

## Chapter 8: The Madness (2013-)

He sat on a chair.

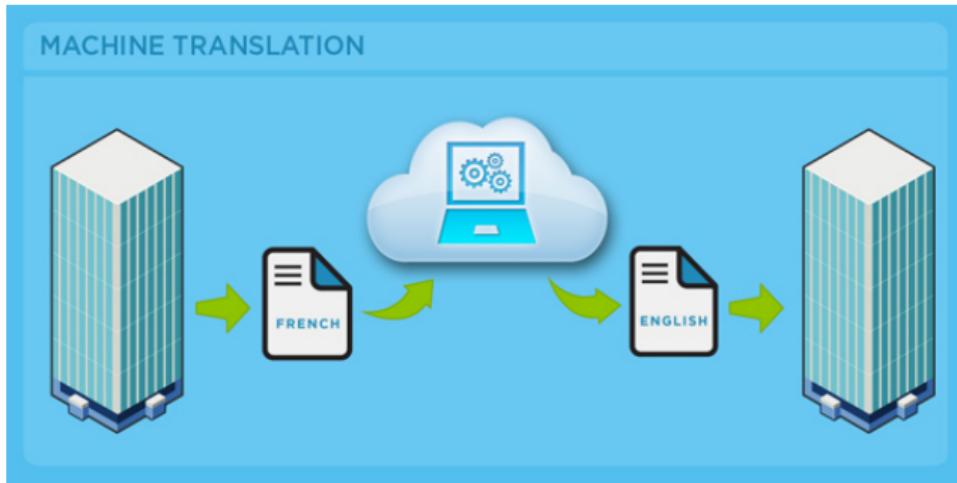
## Language Modeling

- Mikolov et al. (2010)<sup>[1]</sup>
- Li et al. (2015)
- Kiros et al. (2015)<sup>[2]</sup>
- Kim et al. (2015)<sup>[3]</sup>



## Speech Recognition

- Hinton et al. (2012)<sup>[4]</sup>
- Graves et al. (2013)<sup>[5]</sup>
- Chorowski et al. (2015)<sup>[6]</sup>
- Sak et al. (2015)<sup>[7]</sup>



## Machine Translation

- Kalchbrenner et al. (2013)<sup>[8]</sup>
- Cho et al. (2014)<sup>[9]</sup>
- Bahdanau et al. (2015)<sup>[10]</sup>
- Jean et al. (2015)<sup>[11]</sup>
- Gulcehre et al. (2015)<sup>[12]</sup>
- Sutskever et al. (2014)<sup>[13]</sup>
- Luong et al. (2015)<sup>[14]</sup>
- Zheng et al. (2017)<sup>[15]</sup>
- Cheng et al. (2016)<sup>[16]</sup>
- Chen et al. (2017)<sup>[17]</sup>
- Firat et al. (2016)<sup>[18]</sup>

| Time  | User     | Utterance  |
|-------|----------|--|
| 03:44 | Old      | I dont run graphical ubuntu,<br>I run ubuntu server.                                       |
| 03:45 | kuja     | Taru: Haha sucker.   |
| 03:45 | Taru     | Kuja: ?  |
| 03:45 | bur[n]er | Old: you can use "ps ax"<br>and "kill (PID#)"  |
| 03:45 | kuja     | Taru: Anyways, you made<br>the changes right?  |
| 03:45 | Taru     | Kuja: Yes.   |
| 03:45 | LiveCD   | or killall speedlink   |
| 03:45 | kuja     | Taru: Then from the terminal<br>type: sudo apt-get update                                  |
| 03:46 | _pm      | if i install the beta version,<br>how can i update it when<br>the final version comes out? |
| 03:46 | Taru     | Kuja: I did.   |

| Sender   | Recipient | Utterance  |
|----------|-----------|--|
| Old      |           | I dont run graphical ubuntu,<br>I run ubuntu server. |
| bur[n]er | Old       | you can use "ps ax" and                              |

## Conversation Modeling

- Shang et al. (2015)<sup>[19]</sup>
- Vinyals et al. (2015)<sup>[20]</sup>
- Lowe et al. (2015)<sup>[21]</sup>
- Dodge et al. (2015)<sup>[22]</sup>
- Weston et al. (2016)<sup>[23]</sup>
- Serban et al. (2016)<sup>[24]</sup>
- Bordes et al. (2017)<sup>[25]</sup>
- He et al. (2017)
- Serban et al. (2017)<sup>[26]</sup>
- Lewis et al. (2017)

**Task 1: Single Supporting Fact**

Mary went to the bathroom.  
John moved to the hallway.  
Mary travelled to the office.  
Where is Mary? A:office

