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Master in Computer Vision Barcelona

[\[http://pagines.uab.cat/mcv/\]](http://pagines.uab.cat/mcv/)



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Module 6 Deep Learning for Video: Action Detection

22nd March 2018



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Department of Signal Theory
and Communications
Image Processing Group

Temporal Action Detection



<http://activity-net.org/>

Temporal Action Detection



Longboarding

Activity Classification

Temporal Action Detection



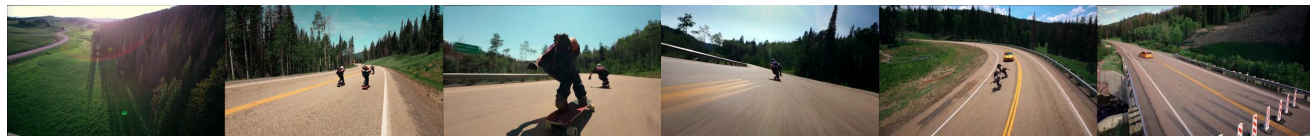
Longboarding

Activity Temporal Localization



A. Montes, Salvador, A., Pascual-deLaPuente, S., and Giró-i-Nieto, X., “Temporal Activity Detection in Untrimmed Videos with Recurrent Neural Networks”, *NIPS Workshop 2016* (best poster award)

Temporal Action Detection

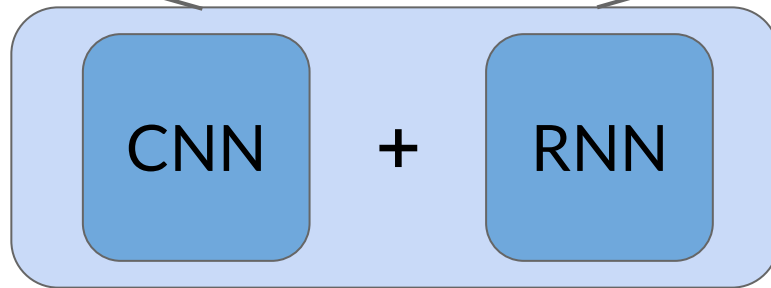
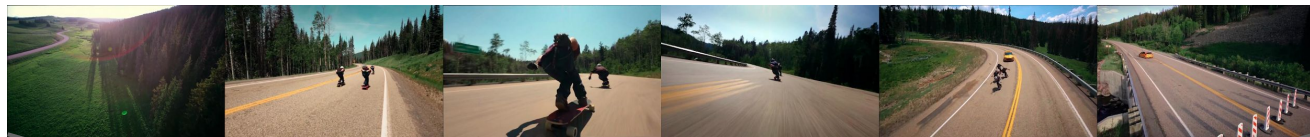


Neural Network

Activity



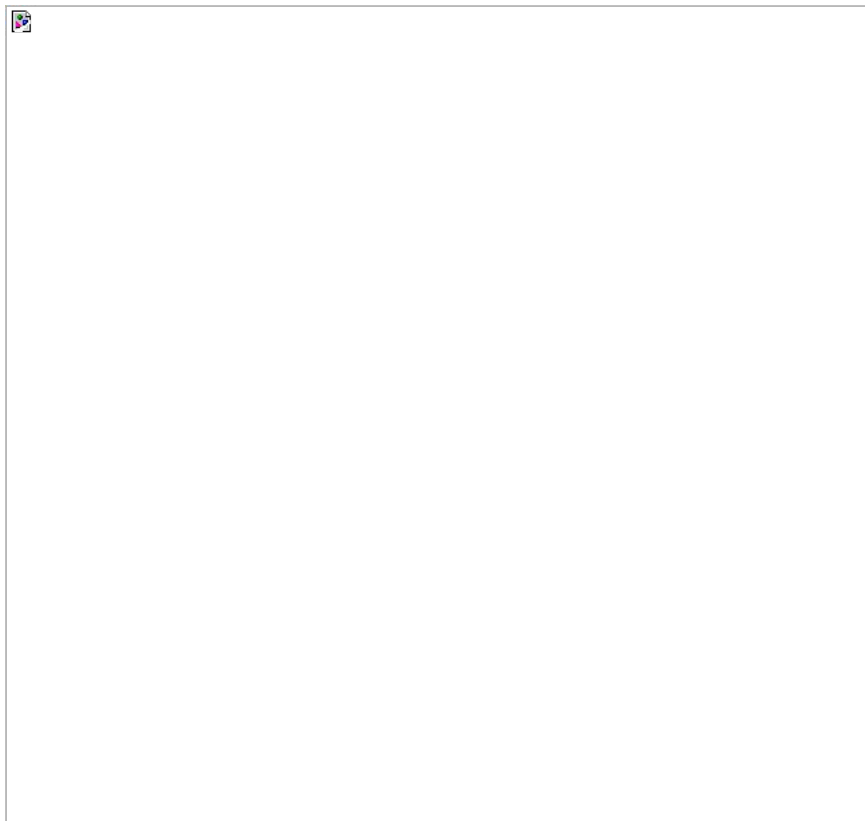
Temporal Action Detection



Activity



Action Detection: C3D + LSTM



Action Detection: C3D + LSTM

	Clip 1	Clip 2	Clip 3		Clip N
Background					
Activity 1					
Activity 2					
Activity 200					

