

Natural Language Processing Applications

CHRISTOPHE SERVAN, PHD

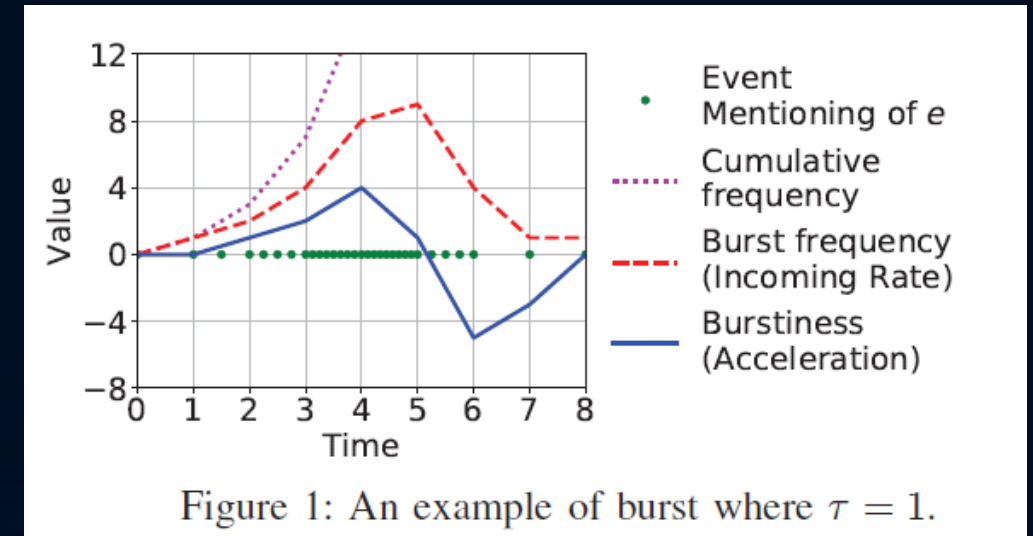
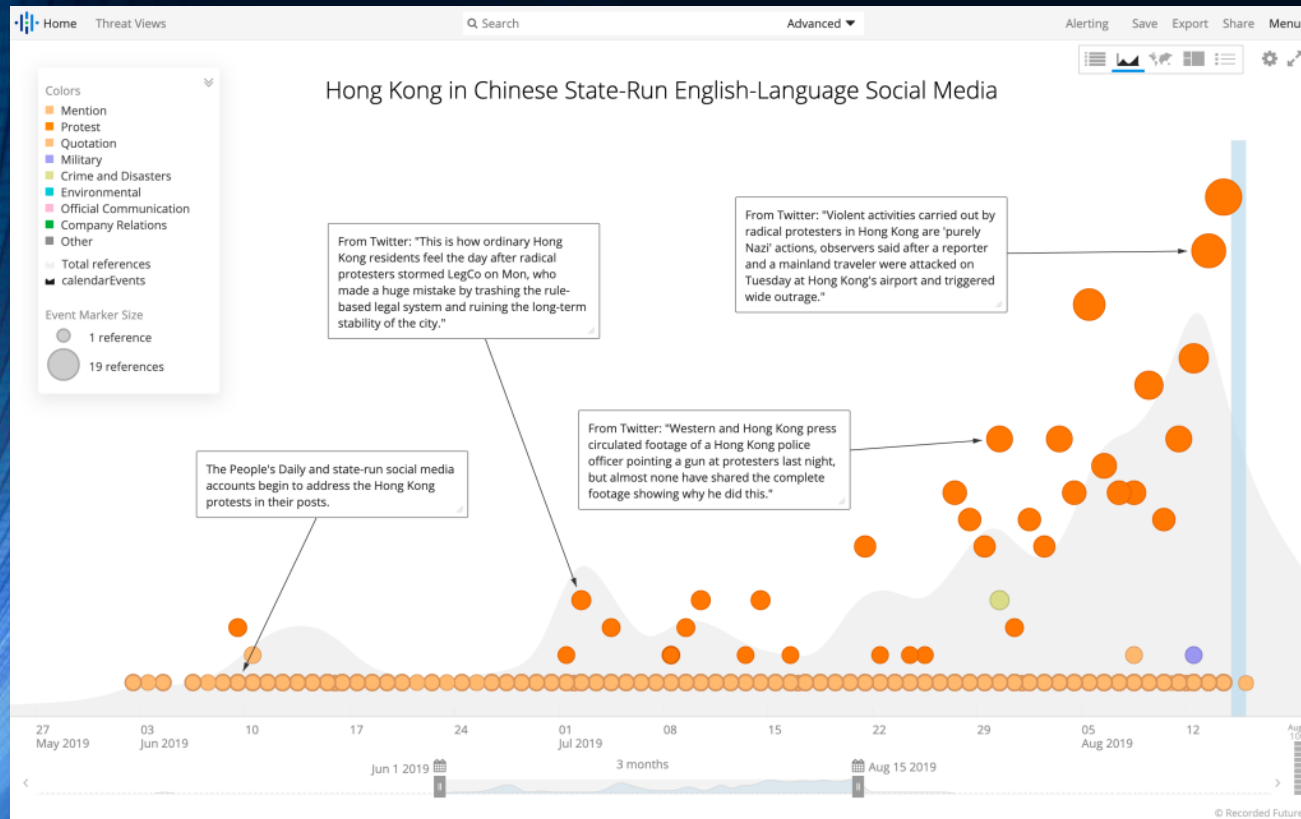
NLP Applications

