

Introduction to NLP

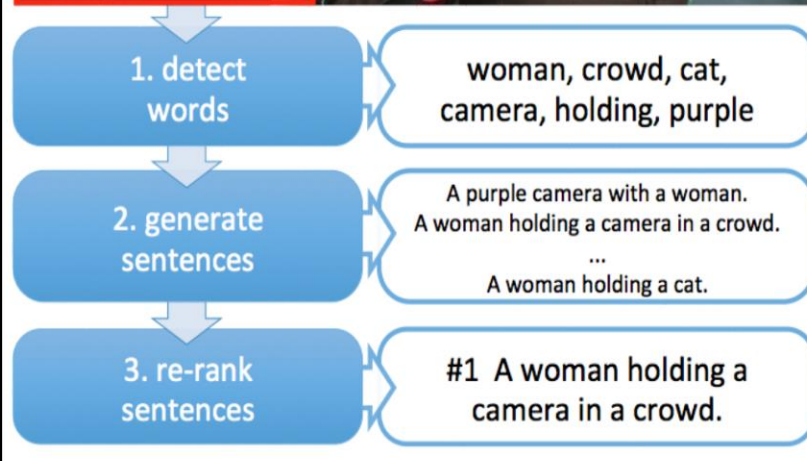
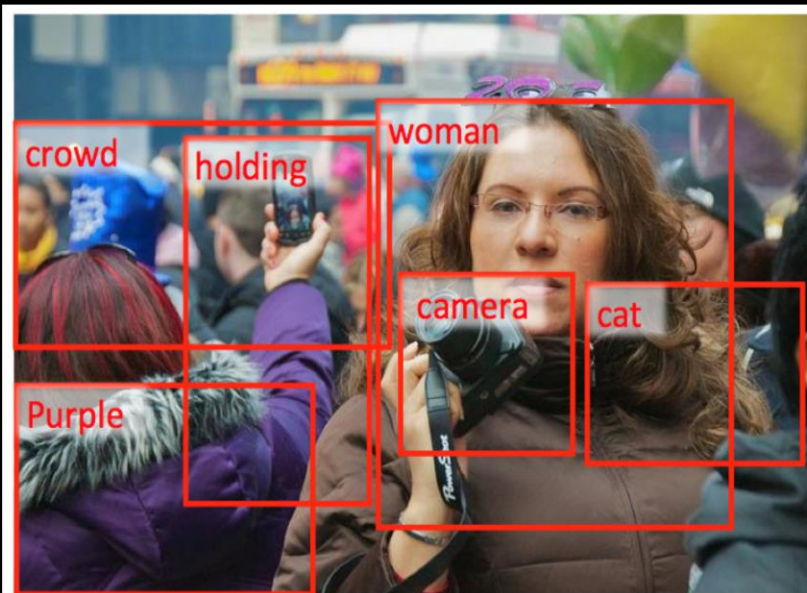
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5 Aug 2016

NLP/ML Everywhere!: Text and Multimedia

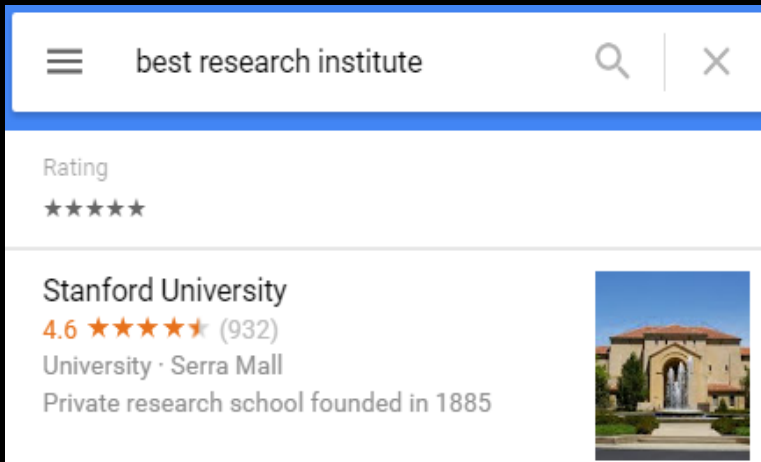
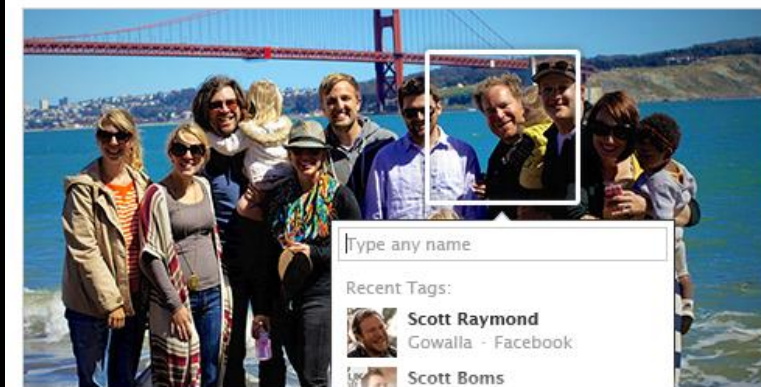
100 funny things to ask S Voice