Action Detection: C3D + LSTM

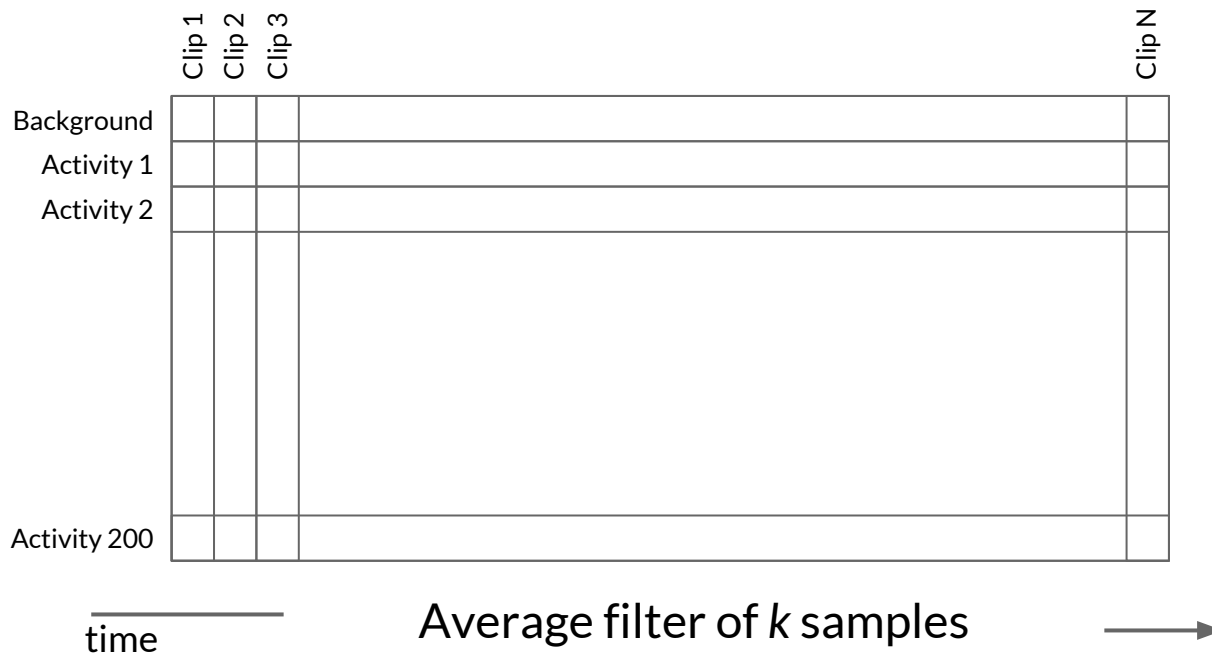
	Clip 1	Clip 2	Clip 3		Clip N	
Background						
Activity 1						
Activity 2						
Activity 200						