A short overview of possibilities

- Event analysis
- Biomedical Analysis
- Entity Analysis
- Anonymization
- Ads
- Emails
- KB Construction
- Search Engines
- Question Answering
- Chatbots
- Customer care

Event Analysis

- Information extracted from news can help model and analyse political events.



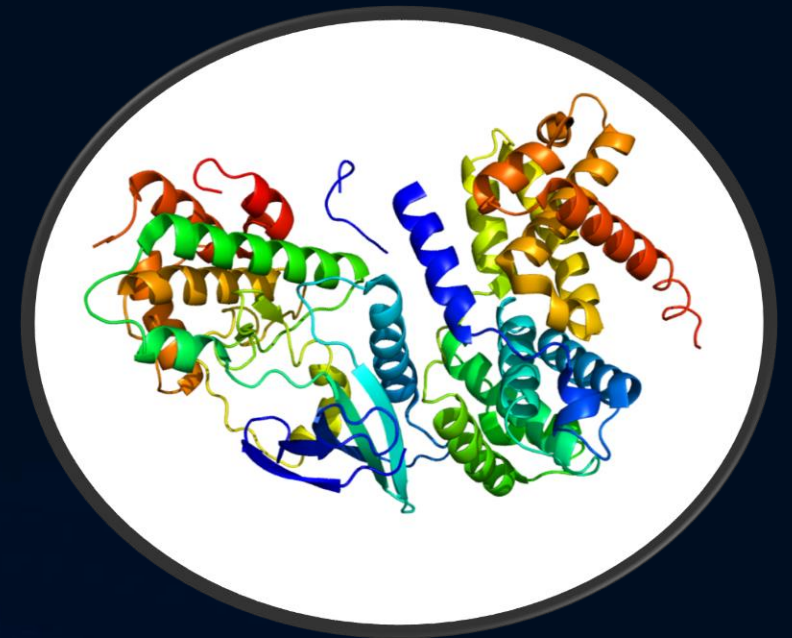
Biomedical Analysis

- Tumor
 - Suppress by protein p53
 - Switch off by kinase protein
- 28 protein targeted in the last 30 years
- IBM system discovered 6 in a month...



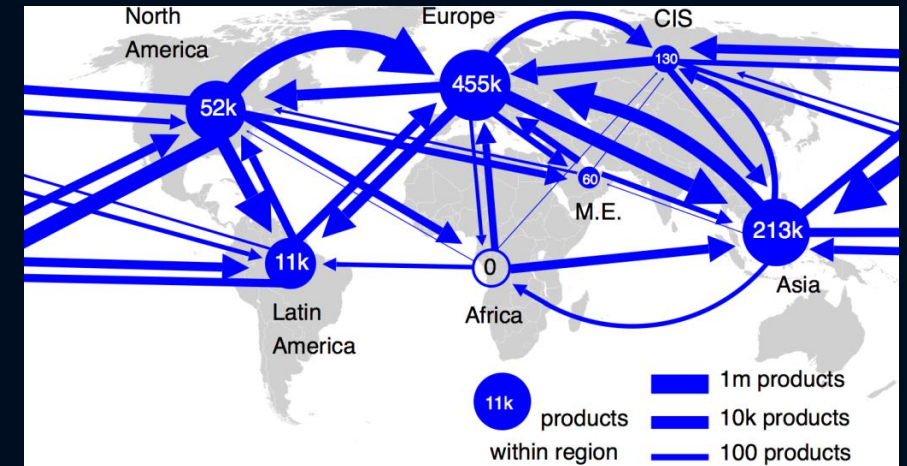
PubMed

PubMed comprises more than 30 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites.



