Advances in Computer Vision / Multimedia Processing

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Outline

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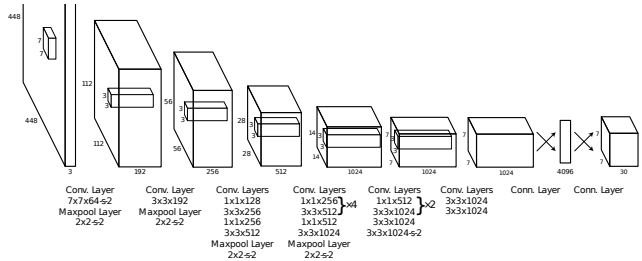
- Based directly on pixel colour data (not necessarily RGB)
- Individual frames as independent pictures
- Very often using (D)*(C)NN

Choose Your (Deep) Weapon!

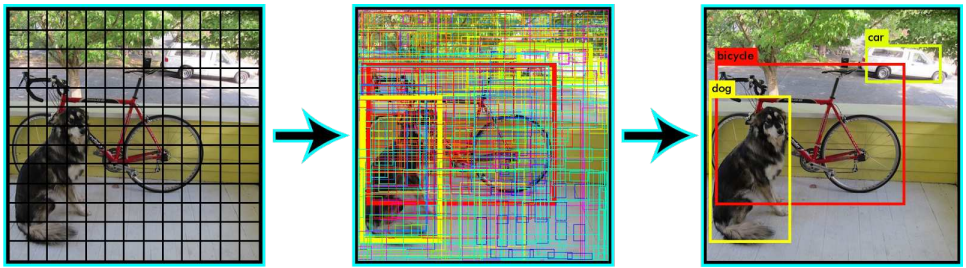
YOLO



Excels in object detection, good in object description.

Choose Your (Deep) Weapon!

YOLO



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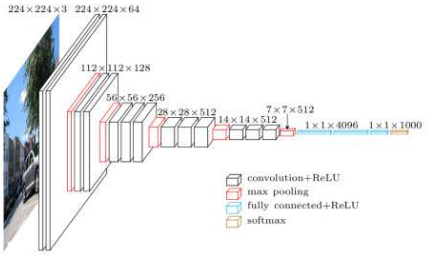
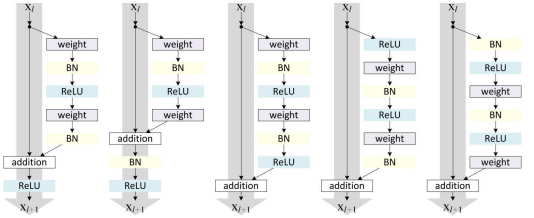
VGG16



Good in object detection, commonly used for face description.

Choose Your (Deep) Weapon!

ResNet



Much deeper, comparable model size, used for face description.

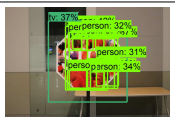
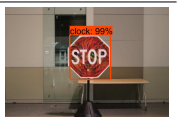
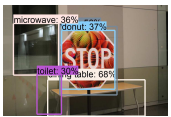
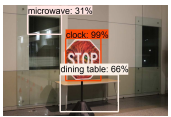
However...

(a) Person (low) (b) Sports ball (low) (c) Untargeted (low)

(d) Person (high) (e) Sports ball (high) (f) Untargeted (high)

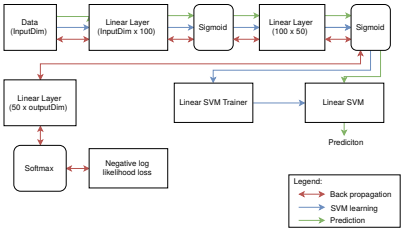
Chen, S. T., Cornelius, C., Martin, J., & Chau, D. H. P.: Physical Adversarial Attack on Object Detectors.

However...

Dist.	Angle	Target: person	Target: sports ball	Untargeted
10’	0°			
10’	30°			

Chen, S. T., Cornelius, C., Martin, J., & Chau, D. H. P.: Physical Adversarial Attack on Object Detectors.

Use of Networks on Statistical Data

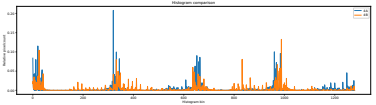


Šabata, T., Pulc, P., & Holena, M.: Semi-supervised and Active Learning in Video Scene Classification from Statistical Features. In Workshop on Interactive Adaptive Learning.

Use of Networks on Statistical Data

(a) Room 4A

(b) Room 4B



(c) Histogram comparison

Šabata, T., Pulc, P., & Holena, M.: Semi-supervised and Active Learning in Video Scene Classification from Statistical Features. In Workshop on Interactive Adaptive Learning.

Detect, Align, Describe, Match

Marčetić, D., & Ribarić, S.: An Online Multi-Face Tracker for Unconstrained Videos.