Average

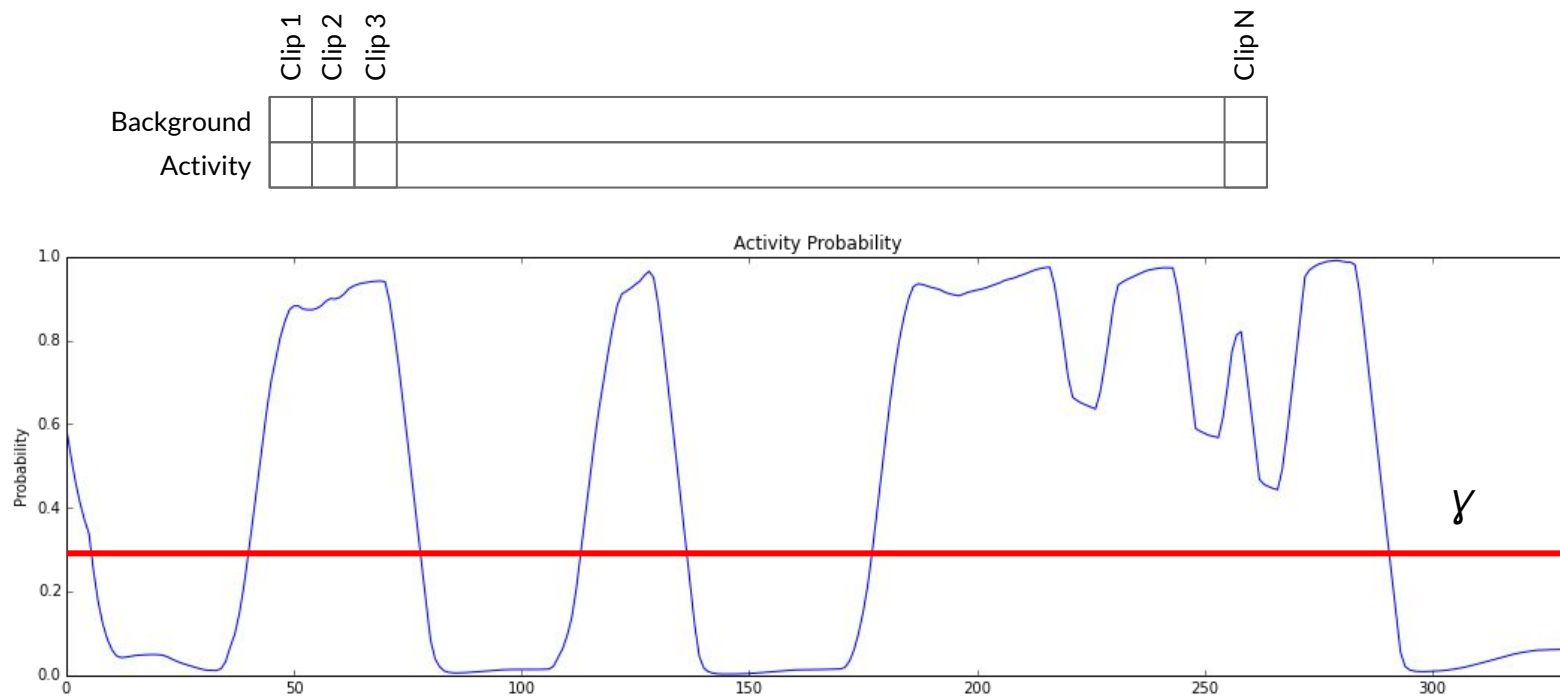
Action Detection: C3D + LSTM



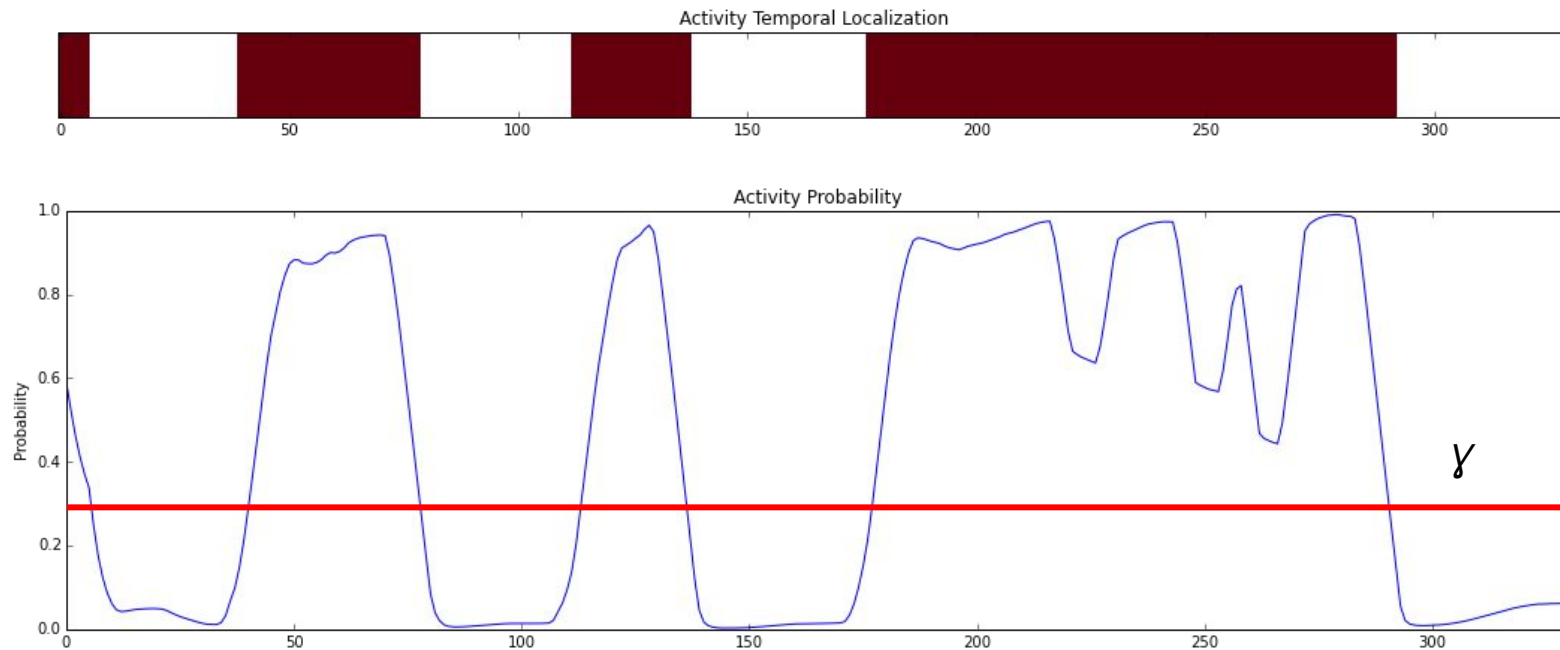
Action Detection: C3D + LSTM



Action Detection: C3D + LSTM