Google Now won't entertain your humour in the same way as Siri and Cortana, but if you own a Samsung phone or tablet you can chat away with the S Voice personal assistant. Here are 100 funny questions to ask Hi Galaxy.



How Tagging Works

Add tags to share more about the people in your posts.




Business Applications for the enterprise

- Customer feedback and experience
- Brand and reputation management
- Business Intelligence and competitive analysis
- Digital Marketing
- Financial sectors
- Customer Support

Deep Learning and NLP

- Advances in deep learning substantially improve performance for traditional NLP tasks.
 - Usage of NLP applications increase dramatically due to improved quality
- These advances open up new vistas, new categories of application
 - E.g. Treating images and text homogeneously that enables applications like automatic description of images

Trends that accelerate ML/NLP research

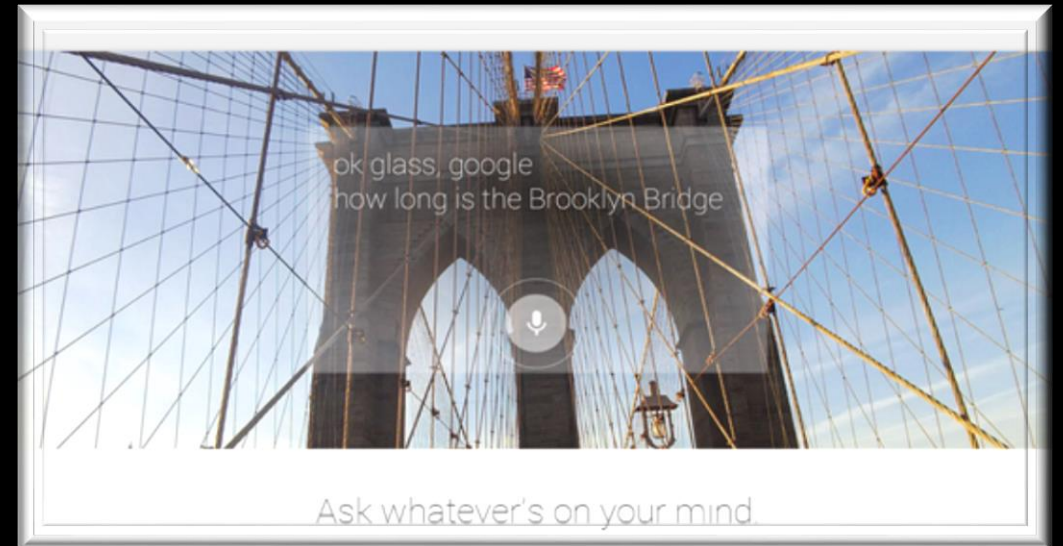
 Syntactic N-grams

Content: These datasets contain counted syntactic ngrams (dependency tree fragments) extracted from the English portion of the Google Books corpus. The datasets are described in the following [publication](#). A more popular description is available [here](#). The dataset format and organization are detailed in the [README](#) file.

Usage: This release is licensed under the terms and conditions of the [Creative Commons Attribution-Non Commercial ShareAlike 3.0 Unported License](#)

