Hasso Plattner Institut
IT Systems Engineering | Universität Potsdam

Master Seminar:
Practical Video Analysis

Hasso Plattner Institute
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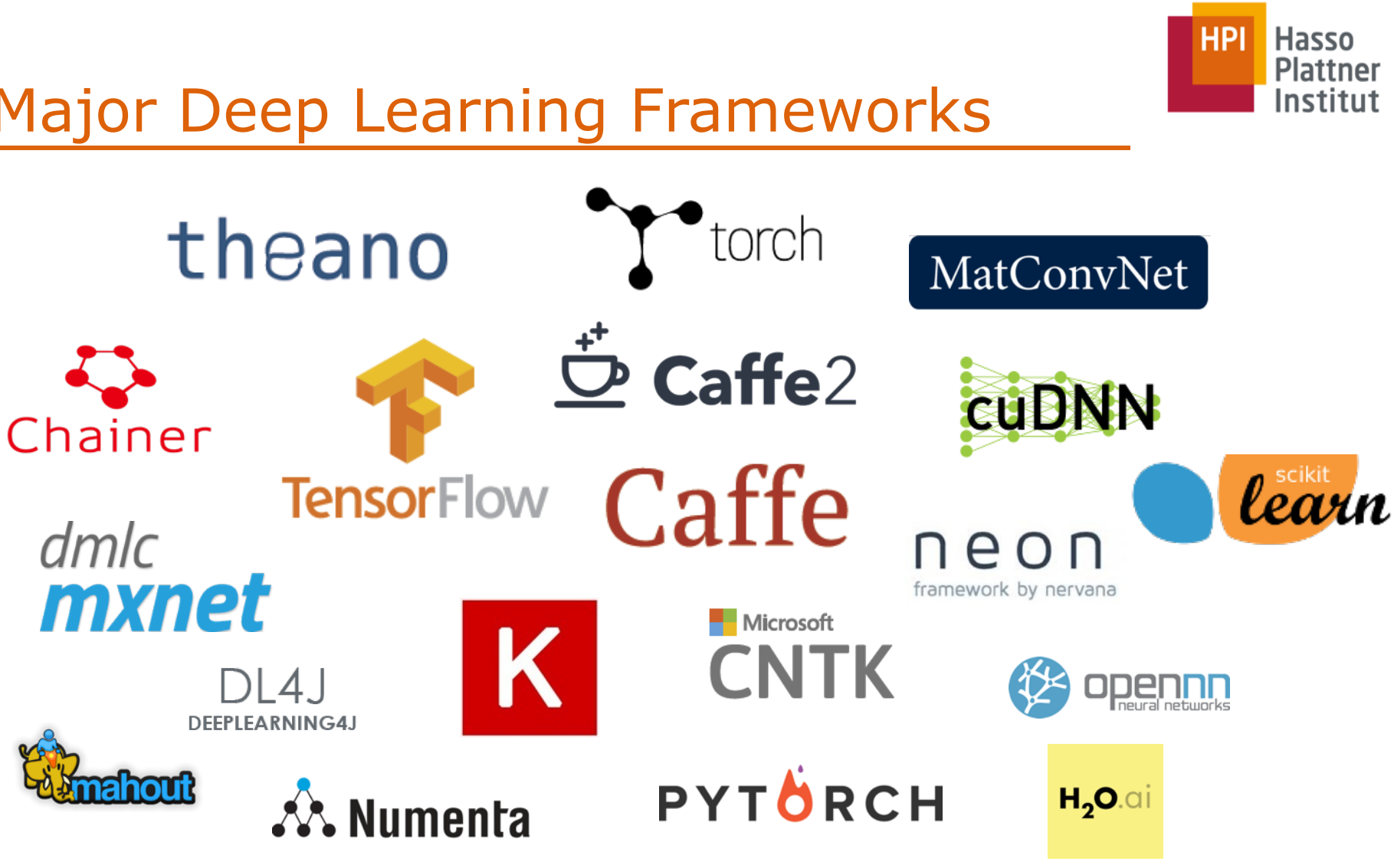
24.04.2017

Major Deep Learning Frameworks



Topic 1: A General LSTM Framework for NLP Applications

Motive:

- NLP develops very fast in recent years with Deep Learning technologies:
  - Machine Translation, Topic Recognition, Sentiment Analysis……

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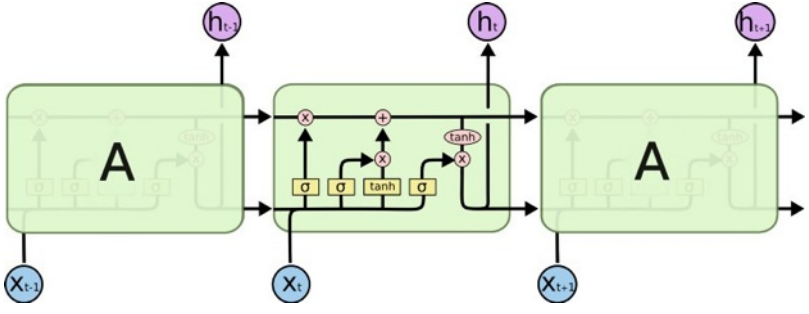