**Task 3: Three Supporting Facts**

John picked up the apple.  
John went to the office.  
John went to the kitchen.  
John dropped the apple.  
Where was the apple before the kitchen? A:office

**Task 2: Two Supporting Facts**

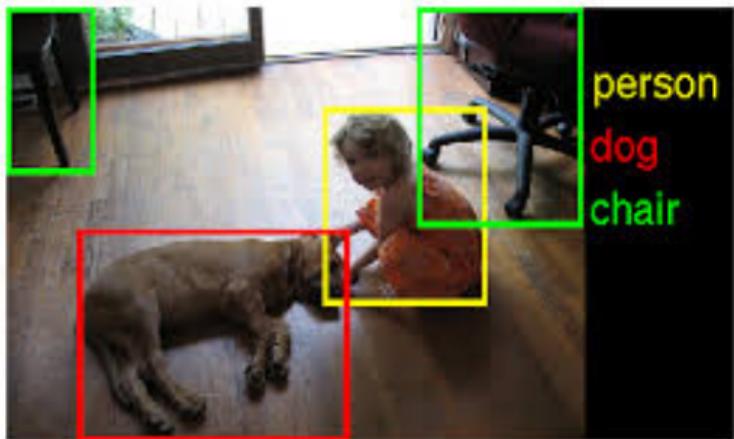
John is in the playground.  
John picked up the football.  
Bob went to the kitchen.  
Where is the football? A:playground

**Task 4: Two Argument Relations**

The office is north of the bedroom.  
The bedroom is north of the bathroom.  
The kitchen is west of the garden.  
What is north of the bedroom? A: office  
What is the bedroom north of? A: bathroom

## Question Answering

- Hermann et al. (2015)<sup>[27]</sup>
- Chen et al. (2016)<sup>[28]</sup>
- Xiong et al. (2016)<sup>[29]</sup>
- Seo et al. (2016)<sup>[30]</sup>
- Dhingra et al. (2017)<sup>[31]</sup>
- Wang et al. (2017)<sup>[32]</sup>
- Hu et al. (2017)<sup>[33]</sup>



## Object Detection/Recognition

- Semantic Segmentation (Long et al., 2015)<sup>[34]</sup>
- Recurrent CNNs (Liang et al., 2015)<sup>[35]</sup>
- Faster RCNN (Ren et al., 2015)<sup>[36]</sup>
- Inside-Outside Net (Bell et al., 2015)<sup>[37]</sup>
- YOLO9000 (Redmon et al., 2016)<sup>[38]</sup>
- R-FCN (Dai et al., 2016)<sup>[39]</sup>
- Mask R-CNN (He et al., 2017)<sup>[40]</sup>
- Video Object segmentation (Caelles et al., 2017)<sup>[41]</sup>



## Visual Tracking

- Zhang et al. (2017)
- Choi et al. (2017)<sup>[42]</sup>
- Yun et al. (2017)<sup>[43]</sup>
- Luo et al. (2017)
- Alahi et al. (2017)<sup>[44]</sup>
- Van et al. (2016)

Retr.

Gen.



1. Top view of the lights of a city at night, with a well-illuminated square in front of a church in the foreground;
2. People on the stairs in front of an illuminated cathedral with two towers at night;

A square with burning street lamps and a street in the foreground;



1. Tourists are sitting at a long table with beer bottles on it in a rather dark restaurant and are raising their bierglaeser;
2. Tourists are sitting at a long table with a white table-cloth in a somewhat dark restaurant;

Tourists are sitting at a long table with a white table cloth and are eating;

## Image Captioning

- Mao et al. (2014)<sup>[45]</sup>
- Mao et al. (2015)<sup>[46]</sup>
- Kiros et al. (2015)<sup>[47]</sup>
- Donahue et al. (2015)<sup>[48]</sup>
- Vinyals et al. (2015)<sup>[49]</sup>
- Karpathy et al. (2015)<sup>[50]</sup>
- Fang et al. (2015)<sup>[51]</sup>
- Chen et al. (2015)<sup>[52]</sup>



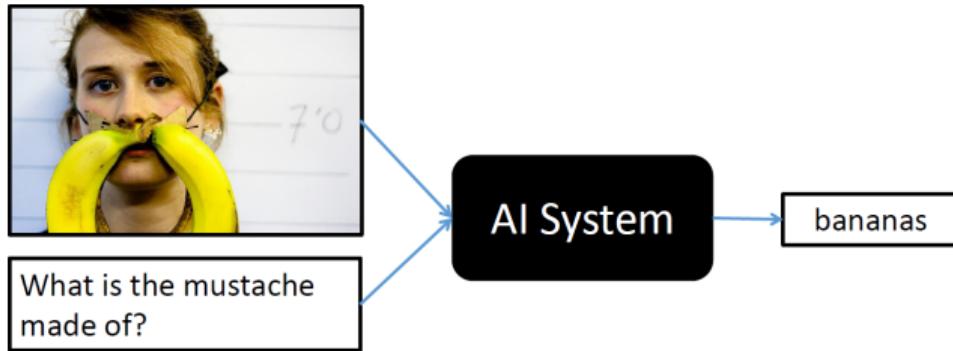
A group of young men playing a game of soccer



A man riding a wave on top of a surfboard.