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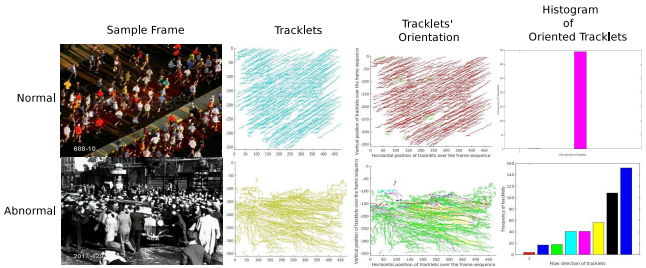
Optical Flow



Lamba, S. & Nain N.: Oriented Tracklets Approach for Anomalous Scene Detection in High Density Crowd

Optical Flow with Camera Motion Compensation

Beumier, C. & Neyt X.: Trajectories and Camera Motion Compensation in Aerial Videos

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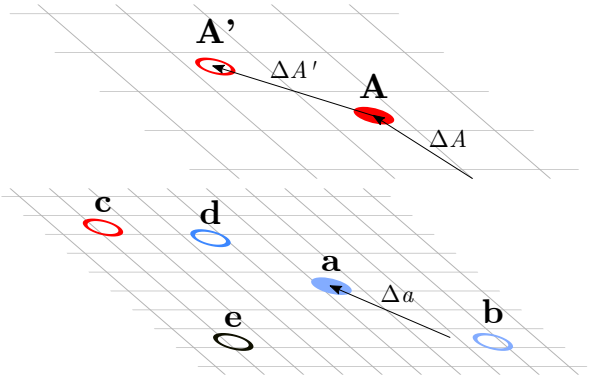
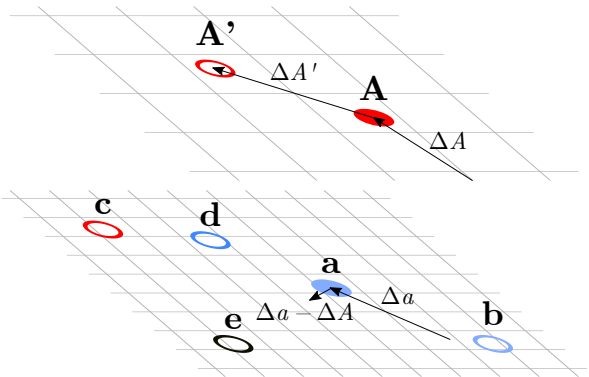


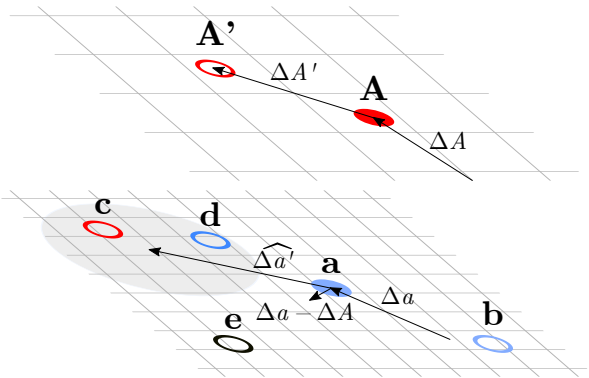
- Information on motion from upper octave (ΔA, $\Delta A'$)

Optical Flow with Camera Motion Compensation



- Information on motion from upper octave ($\Delta A, \Delta A'$)
- Feature motion relative to upper octave ($\Delta a - \Delta A$)

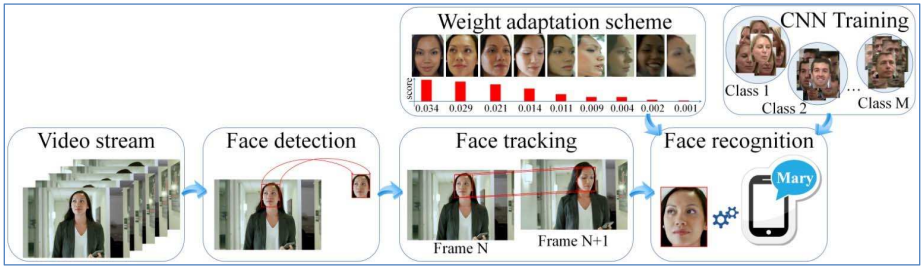
Optical Flow with Camera Motion Compensation



- Information on motion from upper octave ($\Delta A, \Delta A'$)
- Feature motion relative to upper octave ($\Delta a - \Delta A$)
- Estimation of new position of the feature ($\widehat{\Delta a'}$)

Outline

Face Detect, Track, Describe



Tapu, R., Mocanu, B. & Zaharia T.: Face recognition in video streams for mobile assistive devices dedicated to visually impaired.

Based on Type of Content
Training

1. Split content to individual shots
2. Based on statistical properties, pick set of processing methods
3. Store the best-performing methods to database
4. Train a method selection model based on statistical properties

Based on Type of Content
Testing

1. Split content to individual shots
2. Based on statistical properties, pick set of processing methods
3. Run k best methods simultaneously
4. Provide result with highest support

Based on Domains of Interest
Training

1. Split content to individual shots **and "layers"**
2. Based on statistical properties, pick set of processing methods
3. Store the best-performing methods to database
4. Train a method selection model based on statistical properties

Based on Domains of Interest

Layer Splitting

Outline

Thank you

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