Version 20130501

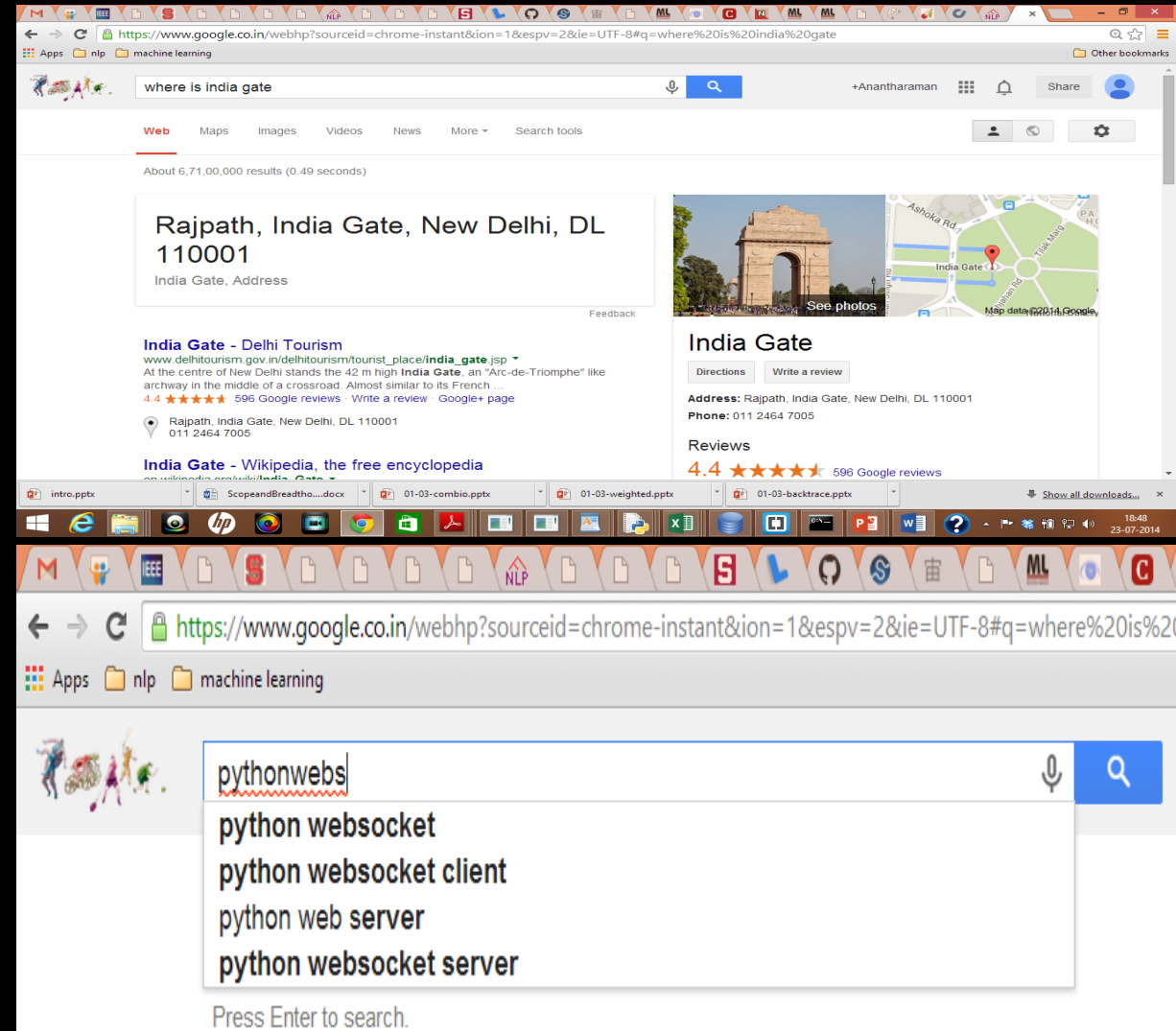
- Availability of web and social data
- Need for natural language based I/O for new devices
- ML techniques: eg deep learning
- Increasing availability of datasets in open web



Some applications of NLP in use today

Products we use everyday

- Google Search Engine
 - Intelligently responding to the query: eg, Where is India Gate?
 - Predicting next word for autocompletion
 - Ability to do spelling corrections
 - Segmenting words that may be joined without space
 - Ranking the search results
- Google translate
- Gmail
 - Eg, Understand contents of an e-mail through NLP and alert the user



Speech/NLP

What technologies are involved here?

- Continuous Speech Recognition
- Natural Language Understanding
- Conversation context modelling
- Natural Language Generation
- Keyword Spotting
- Text to speech generation



