

Face Detection and Classification for video signals using Matlab, Python & OpenCV

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Face Detection - Viola and Jones algorithm

[1] P. Viola, M. Jones, *Rapid Object Detection using a Boosted Cascade of Simple Features*, International Conference on Computer Vision, 2001

Face Classification - CNN design

- Matlab

cnn structure

Face Classification - CNN Training

Training parameters:

- Epochs
- Batch size
- Accuracy

Confusion Matrix

Output Class	Adam Sandler	Alyssa Milano	Brace Willis	Danise Richards	George Clooney	Gwyneth Paltrow	Hugh Jackman	Jason Statham	Jennifer Love Hewitt	Lindsay Lohan	Mark Ruffalo	Robert Downey Jr	Will Smith	
Adam Sandler	430 5.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 0.0%	0 0.0%	0 0.0%	1 0.0%	0 0.0%	0 0.0%	0 0.0%	59.3% 0.7%
Alyssa Milano	1 0.0%	430 5.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	59.3% 0.2%
Brace Willis	0 0.0%	0 0.0%	388 3.2%	0 0.0%	0 0.0%	0 0.0%	1 0.1%	7 0.0%	0 0.0%	3 0.1%	9 0.0%	0 0.0%	0 0.0%	55.1% 4.9%
Danise Richards	0 0.0%	4 0.1%	0 0.0%	533 7.3%	0 0.1%	0 0.0%	0 0.0%	0 0.0%	7 0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	57.2% 2.8%
George Clooney	1 0.0%	0 0.0%	0 0.0%	0 0.0%	767 10.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	59.9% 0.1%
Gwyneth Paltrow	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	737 9.8%	3 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	59.8% 0.4%
Hugh Jackman	7 0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	524 7.0%	4 0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	57.9% 2.1%
Jason Statham	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 0.0%	0 0.0%	234 3.1%	0 0.0%	0 0.0%	7 0.0%	0 0.0%	0 0.0%	58.7% 3.3%
Jennifer Love Hewitt	0 0.0%	1 0.0%	0 0.0%	0 0.0%	1 0.0%	0 0.0%	0 0.0%	438 5.4%	0 0.0%	4 0.1%	0 0.0%	0 0.0%	0 0.0%	58.8% 1.4%
Lindsay Lohan	0 0.0%	13 0.2%	0 0.0%	0 0.0%	3 0.0%	0 0.0%	0 0.0%	0 0.0%	1388 23.5%	2 0.0%	0 0.0%	0 0.0%	0 0.0%	58.9% 1.1%
Mark Ruffalo	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	248 3.3%	0 0.0%	0 0.0%	0 0.0%	100% 0.0%
Robert Downey Jr	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	171 2.3%	0 0.0%	0 0.0%	100% 0.0%
Will Smith	1 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 0.0%	0 0.0%	0 0.0%	380 5.1%	0 0.0%	55.5% 0.0%
	57.2% 2.3%	59.4% 3.8%	59.2% 0.2%	59.5% 0.9%	100% 1.0%	59.1% 0.9%	55.5% 4.5%	59.9% 0.8%	59.4% 0.4%	59.4% 8.1%	100% 0.0%	59.4% 5.1%	58.7% 1.2%	
	Adam Sandler	Alyssa Milano	Brace Willis	Danise Richards	George Clooney	Gwyneth Paltrow	Hugh Jackman	Jason Statham	Jennifer Love Hewitt	Lindsay Lohan	Mark Ruffalo	Robert Downey Jr	Will Smith	
	Target Class													

Figure: Confusion matrix of the CNN

Video Processing

- Python
- OpenCV
- VidGear

Detection and Classification

Conclusions