Entity Analysis

- Extracted:
 - 13M email addresses
 - 235K chemical products
 - 1.4M books
 - 1.1M products
- Analysed:
 - Global trade flow
 - Frequent email provider
 - Frequent people names



Talaika et al, 2015: "IBEX: Harvesting Entities from the Web Using Unique Identifiers"

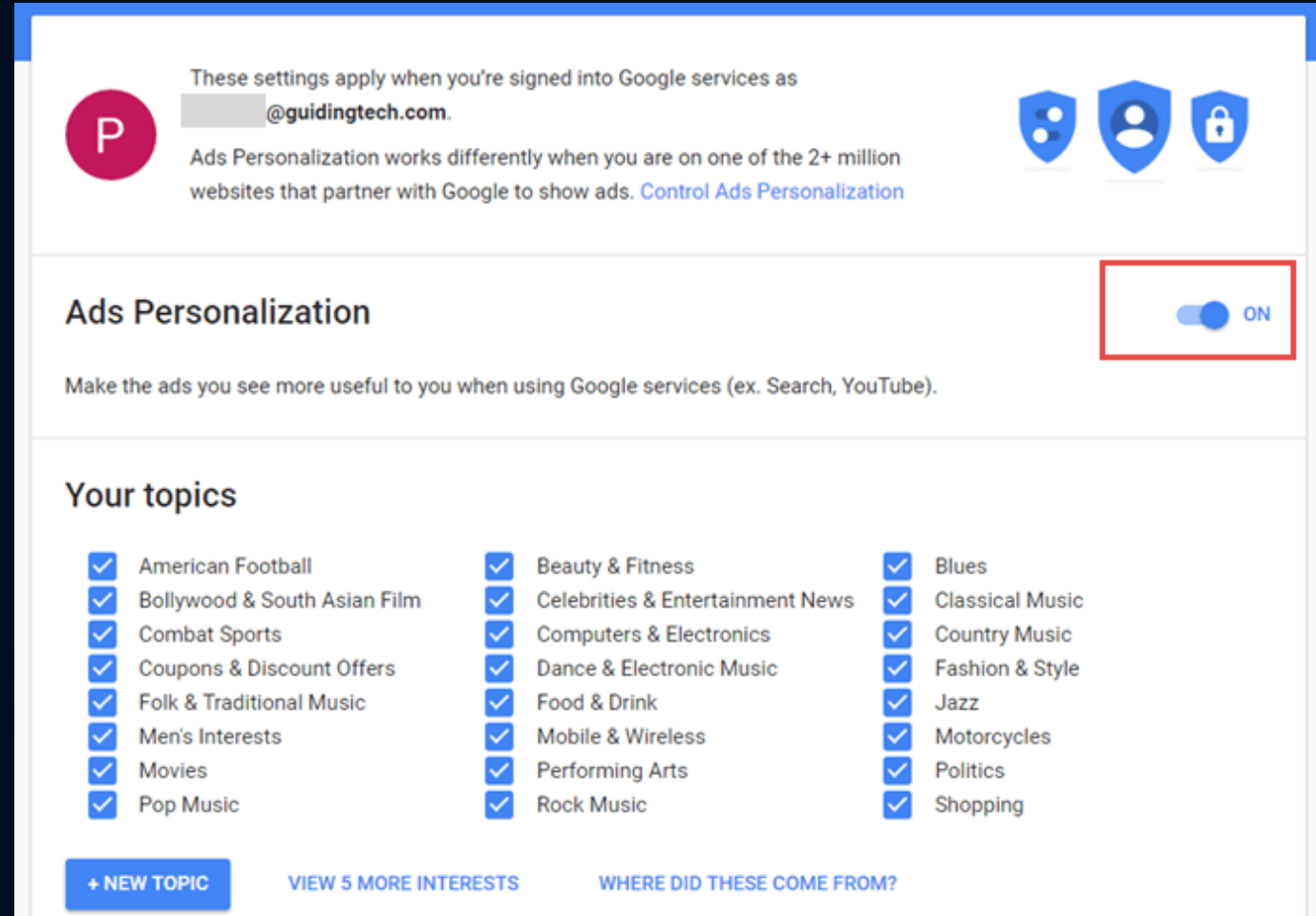
Anonymisation

- Remove personally identifiable information from datasets:
 - NER
 - Pseudonymisation
- Important for:
 - Privacy protections
 - GRPD compliant



