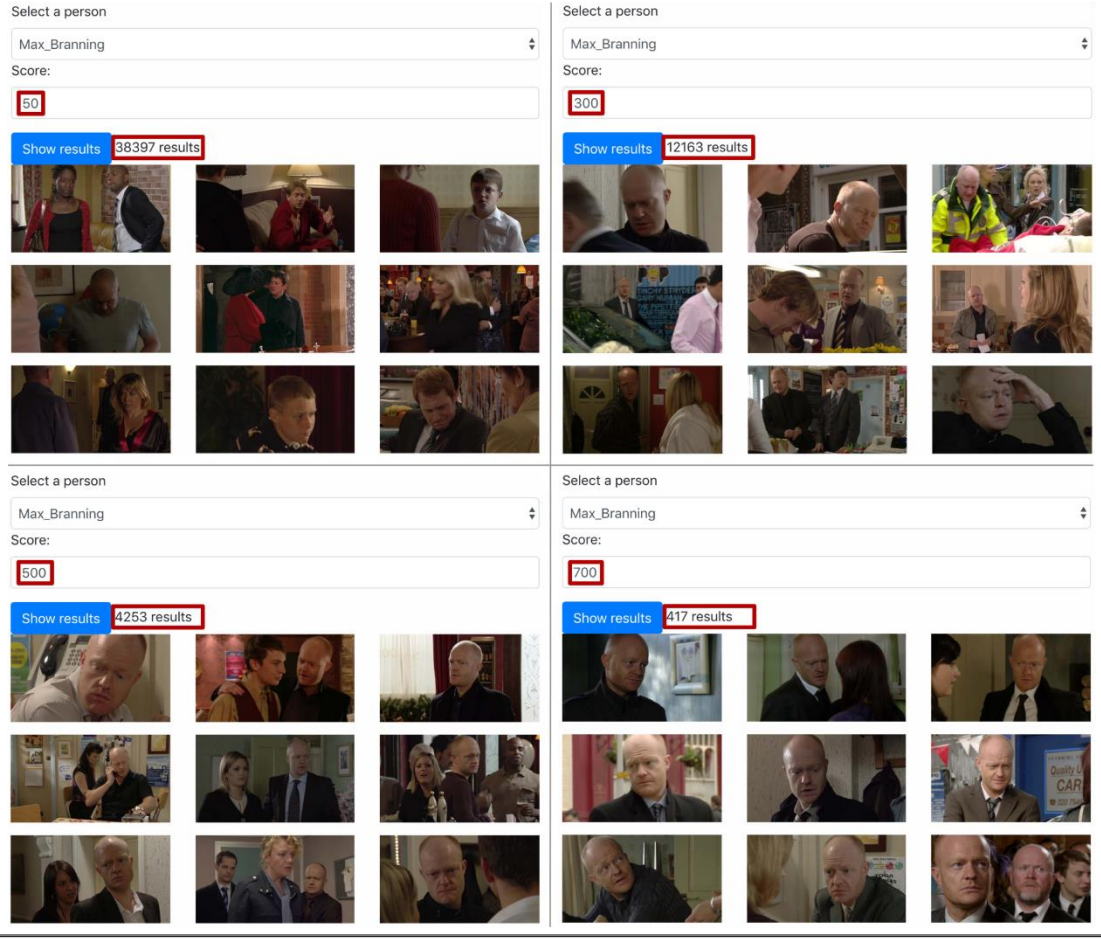
- BBC EastEnders characters known
- Google image search grab samples
- Semi-automatic enhancement
- Ground Truth with 50-300 images/character

Recognizing Person Unit



- Multiple detections frameworks per frame
- Use Ground Truth to recognize EastEnders characters
- Multiple recognition frameworks per detection
- Storing of intermediate recognition results and their scoring for further processing

