Deep Learning - 2019

Mini Projects

Prof. Avishek Anand

Project Logistics

- Mini-Projects (25% of the total credit)
  - Work in groups of 2-4
  - Discuss progress with the tutors in the exercise sessions
  - Submit a writeup (Sample latex code will be provided)

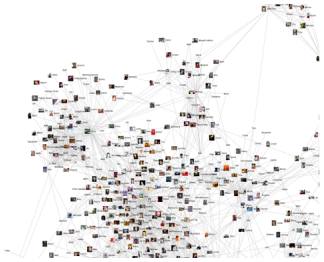
- Important Dates
  - **May 7** -- Topics introduced
    - May 10 – Formal description of Projects
  - **May 14** – Propose Team and vote for project area
  - **May 21** – Teams and Topics Finalized
  - **July 15** – Submission of Report + Code (Anywhere on Earth Time)

- Each team will be assigned a Mentor TA

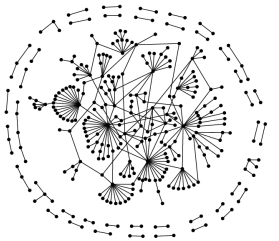
Deep Learning in Networks

Classical ML tasks in networks:

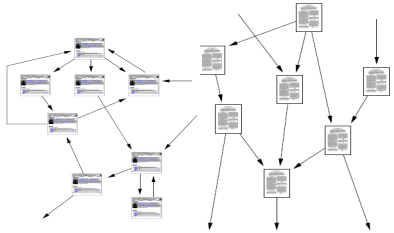
- Node classification
  - Predict a type of a given node
- Link prediction
  - Predict whether two nodes are linked
- Community detection
  - Identify densely linked clusters of nodes
- Network similarity
  - How similar are two (sub)networks



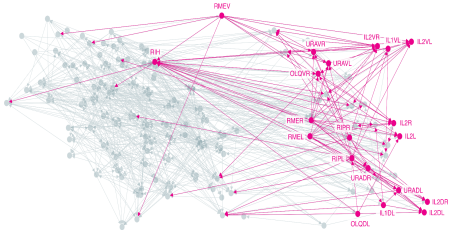
Social networks



Biomedical networks



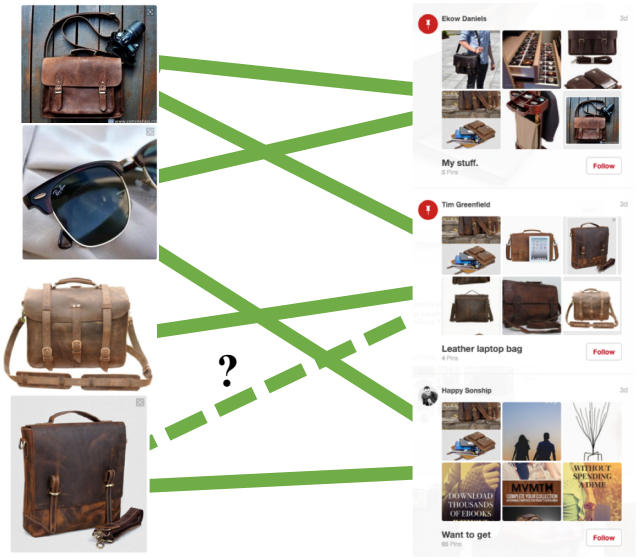
Information networks:
Web & citations



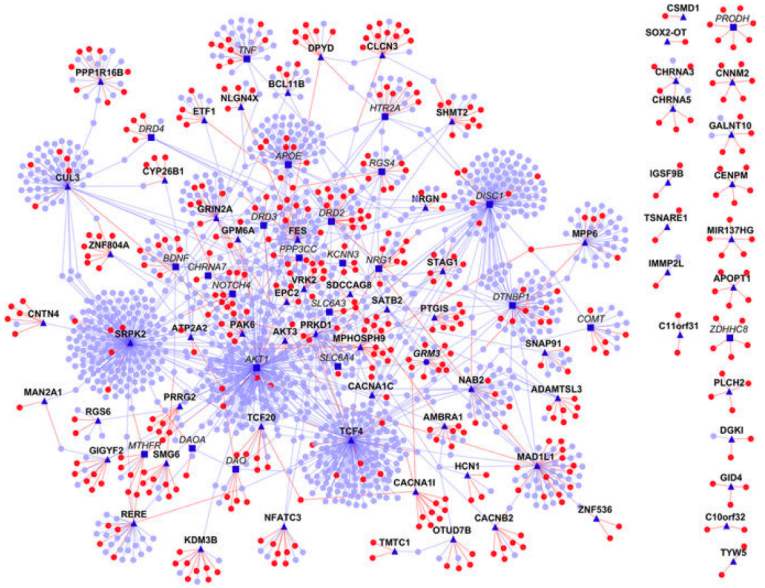
Networks of neurons

Deep Learning in Networks

Content recommendation is link prediction!

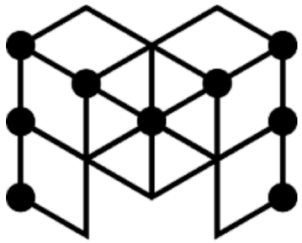


Classifying the function of proteins in the interactome!