Ads

- Personal ads:
 - Adapted to your needs
 - Interesting goods
 - Generate a lot of money
- But:
 - YOU are the product
 - No privacy
 - GDPR problems



This screenshot shows the Google Ads Personalization settings page. At the top, it indicates that settings apply when signed into Google services as **@guidingtech.com**. A red circle highlights the 'P' icon. To the right are three shield icons representing different privacy settings. The main section is titled 'Ads Personalization' and features a toggle switch set to 'ON', which is highlighted by a red rectangle. Below this, a description states: 'Make the ads you see more useful to you when using Google services (ex. Search, YouTube)'. The 'Your topics' section displays a grid of 24 topics, each with a checked checkbox. At the bottom, there are three links: '+ NEW TOPIC', 'VIEW 5 MORE INTERESTS', and 'WHERE DID THESE COME FROM?'.

These settings apply when you're signed into Google services as **@guidingtech.com**.

Ads Personalization works differently when you are on one of the 2+ million websites that partner with Google to show ads. [Control Ads Personalization](#)

Ads Personalization

Make the ads you see more useful to you when using Google services (ex. Search, YouTube).

Your topics

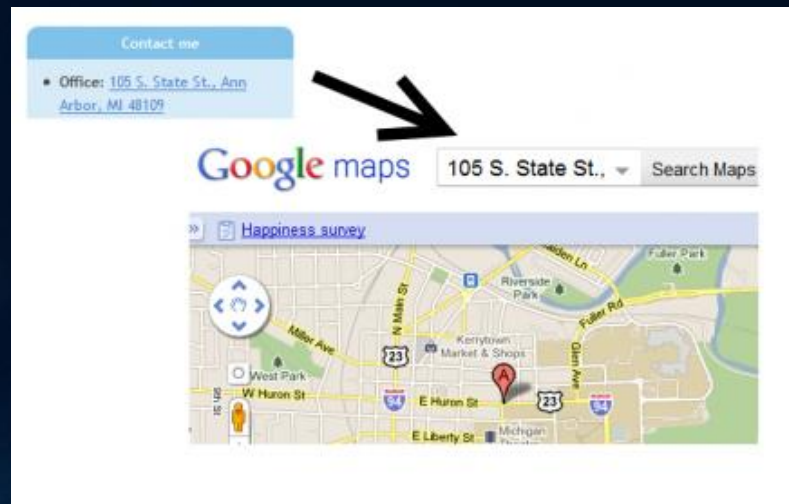
<input checked="" type="checkbox"/> American Football	<input checked="" type="checkbox"/> Beauty & Fitness	<input checked="" type="checkbox"/> Blues
<input checked="" type="checkbox"/> Bollywood & South Asian Film	<input checked="" type="checkbox"/> Celebrities & Entertainment News	<input checked="" type="checkbox"/> Classical Music
<input checked="" type="checkbox"/> Combat Sports	<input checked="" type="checkbox"/> Computers & Electronics	<input checked="" type="checkbox"/> Country Music
<input checked="" type="checkbox"/> Coupons & Discount Offers	<input checked="" type="checkbox"/> Dance & Electronic Music	<input checked="" type="checkbox"/> Fashion & Style
<input checked="" type="checkbox"/> Folk & Traditional Music	<input checked="" type="checkbox"/> Food & Drink	<input checked="" type="checkbox"/> Jazz
<input checked="" type="checkbox"/> Men's Interests	<input checked="" type="checkbox"/> Mobile & Wireless	<input checked="" type="checkbox"/> Motorcycles
<input checked="" type="checkbox"/> Movies	<input checked="" type="checkbox"/> Performing Arts	<input checked="" type="checkbox"/> Politics
<input checked="" type="checkbox"/> Pop Music	<input checked="" type="checkbox"/> Rock Music	<input checked="" type="checkbox"/> Shopping

[+ NEW TOPIC](#) [VIEW 5 MORE INTERESTS](#) [WHERE DID THESE COME FROM?](#)