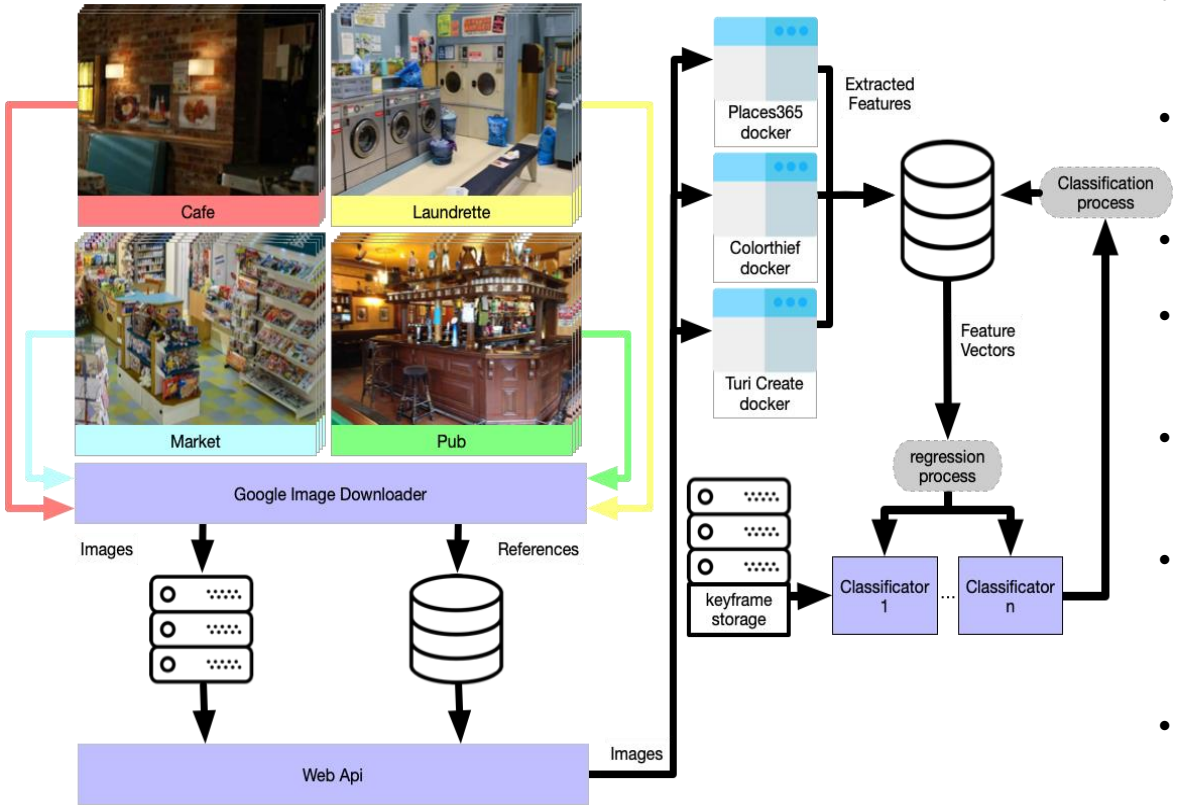
Person Recognition Results



- Visual representation of results with webservice
- False detections decreases with increasing of score value
- Number of images decreases with increasing of score value

No knowledge from visualisation included into automatic evaluation

Recognizing Location Unit



- Google image search grab sample images of classes
- Ground Truth to recognize locations classes
- Processed by multiple frameworks
- Storing ten most probable classifications of Places per image
- Ten most dominant color from Colorthief
- TuriCreate determine ten most similar images to create similarity classifier
- Storing of intermediate results and their scoring