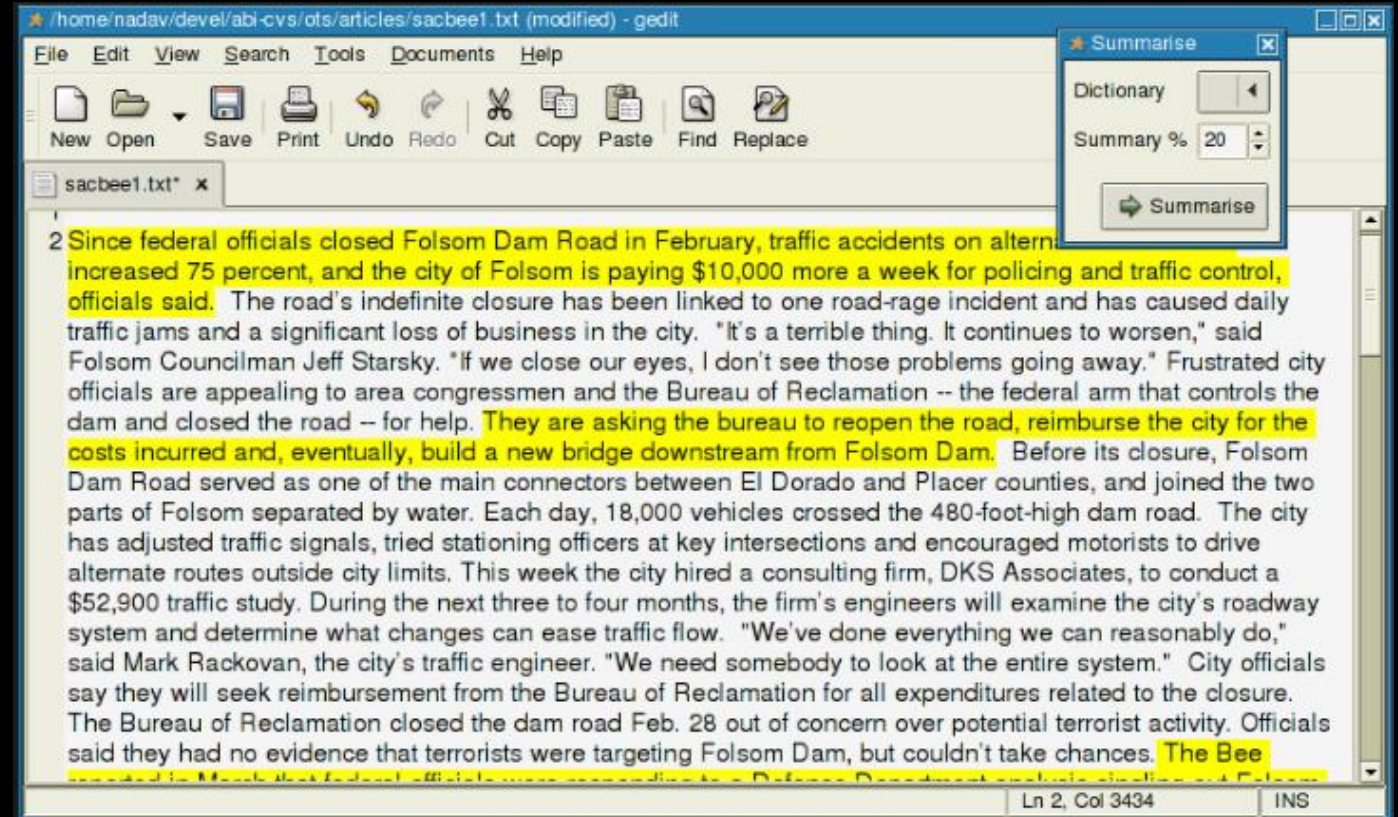
Disambiguation

- Consider an example below.
 - We would like to collect tweets on a subject (Say Rahul Gandhi) and analyse the sentiment
 - We can do a search on Twitter with the Search API with key words: “Rahul Gandhi”
 - This might miss tweets that have only the term Rahul and not Gandhi.
 - If we just search for the search terms: [“Rahul”, “Gandhi”], we may get results that match any Rahul (e.g Rahul Dravid or KL Rahul)
- We can do an **intelligent tweet search** using NLP techniques



Summarization

- The challenge we face is not the lack of information but the overload.
- Summarization is a core technology that can help address information overload
- **Related Problems:**
 - How to validate the quality, correctness of information?
 - Summarizing multimedia
 - How do we summarize social data, where:
 - Data may have less signal, more noise!
 - Data may be biased
 - Data may not be factual
 - Repetitive



Answer Evaluation

- Answer evaluation is a core challenge for online education systems.
- Can the questions be descriptive as well as objective?
- Can there be an automated answer evaluation system that doesn't require peer evaluation?

Intelligent formative assessment with instant feedback: beyond multiple choice


You are handed two rock specimens and you are told that one is an intrusive igneous rock whilst the other is an extrusive igneous rock. How would you know which was the intrusive specimen?

The intrusive rock would have bigger crystals.

Enter answer

Your answer is correct.

The crystals in intrusive igneous rocks are larger than those in extrusive igneous rocks. See Book 2 Activity 5.1. and Section 5.2.1.



☐ If you believe that the computer has marked your answer inaccurately please tick this box and your answer will be reviewed by the course team.