Emails

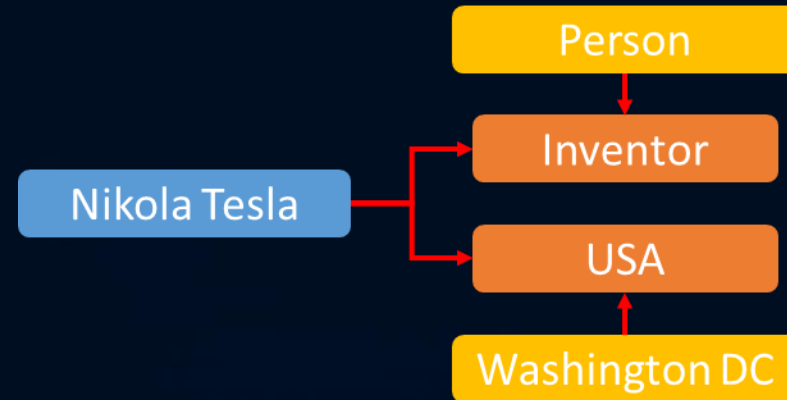
- Analysis of mail content
 - Update contact information
 - Add appointment to your calendar
 - Show it on a map
 - Extract user interest

The screenshot shows a survey creation tool interface. At the top, there are tabs: 'Edit' (highlighted with a red box), 'Send', 'Reports', 'Manage Data', 'Mobile', and 'Integration'. Below these is a 'BASIC' tab (also highlighted with a red box) and an 'ADVANCED' tab. The main area is divided into two columns of question types. In the left column, under 'Multiple Choice', there is a 'Contact Information' option with a person icon, which is highlighted with a red box and has a '+Add' button next to it. In the right column, under 'Text', there is an 'Email Address' option. On the far right, there is a 'Contact Information' form with fields for 'First Name', 'Last Name', 'Phone', and 'Email Address'. At the bottom right of this form is a red 'Add Question' button. Other question types visible include 'Drop-down Menu', 'Graphical Rating' (with options like 'Star Rating', 'Text Slider', 'Push To Social', 'Numeric Slider', 'Thumbs Up/Down', 'Smiley - Rating'), 'Matrix Table' (with options like 'Multi-Point Scales', 'Multi-Select', 'Spreadsheet', 'Side-By-Side Matrix'), and 'Comment Box'.