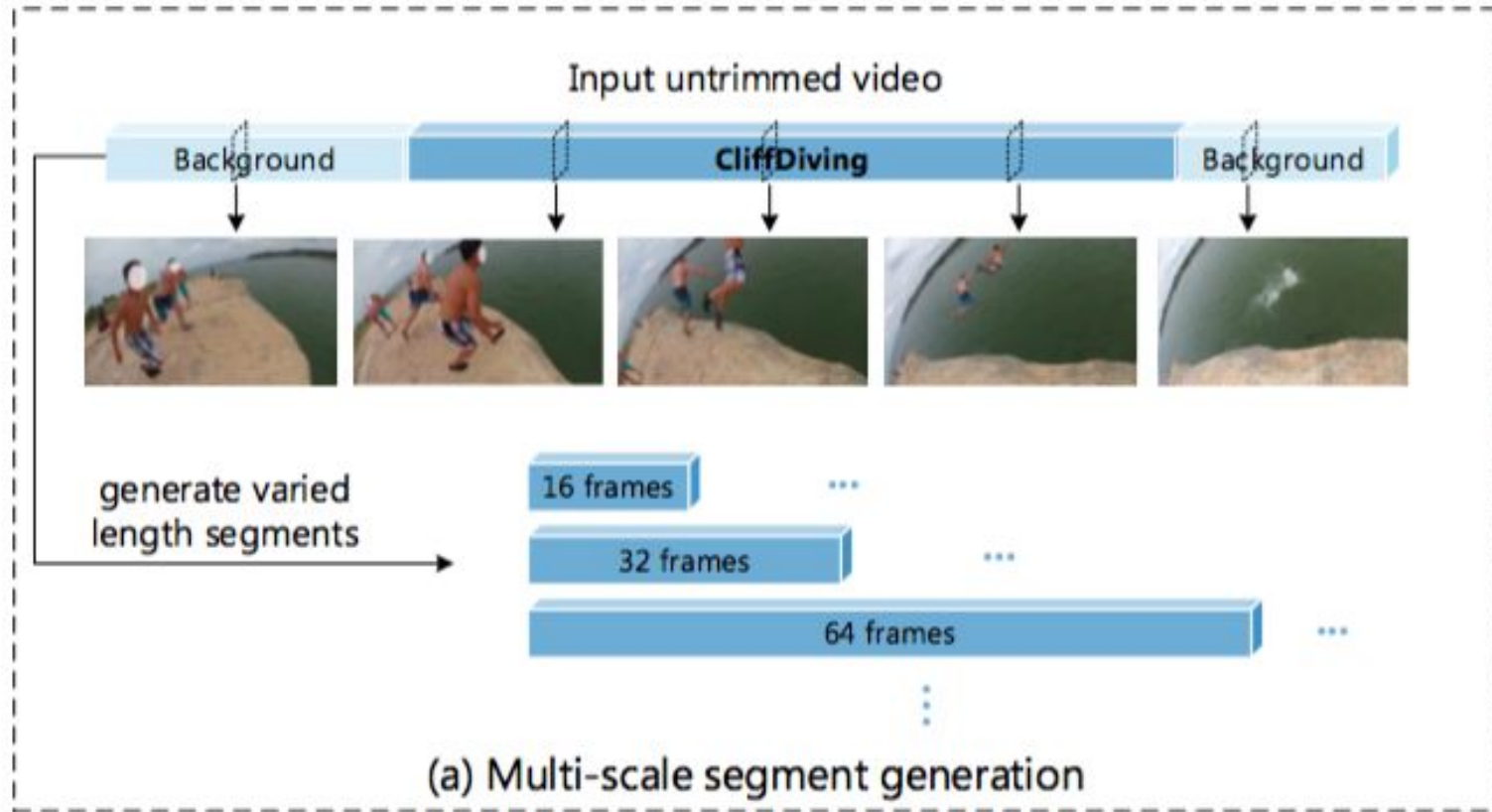
Action Detection: C3D + LSTM



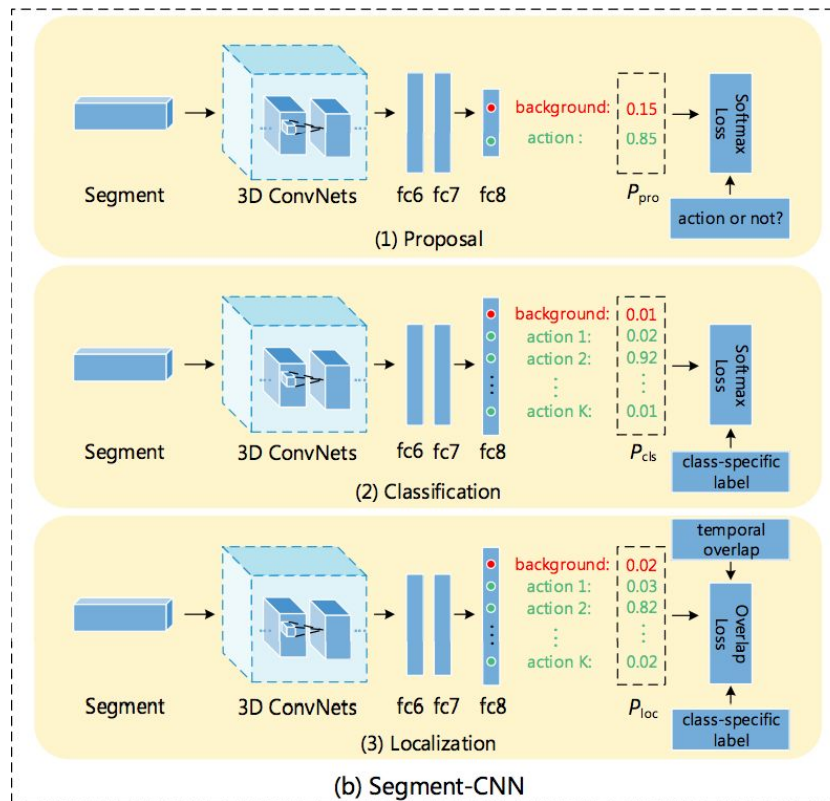
What techniques are used for object detection in images ?