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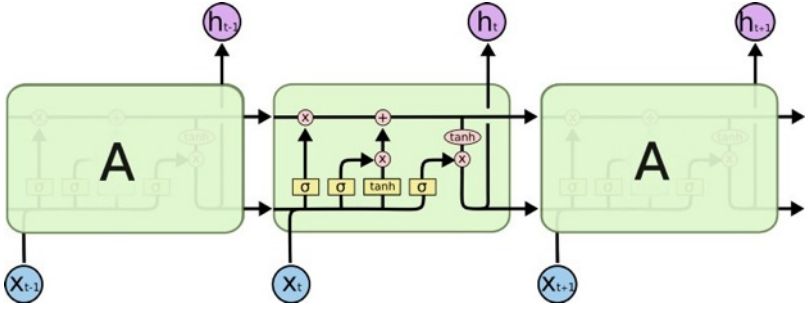

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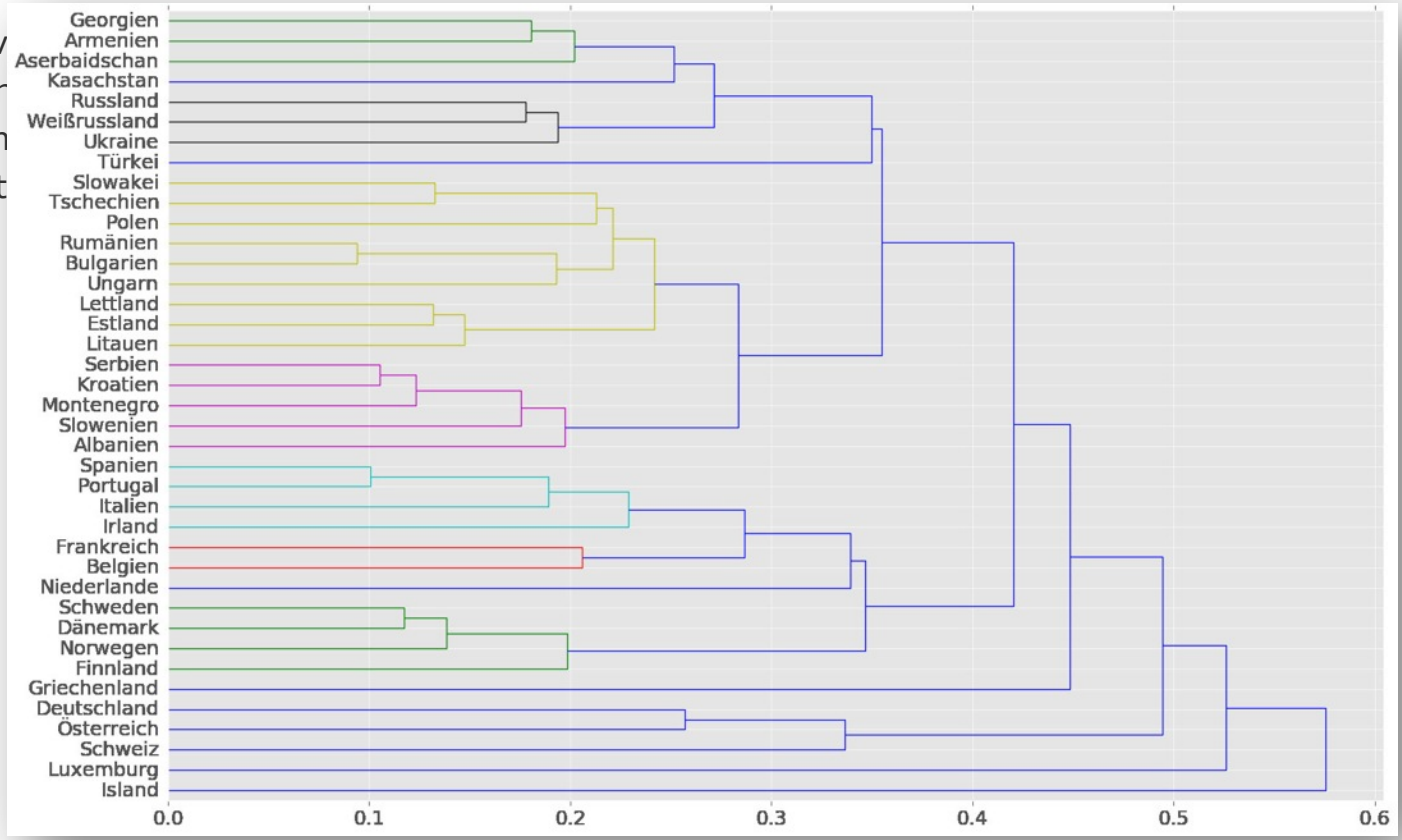

