An NLP application: Machine Translation

Translate

Google Translate works great to translate any sentence.

Google Translate fonctionne très bien de traduire n'importe quelle phrase.
When did they finish constructing the Eiffel tower?

About 5,970,000 results (0.32 seconds)

When did they finish building the Eiffel tower?

How about this?

What year did the construction of the Eiffel tower start and end?

The Eiffel Tower construction started in the Summer of 1887, and finished in the early Spring of 1889.

Why did they build the Eiffel Tower?

The Eiffel Tower was built between 1887 and 1889 by Gustave Eiffel.

When did they start and finish building the Eiffel tower?

It was built between 1887 and 1889 by Gustave Eiffel.

Eiffel Tower - Wikipedia, the free encyclopedia

Jump to Construction: Eiffel Tower under construction between 1887 and 1889...

The foundations were complete by 30 June and the erection of the ironwork began...

When was the Eiffel Tower start building? The summer of 1887.

When did they build the Eiffel Tower? It was built between 1887 and 1889 by Gustave...

AutoSpeed - Building the Eiffel Tower

Eiffel Tower - Paris Eiffel Tower News

48,000,000 results for when did they finish constructing the eiffel tower? too.
When did they complete the Eiffel Tower?

About 92,600,000 results (0.28 seconds)

When did they finish building the Eiffel tower
wiki.answers.com › Wiki Answers › Categories › Cars & Vehicles
Information, Location Paris, France Status Complete Constructed 1887 - 1889 Use Observation tower, Radio broadcasting tower, Height, Antenna/Spire 324 ...

In which year did they finish the Eiffel tower
wiki.answers.com › History › European History › History of France
In which year did they finish the Eiffel tower? In: History of France, ... What did the French peasants have to do before their revolution? Answer i... Did king Louis ...

Eiffel Tower - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Eiffel_Tower
The third and highest level is accessible only by lift - stairs exist but they are not ... The foundations were complete by 30 June and the erection of the ironwork ... It was said that Hitler conquered France, but did not conquer the Eiffel Tower. History - Design of the tower - Tourism - Attempted relocation

The Eiffel Tower - Library
library.thinkquest.org/11420/Eiffel%20tower.htm
The Eiffel tower is one of the most fantastic structures ever constructed. ... It took 2 years 2 months and 5 days to complete it. They have also added covers to protect people from rain. ... Also in 1889 he did work on the internal body of the Statue of

Build The Eiffel Tower Wonder! – CityVille Wikia
cityville.wikia.com/wiki/Build_The_Eiffel_Tower_Wonder!
Build The Eiffel Tower Wonder! is one of the goals in CityVille, ... and finished it but the Tonga Tower and the French Casino didn’t unlock even though ... the french restaurant, the italian cheese market or the french cafe when they’re released!

Why didn’t they finish building the Eiffel tower
wiki.answers.com › ... › Countries States and Cities › France › Paris
Relevant answers: What was the purpose for building the Eiffel Tower? the purpose of building the Eiffel tower was as a entrance arch to the 1889 world fair.

The Eiffel Tower Story - Neatorama
Jul 16, 2007 – Eiffel Tower at dusk (Image Credit: franu88 [Flickr]) Its hard to believe ... They wanted to build some kind of monument that would be as glorious as France itself. ... The Washington Monument, just over half the Eiffel Tower’s size, had taken 36 years to complete. ... But Gustave Eiffel didn’t have that luxury.

Eiffel Tower - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Eiffel_Tower
During its construction, the Eiffel Tower surpassed the Washington ... in 1897, of the antenna atop the Eiffel Tower, it is now taller than the Chrysler Building. ... The third and highest level is accessible only by lift - stairs exist but they are not ... uses of the tower, he finished it's talk by saying that the tower would symbolise ...
News Summarization: wavii.com

How is this done?

ITC decides Apple didn’t violate Motorola WiFi patent after all, tosses case back to judge

Trouble looked to be brewing for Apple last April: an International Trade Commission judge made an initial ruling that Apple infringed on a standards-essential Motorola WiFi patent, raising the possibility of a trade ban if the verdict held true. The fellows in Cupertino may have caught a big break. A Commission review of the decision on Friday determined that Apple didn’t violate the patent, and it upheld positions that exonerated the iPhone maker regarding two others. Apple isn’t entirely off the hook, however. The ITC is remanding the case to the judge to review his stance that Apple hadn’t violated a non-standards-based patent, which still leaves Apple facing the prospect of a ban. However, having to revisit the case nearly resets the clock -- we now have to wait for another ruling and a matching review, and that likely puts any final decision well into 2013. Google-owned Motorola isn’t lacking more weapons in its arsenal, but any stalled proceedings take away bargaining chips in what’s become a high-stakes game.

Read Full Article
An then there’s the NLP “killer app”

Course organization, I

- Me: Bob Berwick, berwick@csail.mit.edu
- TA: Geza Kovacs, gkovacs@mit.edu
  http://web.mit.edu/6.863/
- 2 Lectures/week
- Assignments: lab oriented, w/ a few Winston-style “reading and responses” (R&R)
- No final exam, no hour exams
- 8 Assignments, 1 final project lab; final project lab is team-based
- Assignments typically 2 weeks long (except for Reading & Responses)
- R&R, typically out on Wednesday, due Monday next class for mandatory in-class discussion
  All work can be done jointly, but you must write-up your own reports, identifying who you worked with
- Email pdf/web URLs for Assignment write-ups to: 6.863-graders@mit.edu
Course organization, II

• Grade determined by:
  – 65% Assignments (5 labs, including “Competitive Grammar writing”)
  – 15% Reading & Response assignments & class participation in these and other parts of course
  – 20% final project

• Late days to help with time management (7 days) – see web page for details (1 day = 24 consecutive hours)
  • So you won’t have to ask me for ‘extensions’
  • Use your late days wisely!