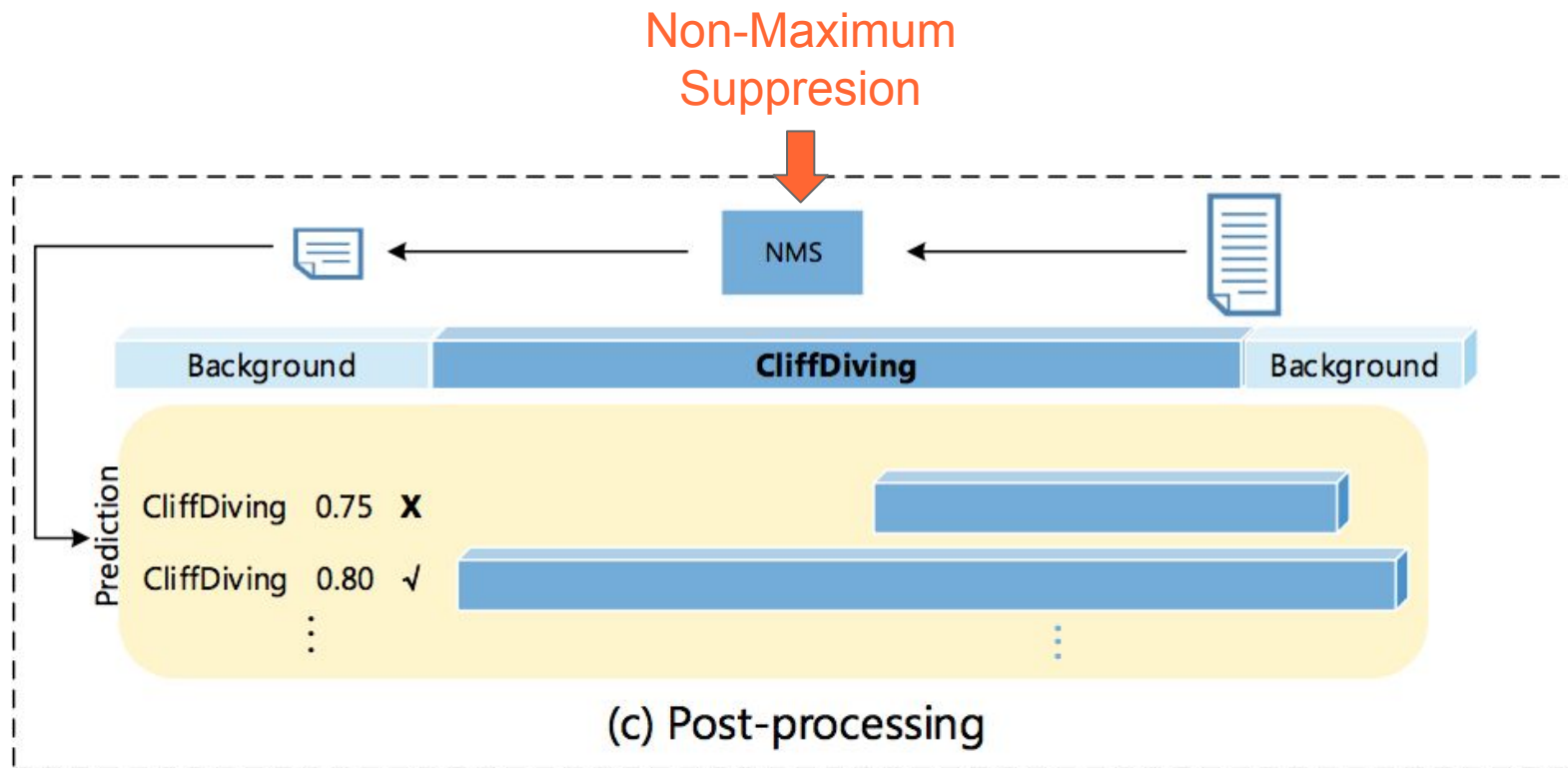
Action Detection: Proposals



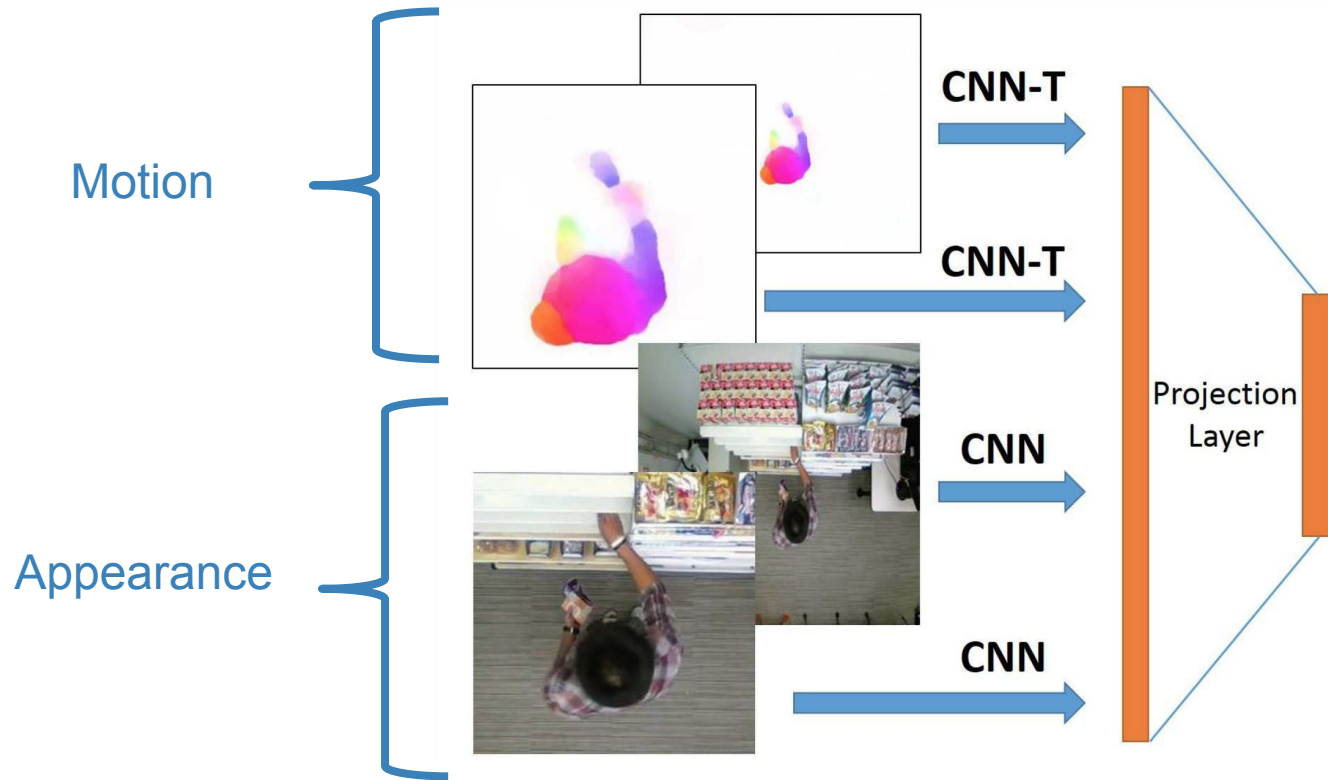
Action Detection: Proposals



Action Detection: Proposals



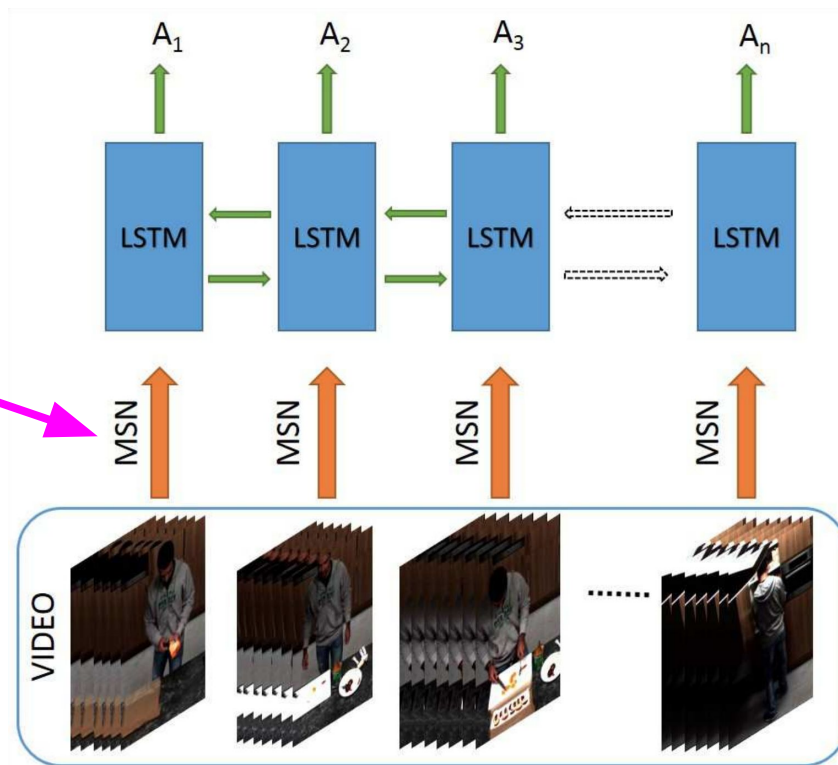
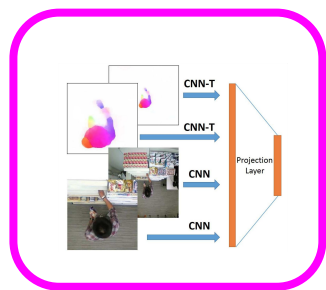
Action Detection: Two-stream CNN + RNN



Singh, Bharat, Tim K. Marks, Michael Jones, Oncel Tuzel, and Ming Shao. ["A multi-stream bi-directional recurrent neural network for fine-grained action detection."](#) CVPR 2016