Next question

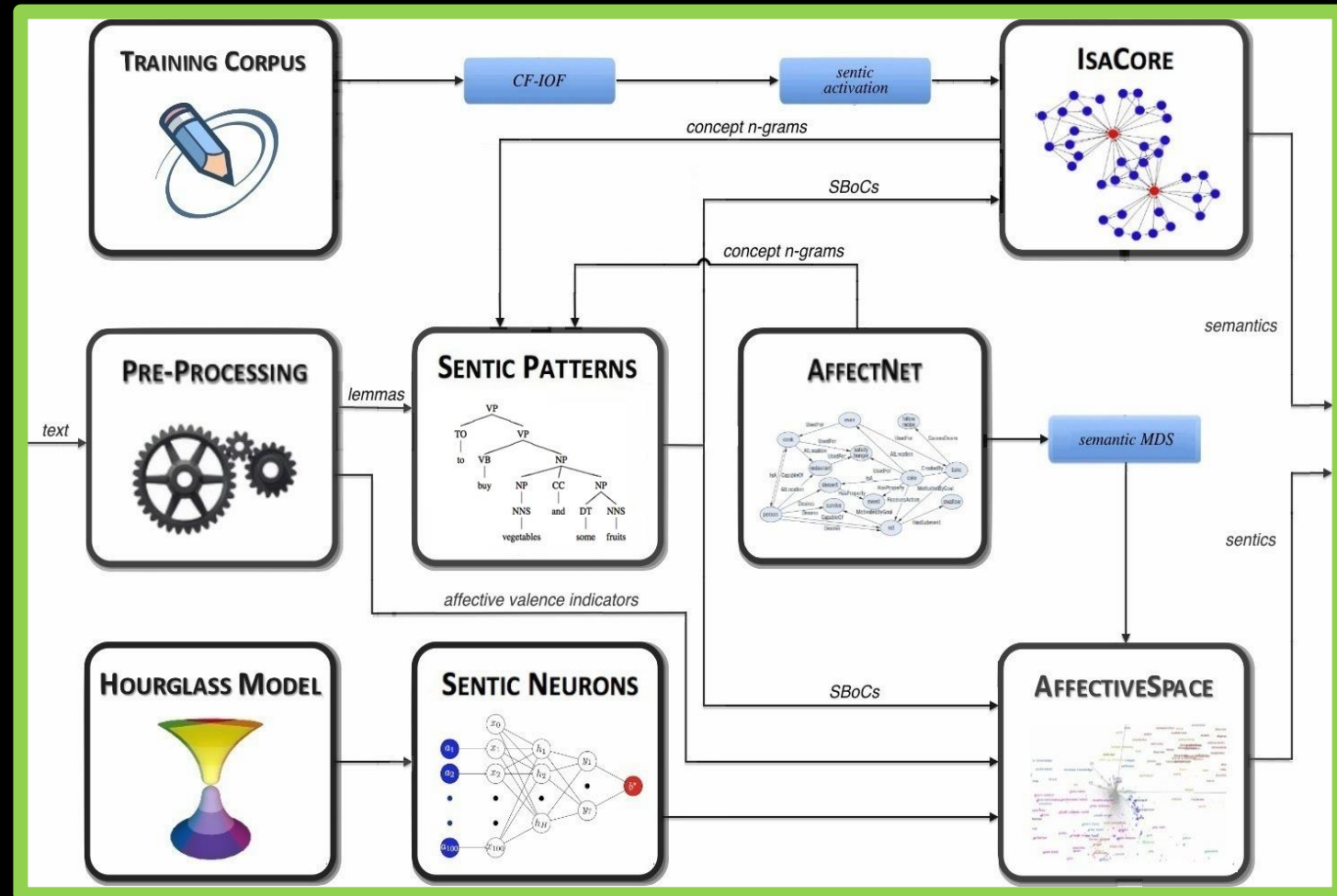
Lead: Phil Butcher

<http://www.sciencedirect.com/science/article/pii/S0360131510000461>

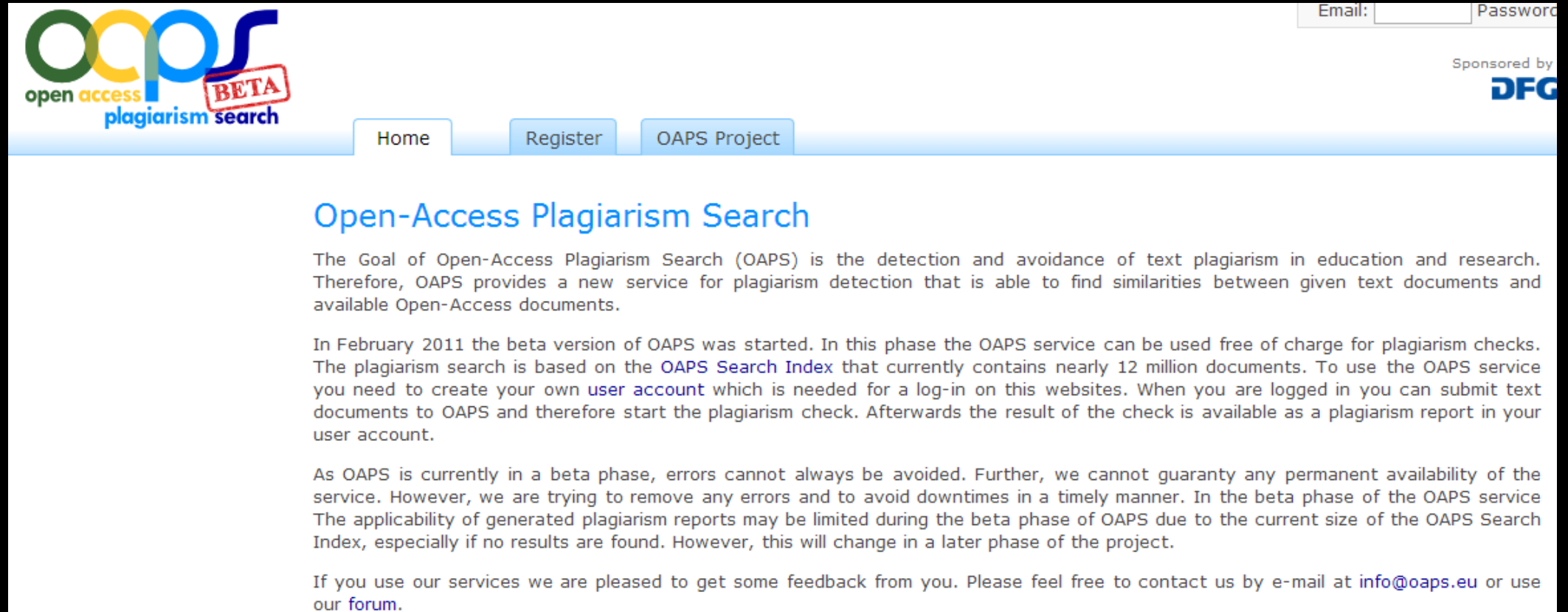
<http://www.open.ac.uk/openmarkexamples>

Sentiment Analysis

- Measurement of pulse of people from social media
- Can measure sentiments against a brand or product or events.
- Crowded space but not a fully solved problem due to inherent challenges in Natural Language Processing
- Can we do better?




Plagiarism Detection



The screenshot shows the homepage of the Open-Access Plagiarism Search (OAPS) website. At the top left is the OAPS logo, which includes the text "open access plagiarism search" and a red "BETA" stamp. To the right of the logo is a navigation bar with three buttons: "Home", "Register", and "OAPS Project". In the top right corner, there are input fields for "Email:" and "Password:". Below the navigation bar, the main heading "Open-Access Plagiarism Search" is displayed in blue. The main content area contains three paragraphs of text. The first paragraph describes the goal of OAPS. The second paragraph details the beta version's features and usage. The third paragraph discusses the limitations of the beta phase. The final line of text provides contact information for feedback.

Email: Password:

Sponsored by 

[Home](#) [Register](#) [OAPS Project](#)

Open-Access Plagiarism Search

The Goal of Open-Access Plagiarism Search (OAPS) is the detection and avoidance of text plagiarism in education and research. Therefore, OAPS provides a new service for plagiarism detection that is able to find similarities between given text documents and available Open-Access documents.

In February 2011 the beta version of OAPS was started. In this phase the OAPS service can be used free of charge for plagiarism checks. The plagiarism search is based on the [OAPS Search Index](#) that currently contains nearly 12 million documents. To use the OAPS service you need to create your own [user account](#) which is needed for a log-in on this websites. When you are logged in you can submit text documents to OAPS and therefore start the plagiarism check. Afterwards the result of the check is available as a plagiarism report in your user account.

As OAPS is currently in a beta phase, errors cannot always be avoided. Further, we cannot guaranty any permanent availability of the service. However, we are trying to remove any errors and to avoid downtimes in a timely manner. In the beta phase of the OAPS service The applicability of generated plagiarism reports may be limited during the beta phase of OAPS due to the current size of the OAPS Search Index, especially if no results are found. However, this will change in a later phase of the project.

If you use our services we are pleased to get some feedback from you. Please feel free to contact us by e-mail at info@oaps.eu or use our [forum](#).