## Video Captioning

- Donahue et al. (2014)<sup>[53]</sup>
- Venugopalan et al. (2014)<sup>[54]</sup>
- Pan et al. (2015)<sup>[55]</sup>
- Yao et al. (2015)<sup>[56]</sup>
- Rohrbach et al. (2015)<sup>[57]</sup>
- Zhu et al. (2015)<sup>[58]</sup>
- Cho et al. (2015)<sup>[9]</sup>
- S. Sha 2017



## Visual Question Answering

- Santoro et al. (2017)<sup>[59]</sup>
- Hu et al. (2017)<sup>[60]</sup>
- Johnson et al. (2017)<sup>[61]</sup>
- Ben-younes et al. (2017)<sup>[62]</sup>
- Malinowski et al. (2017)<sup>[63]</sup>
- Nam et al. (2016)
- Kazemi et al. (2016)<sup>[64]</sup>

She \_\_\_\_.



(nods)

She opens the \_\_\_\_.



(door)



Question: What is the cat doing? Answer: playing with a tablet

## Video Question Answering

- Tapaswi et. al. 2016<sup>[65]</sup>
- Zeng et. al. 2016<sup>[66]</sup>
- Maharaj et. al. 2017<sup>[67]</sup>
- Zhao et. al. 2017<sup>[68]</sup>
- Yu Youngjae et. al. 2017<sup>[69]</sup>
- Xue Hongyang et. al. 2017<sup>[70]</sup>
- Mazaheri et. al. 2017<sup>[71]</sup>

Input video

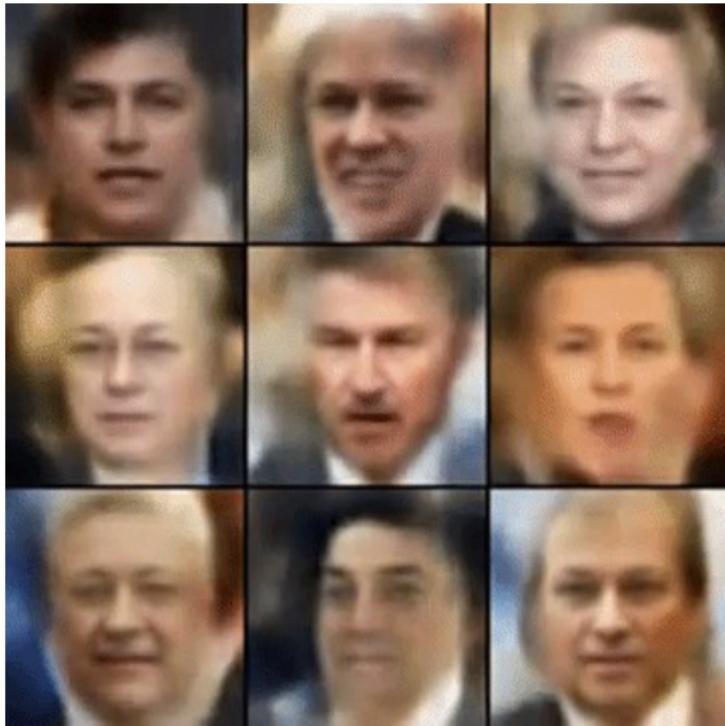


Summary



## Video Summarization

- Chheng 2007<sup>[72]</sup>
- Ajmal 2012<sup>[73]</sup>
- Zhang Ke 2016<sup>[74]</sup>
- Zhong Ji 2017<sup>[75]</sup>
- Panda 2017<sup>[76]</sup>



## Generating Authentic Photos

- Variational Autoencoders (Kingma et. al., 2013)<sup>[77]</sup>
- Generative Adversarial Networks (Goodfellow et. al., 2014)<sup>[78]</sup>
- Plug & Play generative nets (Nguyen et al., 2016)<sup>[79]</sup>
- Progressive Growing of GANs (Karras et al., 2017)<sup>[80]</sup>



## Generating Raw Audio

- Wavenets (Oord et. al., 2016)<sup>[81]</sup>



## Pixel RNNs

- (Oord et al., 2016)<sup>[82]</sup>
- (Oord et al., 2016)<sup>[83]</sup>
- (Salimans et al., 2017)<sup>[84]</sup>

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