Location Recognition Results & Fusion

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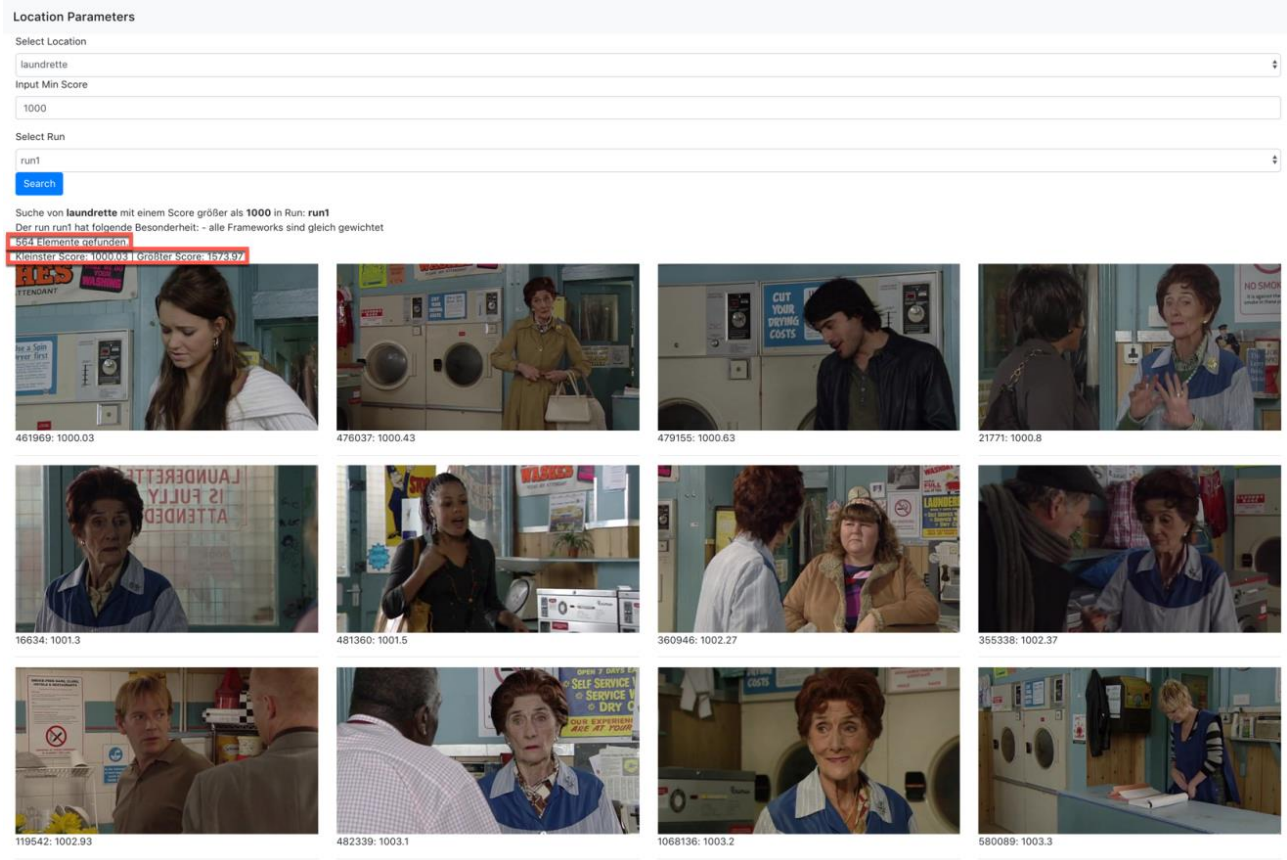
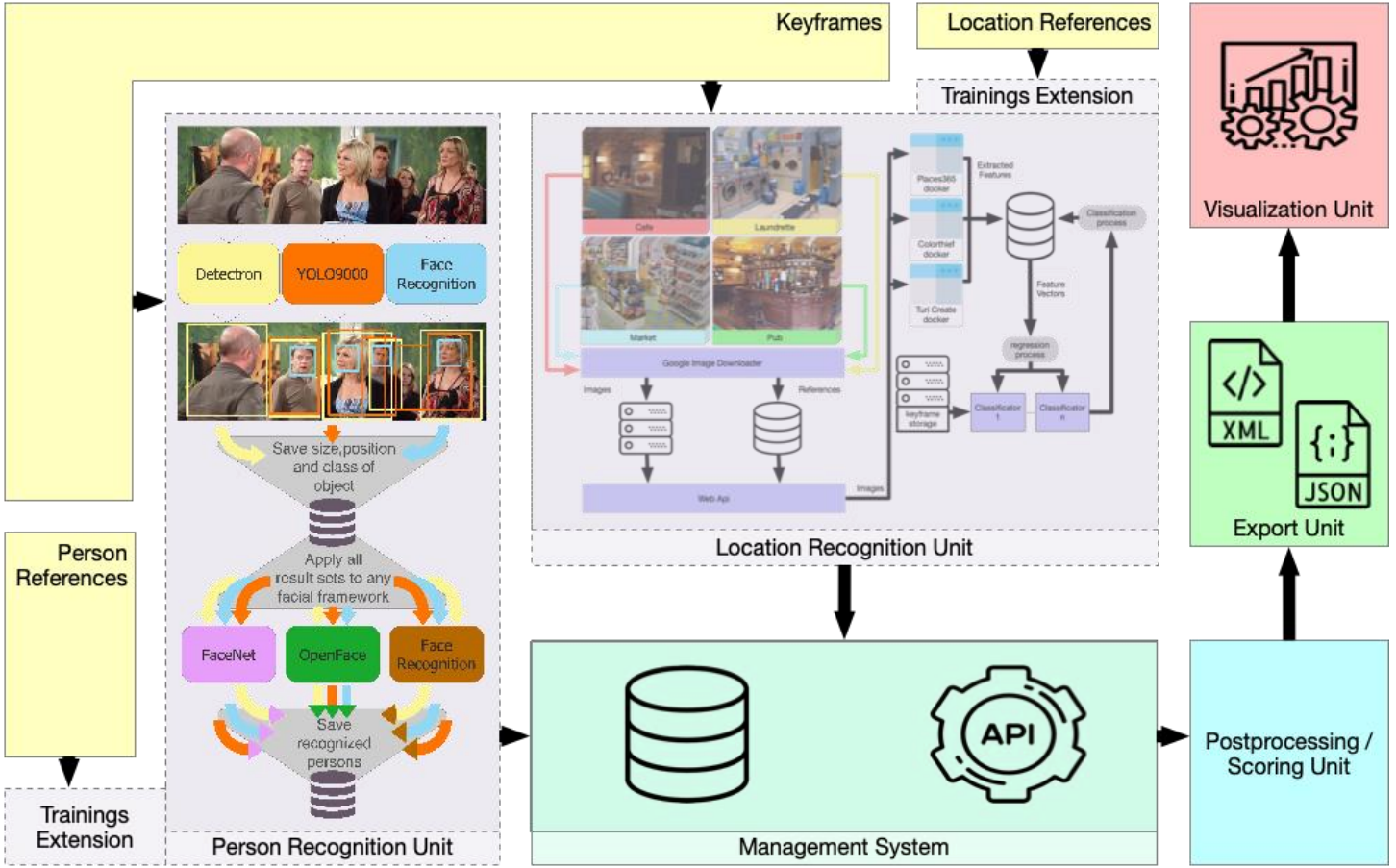


- Visual representation of results
- Analysing the query
- Combination of person and location
- Retrieving best match form database
- Multiple iterations of replenish to get 1000 result images if needed

No knowledge from visualisation included into automatic evaluation

Holistic Workflow



Results

- Fully reconstructed, flexible and extendable system
- Main focus on infrastructure cause only mediocre results
- Fusion of results from different frameworks need optimization
- Automatic runs: (1-3) MAP: ~0.1 Prec@100: ~0.26
- Interactive run: (4) MAP: ~0.25 Prec@100: ~0.45
- Two different frameworks for reliable person detection
- Small differences in frames result in different prediction values

Summary

- Multiple use of containers and frameworks
- Flexible and extendable infrastructure design
- Web-based UI for visualisation and interactive evaluation
- Interactive outperforms automatic runs
- Multiple frameworks for same task may improve results
- Advantages in data fusion needed

Thank you for your attention.
Any questions?

References

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