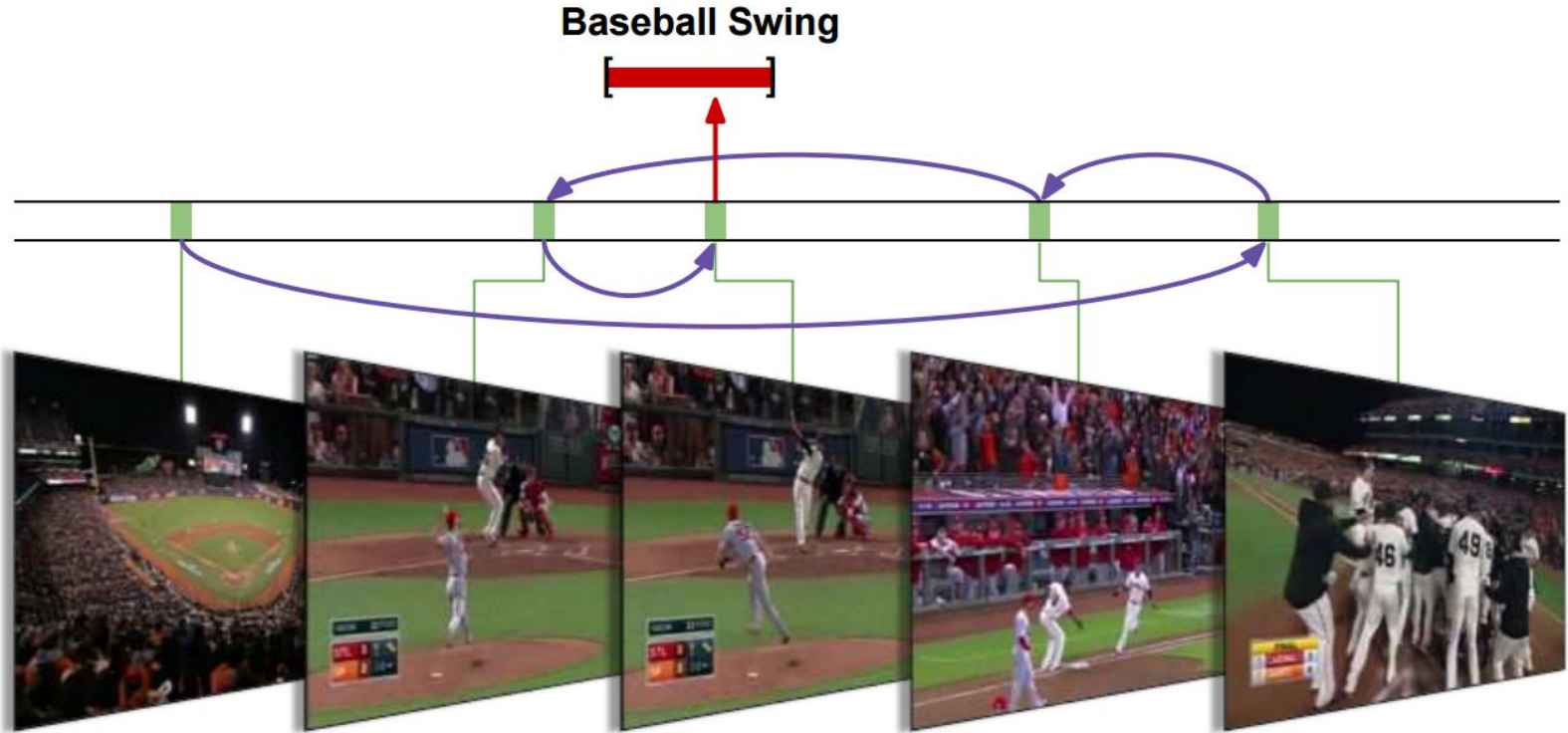
Action Detection: Two-stream CNN + RNN

Multi-Stream Network



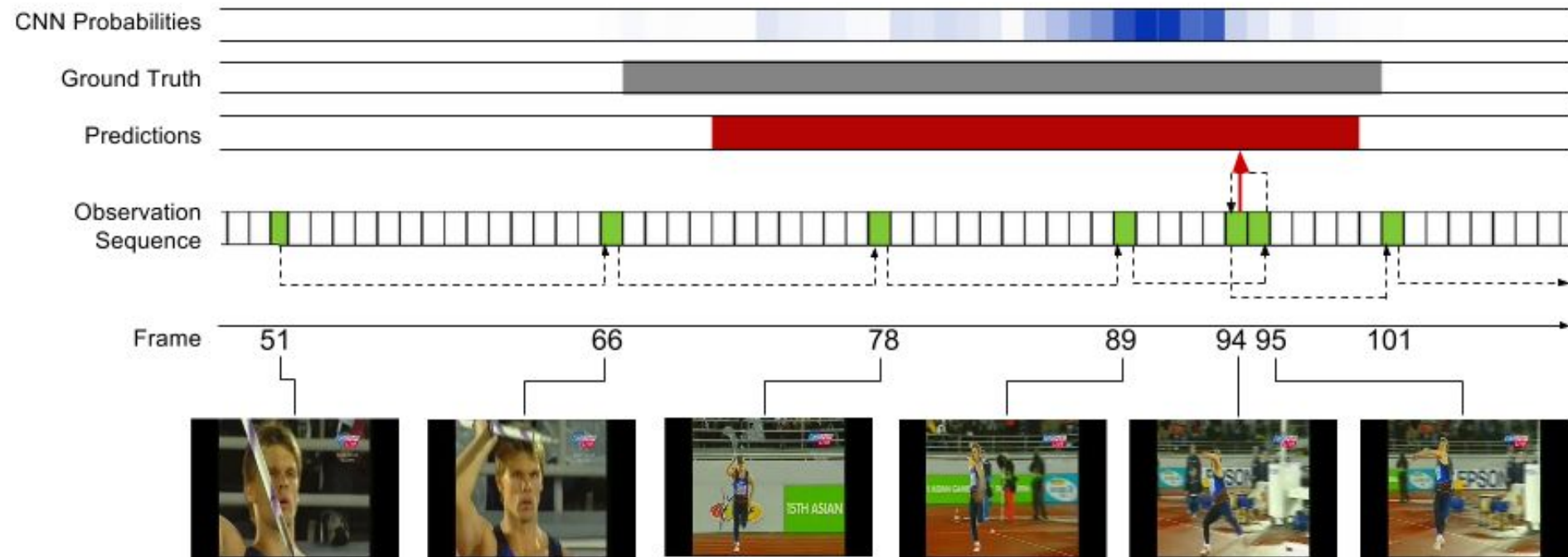
Singh, Bharat, Tim K. Marks, Michael Jones, Oncel Tuzel, and Ming Shao. ["A multi-stream bi-directional recurrent neural network for fine-grained action detection."](#) CVPR 2016