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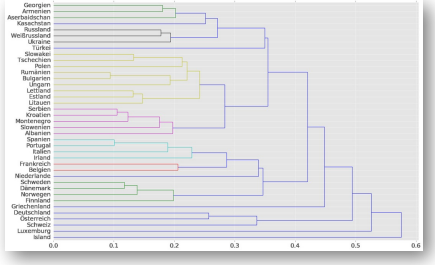

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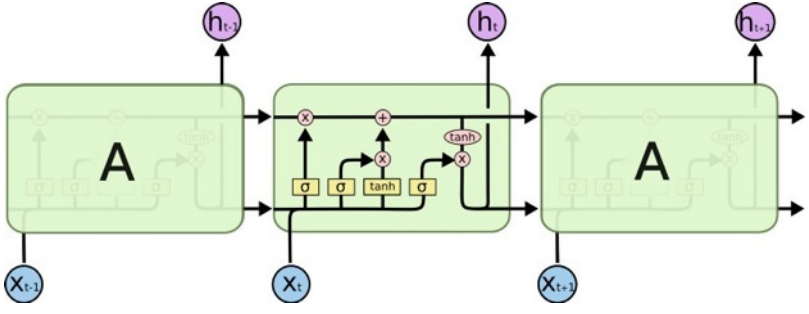
Goal:

- Theory learning: DNN, RNN, LSTM, WV……
- Build multi-layer LSTM network with WV as input feature:
  - Sequence-to-Sequence
  - Sequence-to-Point
- Prototypes with available datasets:
  - MT or MT post-processing
  - Sentiment Analysis



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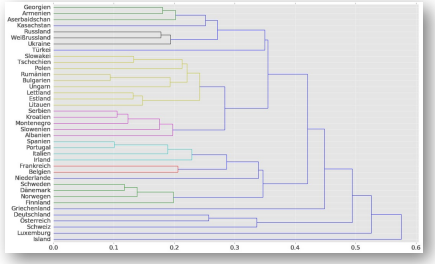

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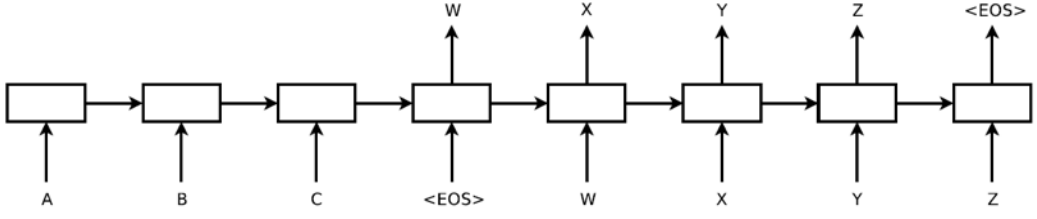
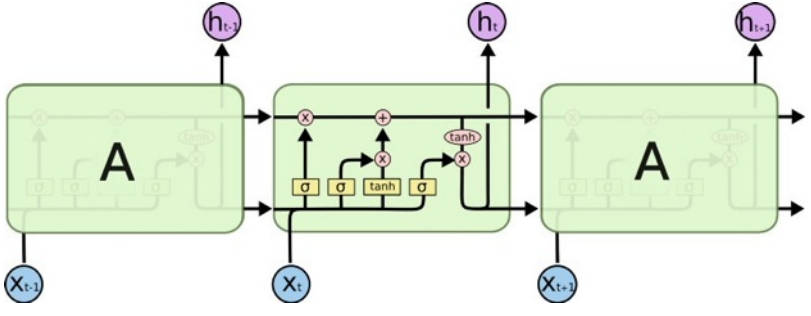