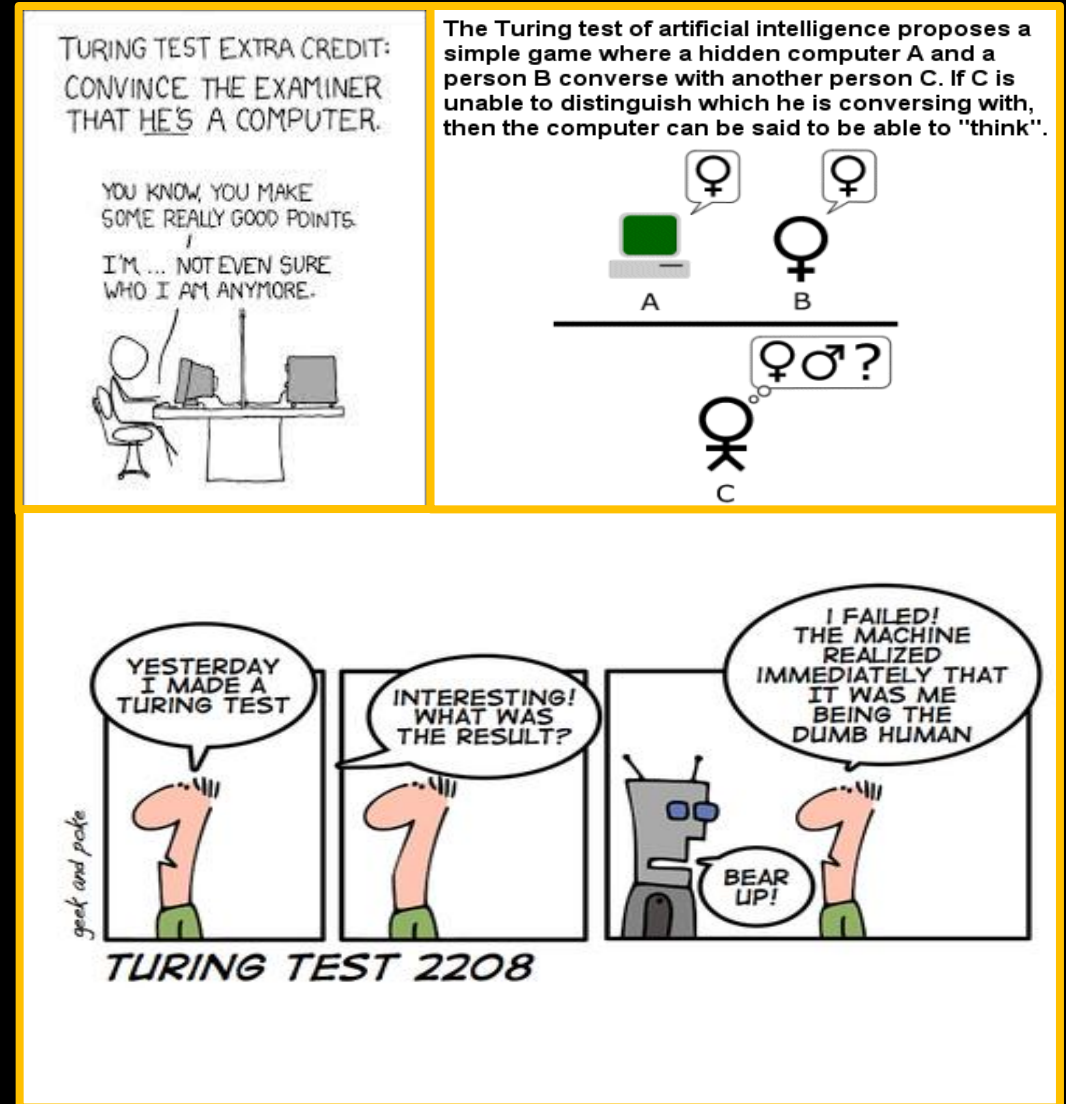
Dialog Systems

- Dialog systems that can be deployed commercially

- Natural Language Processing

- Natural language generation

- Speech Input/Output



Demo (Try yourself)

- <http://www.manifestation.com/neurotoys/eliza.php3>

ELIZA emulates a Rogerian psychotherapist.

ELIZA has almost no intelligence whatsoever, only tricks like string substitution and canned responses based on keywords. Yet when the original ELIZA first appeared in the 60's, some people actually mistook her for human. The illusion of intelligence works best, however, if you limit your conversation to talking about yourself and your life.

This javascript version of ELIZA was originally written by Michal Wallace and significantly enhanced by George Dunlop.

