

# Communication With Machines



~50-70s

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
EDIT      BS9U.DEVT3.CLIBPAU(TIMMIES) - 01.31          Columns 00001 00
Command ==> 
*****
000001 /* REXX EXEC *****
000002 /*
000003 /* TIMMIES FACTOR - COMPOUND INTEREST CALCULATOR
000004 /*
000005 /* AUTHOR: PAUL GAMBLE
000006 /* DATE: OCT 1/2007
000007 /*
000008 /*
000009 *****
000010
000011
000012 say *****
000013 say Welcome Coffee drinker.:
000014 say *****
000015 DO WHILE DATATYPE(CoffeeAmt) \= 'NUM'
000016   say ""
000017   say "What is the price of your coffee?","
000018   "(e.g. 1.58 = $1.58)"
000019   parse pull CoffeeAmt
000020 END
000021
000022 DO WHILE DATATYPE(CoffeeWk) \= 'NUM'
000023   say ""
000024   say "How many coffees a week do you have?"
000025   parse pull CoffeeWk
000026 END
000027
000028 DO WHILE DATATYPE(Rate) \= 'NUM'
000029   say ""
000030   say "What annual interest rate would you like to see on that money?","
000031   "(e.g. 8 = 8%)"
000032   parse pull Rate
000033 END
000034 Rate = Rate * 0.01 /* CHG TO DECIMAL NUMBER */
```

~80s

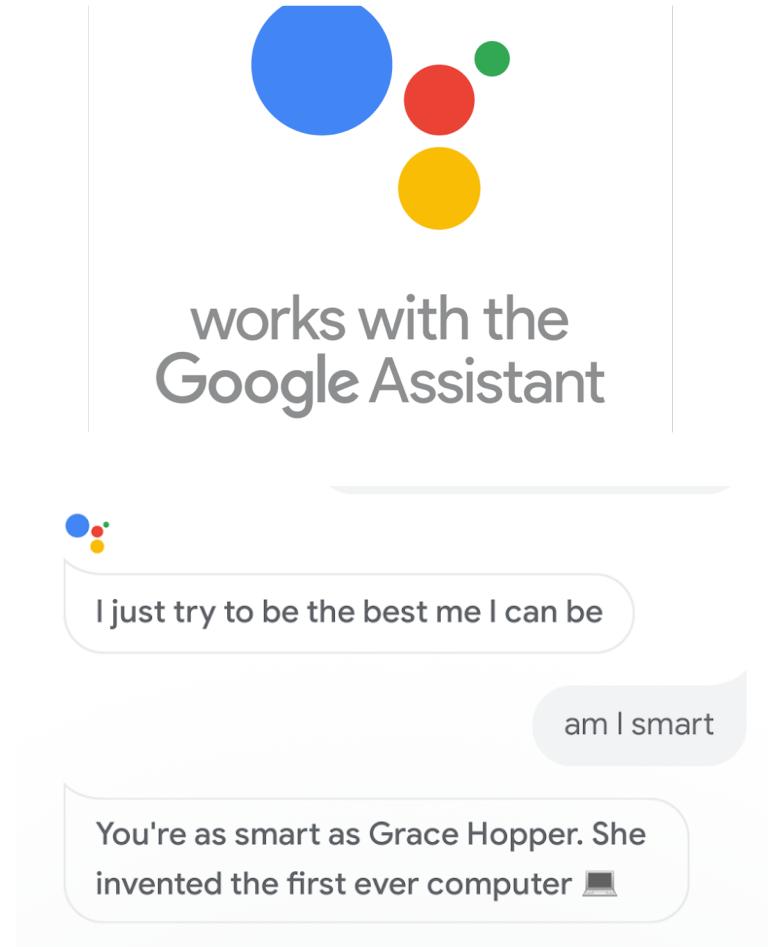


today

# Conversational Agents

Conversational agents contain:

- Speech recognition
- Language analysis
- Dialogue processing
- Information retrieval
- Text to speech



A black and white photograph of a large, modern building with a curved glass facade and a central entrance. The building has a prominent white overhang or canopy over the entrance. The foreground shows a paved area with some low-lying plants and a road in the distance.

In early 2011, an IBM computing system named Watson competed against the world's best Jeopardy! champions.

# Question Answering



- What does “divergent” mean?
- What year was Abraham Lincoln born?
- How many states were in the United States that year?
- How much Chinese silk was exported to England in the end of the 18th century?
- What do scientists think about the ethics of human cloning?

# Machine Translation

Google Translate

CHINESE - DETECTED ↔ ENGLISH

我学习深度学习和机器学习 ×

Wǒ xuéxí shēndù xuéxí hé jīqì xuéxí

🔊 Send feedback

I study deep learning and machine learning. ☆

🔊 ⋮

Google Translate

Text Documents

DETECT LANGUAGE ENGLISH SPANISH FRENCH ↔ ENGLISH SPANISH ARABIC ▼

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| _DETECT LANGUAGE   | ENGLISH        | SPANISH            | FRENCH            | ENGLISH      | SPANISH    | ARABIC |
|--|----------------|--------------------|-------------------|--------------|------------|--------|
| <input checked="" type="checkbox"/> Detect language <span>⊕</span> | Czech          | Hebrew             | Latin             | Portuguese   | Tajik      |        |
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| Albanian   | Dutch          | Hmong              | Lithuanian        | Romanian     | Telugu     |        |
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| Chinese  | Haitian Creole | Kurdish (Kurmanji) | Pashto            | Sundanese    |            |        |
| Corsican   | Hausa          | Kyrgyz             | Persian           | Swahili      |            |        |
| Croatian   | Hawaiian       | Lao                | Polish            | Swedish      |            |        |

# Natural Language Processing

## Applications

- Machine Translation
- Information Retrieval
- Question Answering
- Dialogue Systems
- Information Extraction
- Summarization
- Sentiment Analysis
- ...

## Core Technologies

- Language modeling
- Part-of-speech tagging
- Syntactic parsing
- Named-entity recognition
- Word sense disambiguation
- Semantic role labeling
- ...

NLP lies at the intersection of computational linguistics and machine learning.