Required Textbooks: #1 (Jurafsky & Martin)

New and improved for 2008
(2nd edition)

Nearly 1000 pages
(full year’s worth…)
25 chapters
Divided into 5 parts
First few chapters on website

I. Words
II. Speech
III. Syntax
IV. Semantics and Pragmatics
V. Applications
Textbooks #2

Which is available online at MIT: (Whew!)
At last, a computer that understands you like your mother.
Language ambiguity makes NLP hard:
Take news headlines

Iraqi Head Seeks Arms
Juvenile Court to Try Shooting Defendant
Teacher Strikes Idle Kids
Stolen Painting Found by Tree
Kids Make Nutritious Snacks
Local HS Dropouts Cut in Half
Obesity Study Looks for Larger Test Group

Buffaloed!

Input: buffalo buffalo buffalo buffalo buffalo.
Input type: Plain Sentence  Parser: Stanford
Log Prob = -77.03620910644531

```
ROOT
  NP
    NP
      JJ NN JJ JJ NN
        buffalo buffalo buffalo buffalo buffalo
```
What Makes NLP hard: Conscious and Unconscious Knowledge
Locke, Hume’s shoe world

But every mother knows this is the REAL shoe world...
A transcription of an actual conversation

Oh, one time one of my friends took me to a huge trucking garage where he works. This trucking garage repairs transportation trailer trucks and trailer cabs. You know how high they are. Well, I stayed at the garage for more than an hour and a half or two hours and I saw all the giant mechanical equipment there is. And I saw the small equipment for testing and cleaning out carburetors. And I was taken to a place where trucks were smashed up in an accident. And I saw one cab flattened down to about a foot high. The cab - you know how big the cab is-but it was squashed down about one foot. And I was amazed to see the trucks that got smashed up in an accident. And my mechanics friend told me that the driver who got out of that cab that was squashed down by accident, got out by a narrow escape. He came out alive. He was not killed but he was very badly injured.

How is this knowledge acquired?

“Tadoma method”
How do babies learn all this stuff???

{pabiku, tibudo, daropi, golatu}

Challenge: Combining Inference with Cognitive Constraints
(How real people solve real problems can help real computers)

Problem: twasbrilligandthesilhghtovesdidgyreandgimble

“Standard” solution: prettybaby pre-ty-ba-hy
Graph of transition probabilities: Pr(x_{i+1}|x_i) & look for local minima
“Standard” claim: works great; “stats is all you need” (Science, 1996)

Works great? NO!!!
Actual results on actual speech to children: works lousy
What’s the answer? But, add a single, universal constraint
and it works GREAT!

<table>
<thead>
<tr>
<th>Precision and Recall, Pure Stat</th>
<th>Interference vs. Stat Inference + UG,</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250,000 child-directed examples</td>
</tr>
</tbody>
</table>

Only statistics

```
<table>
<thead>
<tr>
<th></th>
<th>true positives</th>
<th>true positives  +  false positives</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI precision</td>
<td>41.6</td>
<td>23.3</td>
</tr>
<tr>
<td>SI-UG precision</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

What IS this ONE universal constraint????

D‘you-av-tay’
Do you have time
The real poverty of the stimulus

\[ N' \text{ rep' em} = \]
And rip them

The classic example

- Child: Nobody don’t like me.
- Mother: No, say “Nobody likes me.”
- Child: Nobody don’t like me.
- Mother: No, say “Nobody likes me.”
- Child: Nobody don’t like me.
- Mother: No, say “Nobody likes me.”
- Child: Nobody don’t like me.
- [dialogue repeated five more times]
- Mother: Now listen carefully, say “Nobody likes me.”
- Child: Oh! Nobody don’t likeS me.
The simplest language model – some probability distribution over sentences

Is alway aged of till tengnit logment a fall in 10; was writhe at
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wellerre, such as
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aartes?

4y: By the returall beneft has every fatants of all thou go? And
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wecking
to the mere gread abrase of thing, and was those conv服务业
clan cen 2 one language; all Lab, which for the growth othey dis..
Using more context

[Gen 14:1] And it came to pass through, they always
and everywhere represent the interests of the conditions of
oppression, new forms of
struggle in place of Sichem,
unto the plain of Moreh. And the LORD had respect unto Abel and Abel
was a keeper
of sheep, but Cain was a sweet finish, after the flood:

[Gen 7:8] Of clean beasts, and of beasts that are not clean by two,
the male and his house with great
plagues because of the
ground of
the sire character, into one nation, with one government, one code of
laws, one national class interest, one frontier, and one custom
tariff.

Q: what was the training data set here?

For next time (Monday)

• Do Assignment 1: R&R #1 on GoogleTalk
  • **bring** hardcopy to class for in-class discussion &
    revision, then turn in this final hardcopy after class
    on **Monday** – **email to 6.863-graders@mit.edu**
• Install NLTK (see instructions in R&R #1)
• Do background reading for assignment as per website
• See webpage for all lecture notes, labs, etc., etc.:
  http://web.mit.edu/6.863/
After all, there **might** be some ambiguity…