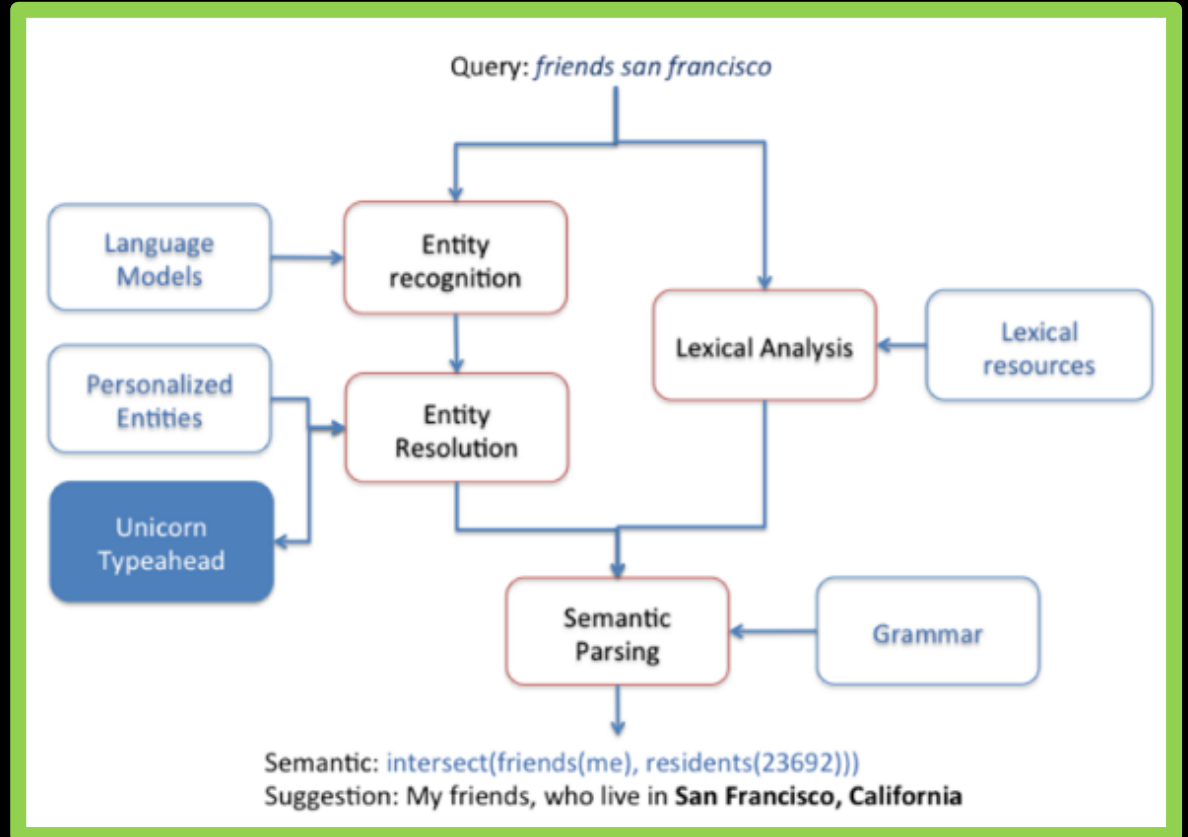
Note: Eliza is dumb! This is common knowledge. Please don't write to me telling me she's dumb, or how to fix it. If you don't like the way she works, you can change the code yourself. Just view source on this page to see the javascript, and save it to your hard drive. Then do a search for javascript documenation, and you should be able to make Eliza act any way you want. :)

Talk to Eliza

```
> Hello, I am Eliza.
```

Case Study: Facebook Graph Search

- Data in Facebook is organized as structured objects (graphs).
- Nodes can be users, pages, places, photos, posts with lots of types of edges.
 - For example, users have gender information, places have addresses, and photos have posting dates
- The richness of data requires a sophisticated search mechanism
 - A simple keyword based search is inadequate, given the variety of data



Our Course Contents and Plan

- Our course would cover the traditional as well as the cutting edge technologies on core NLP and Machine learning techniques
- It is insightful to look at several product case studies (such as Facebook Graph API search or IBM Watson) and map the technologies to product features
 - For instance: From the block diagram of Facebook Search API, we note that they have used Language Modelling, Named Entity Recognition, Lexical Analysis and Semantic Parsing. We will be covering all those topics in great detail.

Summary

- Natural Language Processing is central to many exciting applications that emerge in recent times.
 - E.g. Chatbots, Question Answering Systems, Enterprise applications etc.
- ML/Deep learning techniques hold a lot of promise in developing semantics driven applications.
 - E.g. Distributed Representations
- Our course is intended to address both the traditional algorithmic approach to NLP as well as the modern deep learning based techniques