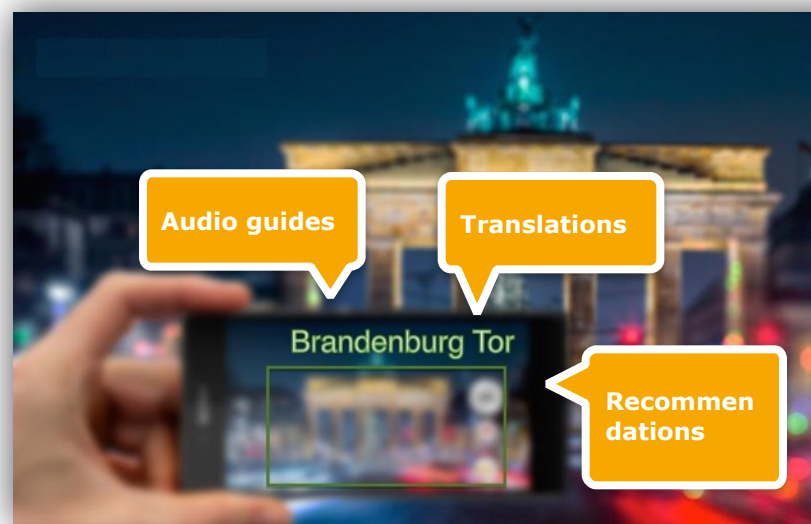
Topic 2: Place Recognizer

Idea:

- Build an App with machine vision features, e.g. place recognition in real-time using a smart phone
- Gather training images from Google maps and flickr
- Create deep model to extract visual features for place recognition
- Recommendations and useful features, z.B. audio guides, translations…
- More ideas from you…

Your participation:

- Develop method to label training data
- Experiment with deep object recognition models
- Deploy deep learning technology to a mobile platform



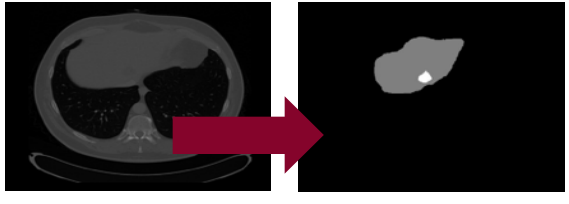
Topic 3: Application based on Adversarial Training for Medical Image Segmentation

Idea:

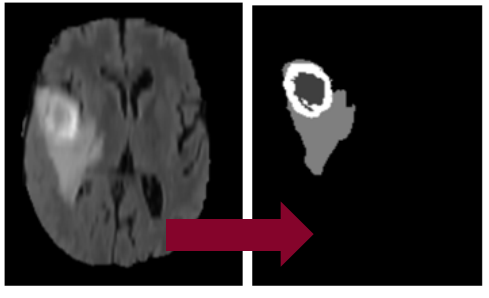
- Automated lesions segmentation is an important clinical diagnostic task and very challenging
- Adversarial networks have opened up many new directions
- We want to put imagery into AI [1]

We offer and expected:

- Liver Tumor Segmentation data set (LITS-Challenges 2017)
- Brain Tumor Segmentation Challenges (BRATS-Challenge 2017)
- An online segmentation application



LITS-dataset



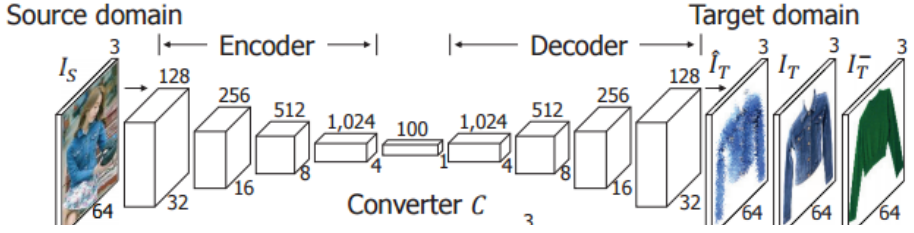
BRATS-dataset

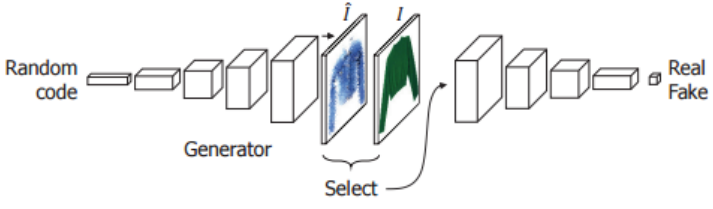
Topic 3: Adversarial Training for Medical Image Segmentation

Solution:

[1] Pixel Domain Transformation

[2] Generative Adverserial Nets





[1] D Yoo, N Kim, S Park, AS Paek, IS Kweon – ECCV 2016

[2] I Goodfellow, J Pouget-Abadie, M Mirza, B Xu- NIPS 2014

Tools and Hardware

- Caffe/Caffe2: deep Learning framework by Berkeley vision lab/Facebook AI
- MXNET: a flexible framework of neural networks
- Google's TensorFlow
- CNNdroid: open source library for GPU-accelerated execution of trained deep convolutional neural networks on Android
- Chair's GPU Server

Leistungserfassung

- The final evaluation will be based on:
  - Initial implementation / idea presentation, 10% (29.05.2017)
  - Final presentation, 20% (24.07.2017)
  - Report/Documentation, 12-18 pages (single column), 30% (bis 15.08.2017)
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Thank you for your Attention!