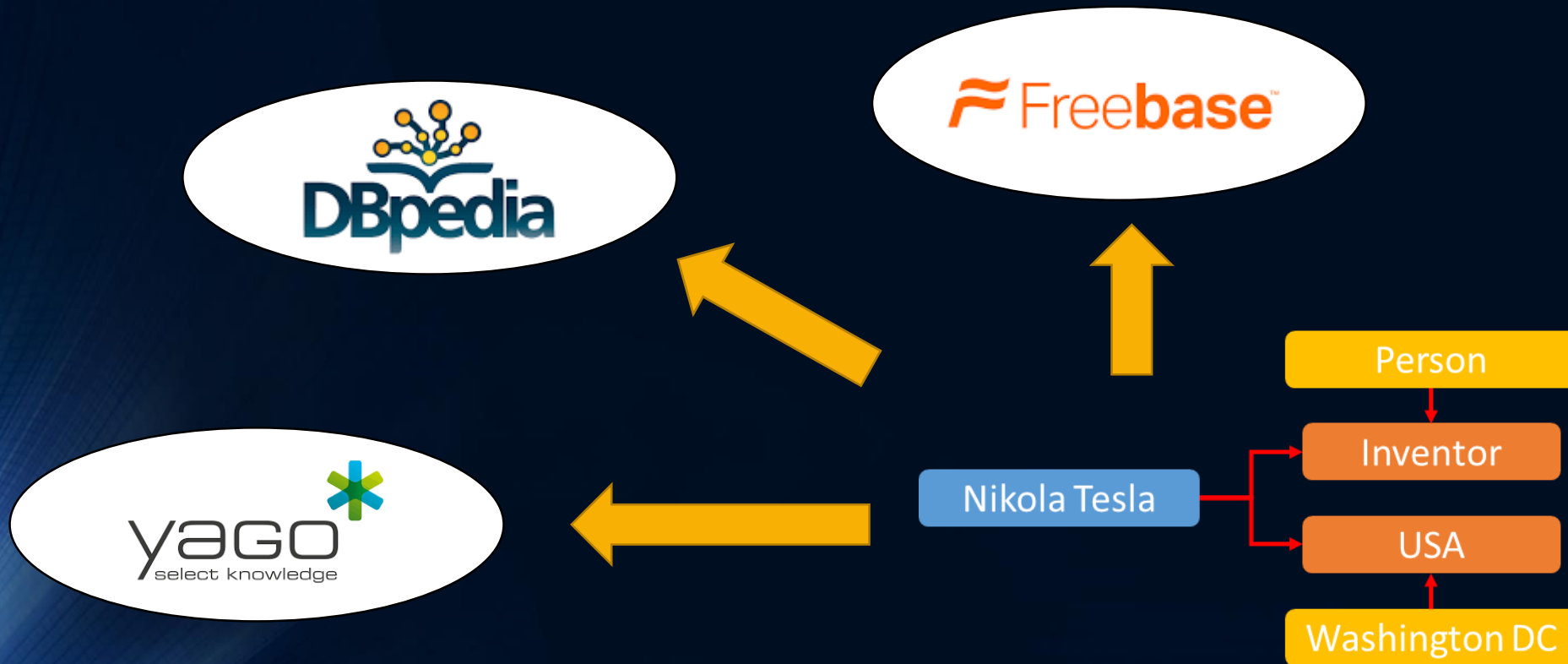
Knowledge base construction

A set of computer-readable data (RDF, SparQL, etc.)



Knowledge base construction

A set of computer-readable data (RDF, SparQL, etc.)



Search Engines

- Query analysis
 - Intention detection
 - Information extraction
 - ...
- Document analysis
 - Topic extraction
 - Classification
 - ...



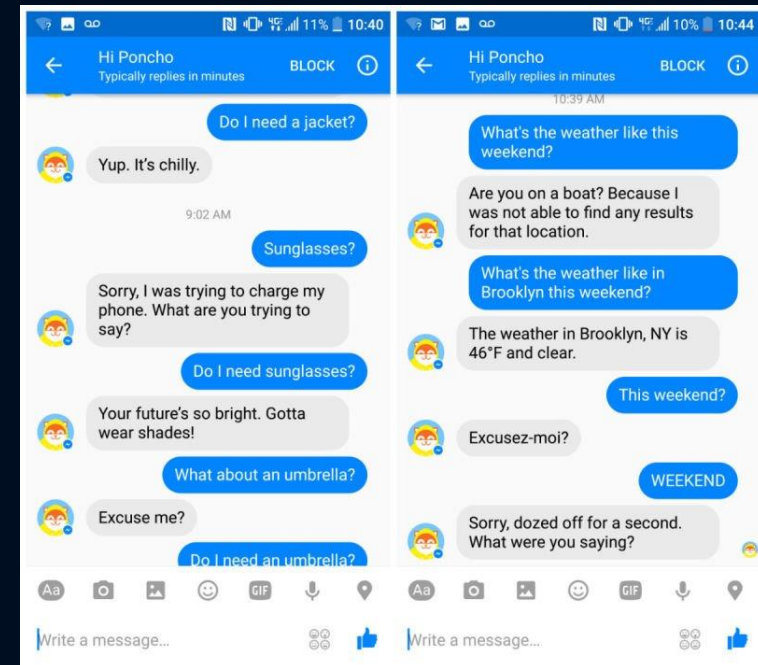
Question Answering

- Jeopardy!
 - Databases
 - Documents
 - Mixed approaches



Chatbots

- Home pods
 - Alexa
 - Google home
 - Siri
 - ...
- Written chatbots



Customer care

Dear customer care,

My Iphone X charging cable is not compatible with my computer.
Can you help me, please?

⇒ Analysis

Product	Part	Problem
Iphone X	Cable	Compatibility



Customer care

Dear customer care,

My Iphone X charging cable is not compatible with my computer.
Can you help me, please?

⇒ Analysis

Product	Part	Problem
Iphone X	Cable	Compatibility



Customer care

Dear customer care,

My **Iphone X** **charging cable** is not compatible with my computer.
Can you help me, please?

⇒ Analysis

Product	Part	Problem
Iphone X	Cable	Compatibility



Customer care

Dear customer care,

My **Iphone X** **charging cable** is **not compatible** with my computer.
Can you help me, please?

⇒ Analysis

Product	Part	Problem
Iphone X	Cable	Compatibility



Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...

Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...
- From a database

Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...
- From a database
- Database + parsing

Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...
- From a database
- Database + parsing
- A joining database

Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...
- From a database
- Database + parsing
- A joining database
- Just more of the above

Are computer intelligent

- Computers can answer factual questions
- ... in natural language
- Computers can analyse events
- Computers beat human in QA
- Computers can drive cars, airplanes, space shuttles, play chess, go and Star Craft...
- From a database
- Database + parsing
- A joining database
- Just more of the above
- Yes but this is computation after all...

- Once you've done it, it all seems obvious

“Artificial Intelligence is always that which has not been done yet” (Larry Tesler, 1980)

Conclusion