Action Detection: Reinforcement Learning



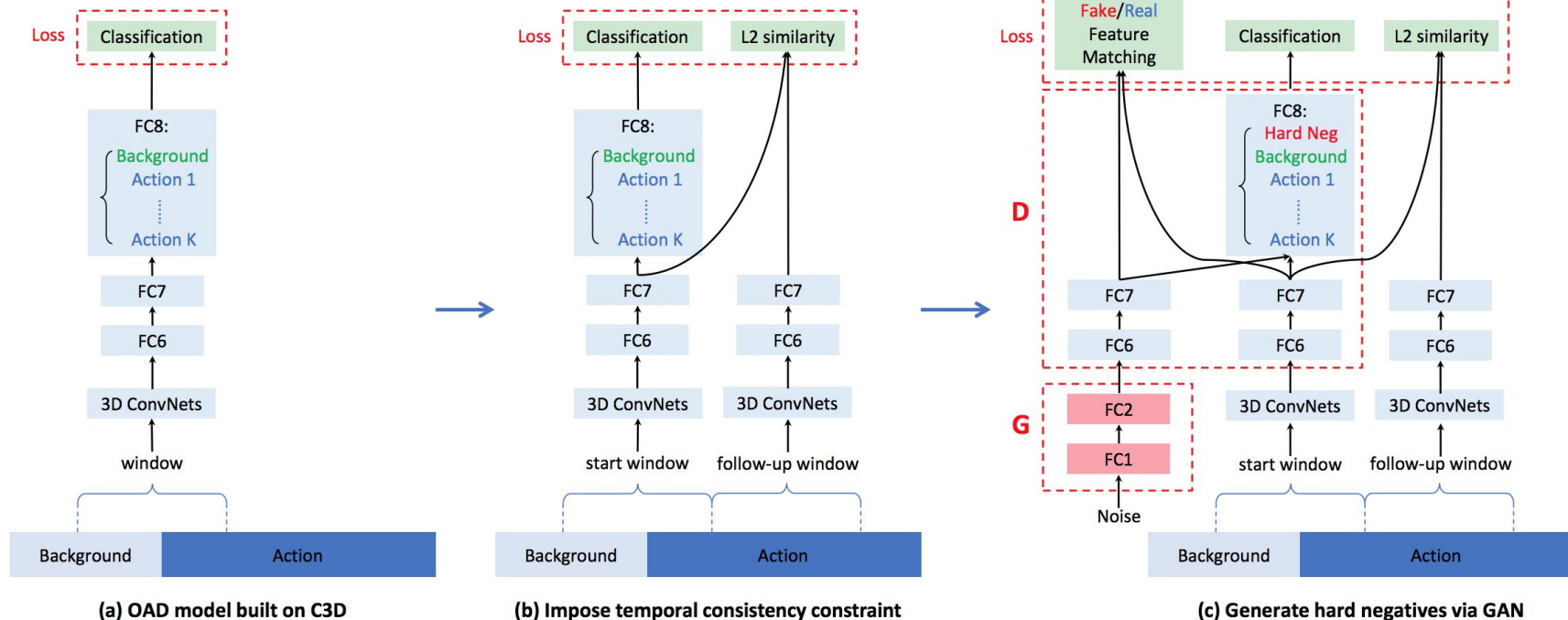
Yeung, Serena, Olga Russakovsky, Greg Mori, and Li Fei-Fei. ["End-to-end Learning of Action Detection from Frame Glimpses in Videos."](#) CVPR 2016

Action Detection: Reinforcement Learning



Yeung, Serena, Olga Russakovsky, Greg Mori, and Li Fei-Fei. ["End-to-end Learning of Action Detection from Frame Glimpses in Videos."](#) CVPR 2016

Action Detection: Online



Shou, Zheng, Junting Pan, Jonathan Chan, Kazuyuki Miyazawa, Hassan Mansour, Anthony Vetro, Xavier Giro-i-Nieto, and Shih-Fu Chang. ["Online Action Detection in Untrimmed, Streaming Videos-Modeling and Evaluation."](#) arXiv preprint arXiv:1802.06822 (2018).

Deep Learning online courses by UPC:

DEEP LEARNING FOR ARTIFICIAL INTELLIGENCE

videos will be online

Master Course UPC ETSETB TelecomBCN Barcelona. Autumn 2017.



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+ info: <http://dlai.deeplearning.barcelona>

DEEP LEARNING FOR COMPUTER VISION

Summer School at UPC TelecomBCN Barcelona. ?? June 2018.



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+ info: <http://bit.ly/dlcv2018>

DEEP LEARNING FOR SPEECH AND LANGUAGE

Winter School at UPC TelecomBCN Barcelona. 24-30 January 2018.



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+ info: <https://telecombcn-dl.github.io/2018-dsl/>

- [MSc course](#) (2017)
- [BSc course](#) (2018)

- [1st edition](#) (2016)
- [2nd edition](#) (2017)
- [3rd edition](#) (2018)

- [1st edition](#) (2017)
- [2nd edition](#) (2018)

Next edition Autumn 2018

Summer School (late June 2018)

Next edition Winter/Spring 2019