Deep Learning for Question Answering

- Given a Question (to a search Engine) find the document that contains the answer.
  - Open Domain question answering



MS MARCO

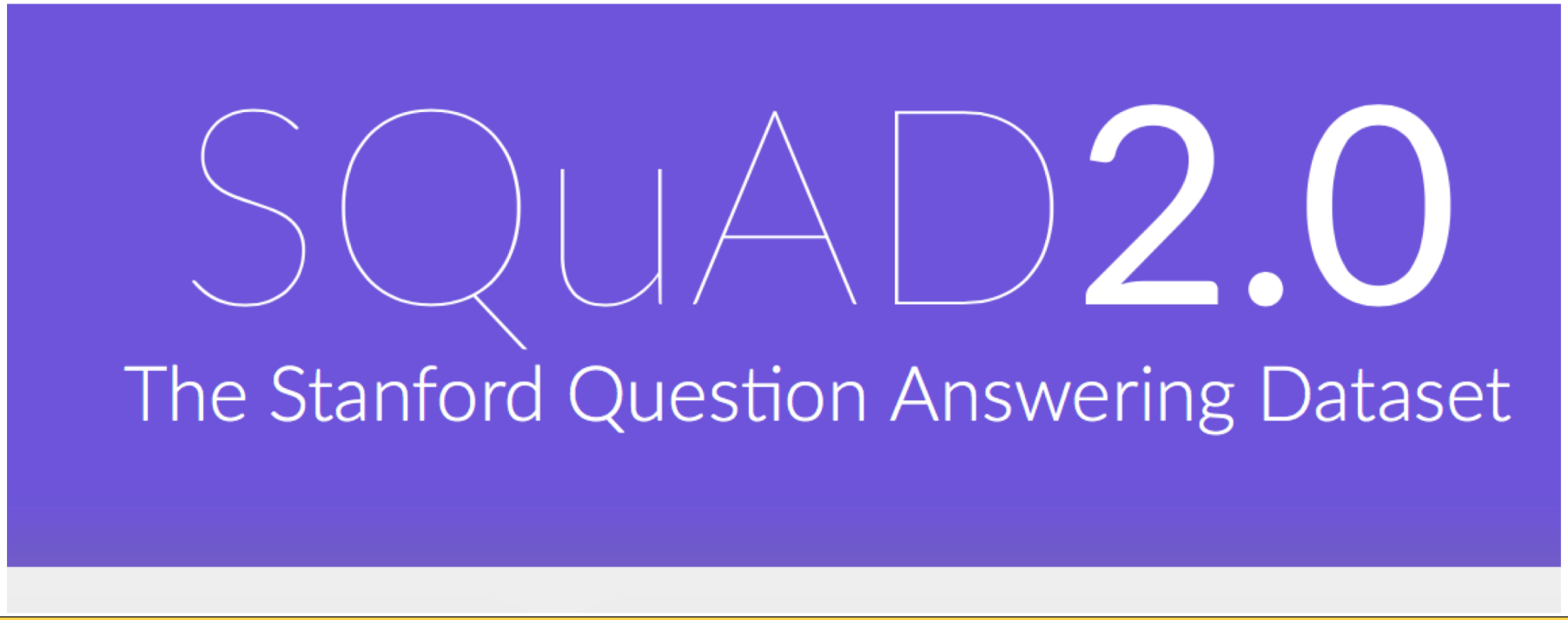
Microsoft MAchine Reading COmprehension Dataset

Follow MSMarcoAI

1,010,916 Real Bing User Queries	182,669 Natural Language Answers	No Answer Subset	10 Passages Per Query	3,213,835 Full Web Documents

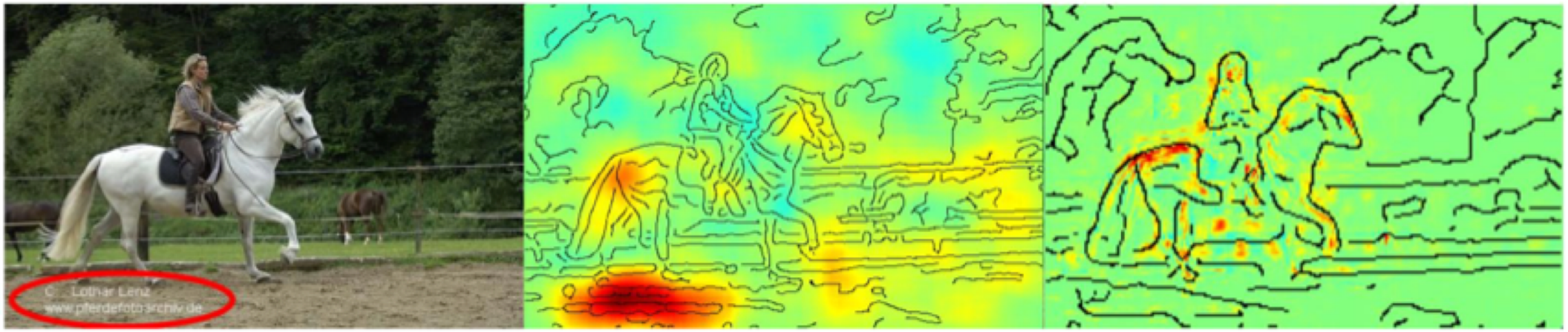
Deep Learning for Question Answering

- Given a Question and a Passage, find the answer in this Passage.
  - Reading Comprehension



Explainable DL Models

- Right for the Right reasons: a machine learning model is accurate and interpretable if
  - Build a DL model that is human understandable
  - Explain why a Deep Learning Model took a certain decision



Deep Learning for Other Tasks (Misc.)

- If you do not like any of the topic areas
- If you have an topic that is well defined –
  - Crisp Task Definition
  - Known existing dataset
  - Well defined evaluation
  - Existing research papers that have worked in it
- Send us a project proposal (1 – 2 pages)
  - Definition of the task
  - Details of the dataset
  - Details of the Evaluation framework
  - List of references that work on it or convincing rationale of why it is important
- Date: May 14