DL Dev Course: Week 07 Conversational Agents

RED DRAGON AI

Conversational Agents

- Old style Chatbots - IBM, AIML, Eliza
- Simple Modern Chatbot - Facebook bots, API.ai
- Generative Chatbot - Twitter Bots
- Intelligent Agent - Google Assistant, Kate

Considerations

- Open domain vs. closed domain
- Pre-made vs dynamic responses
- Just chat vs trigger actions
- Access to what information / Web

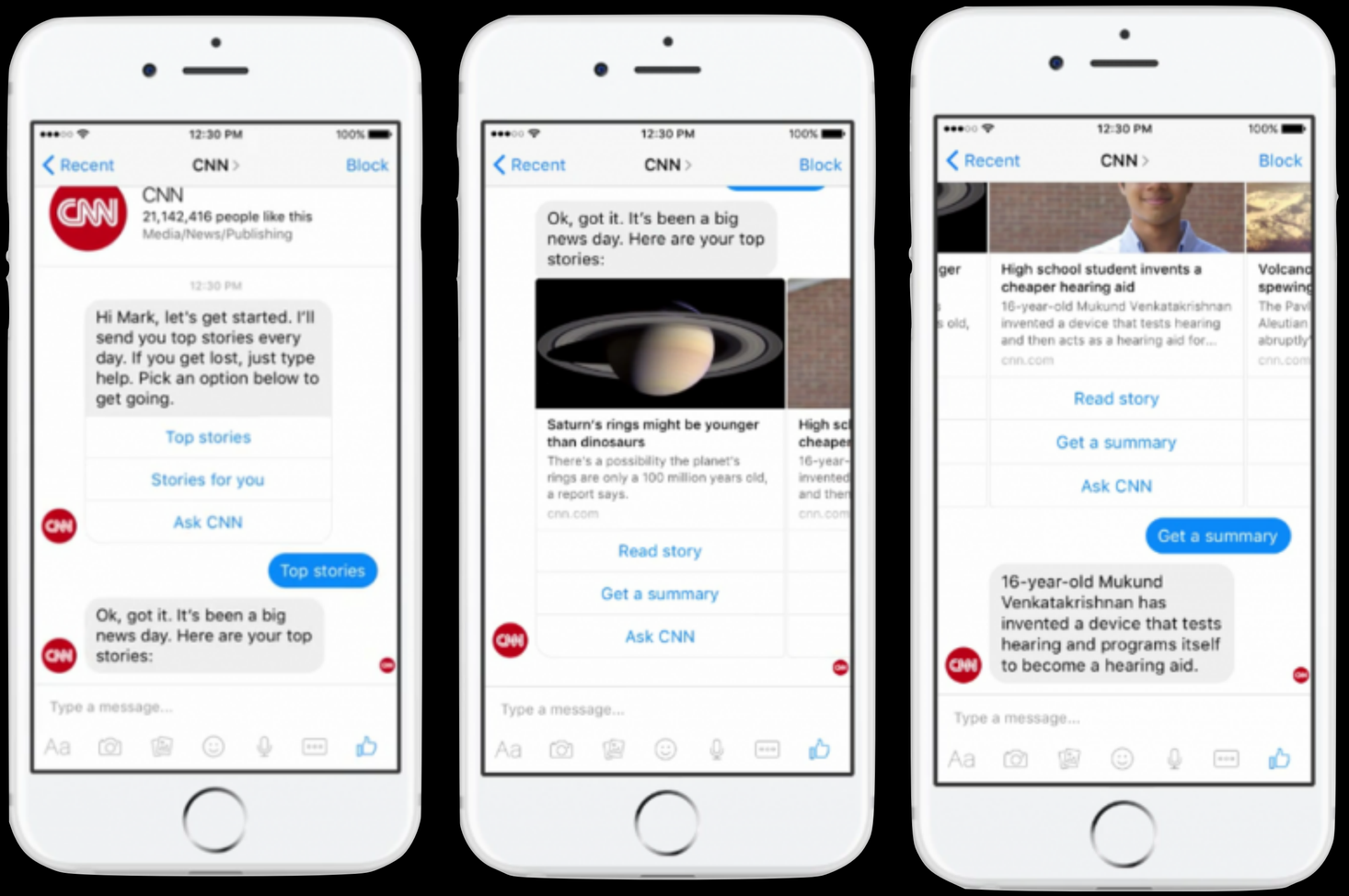
Old Style Chatbots: AIML

- XML
- Eliza / Alice bot
- Pandorabots, Watson
- Regex
- Outdated and very fixed in the way that the work

AIML example

```
</category>
<category>
  <pattern>HELLO *</pattern>
  <template>
    Hello there.
    <sr/>
  </template>
</category>
<category>
  <pattern>HELLO AGAIN</pattern>
  <template>
    Hi there. I was just wanting to talk to
    <get name="name"/>
    .
  </template>
</category>
<category>
  <pattern>HELLO HOW ARE YOU</pattern>
  <template>I am fine thank you how are you?</template>
</category>
<category>
  <pattern>HELLO THERE</pattern>
  <template>
    Salutations,
    <get name="name"/>
  </template>
</category>
<category>
  <pattern>HELLO</pattern>
  <template>Hi there!</template>
</category>
<category>
  <pattern>HELLOW</pattern>
  <template>
    <srai>hello</srai>
  </template>
</category>
<category>
  <pattern>HELO</pattern>
```

Simple Modern Chatbot



Simple Modern Chatbot

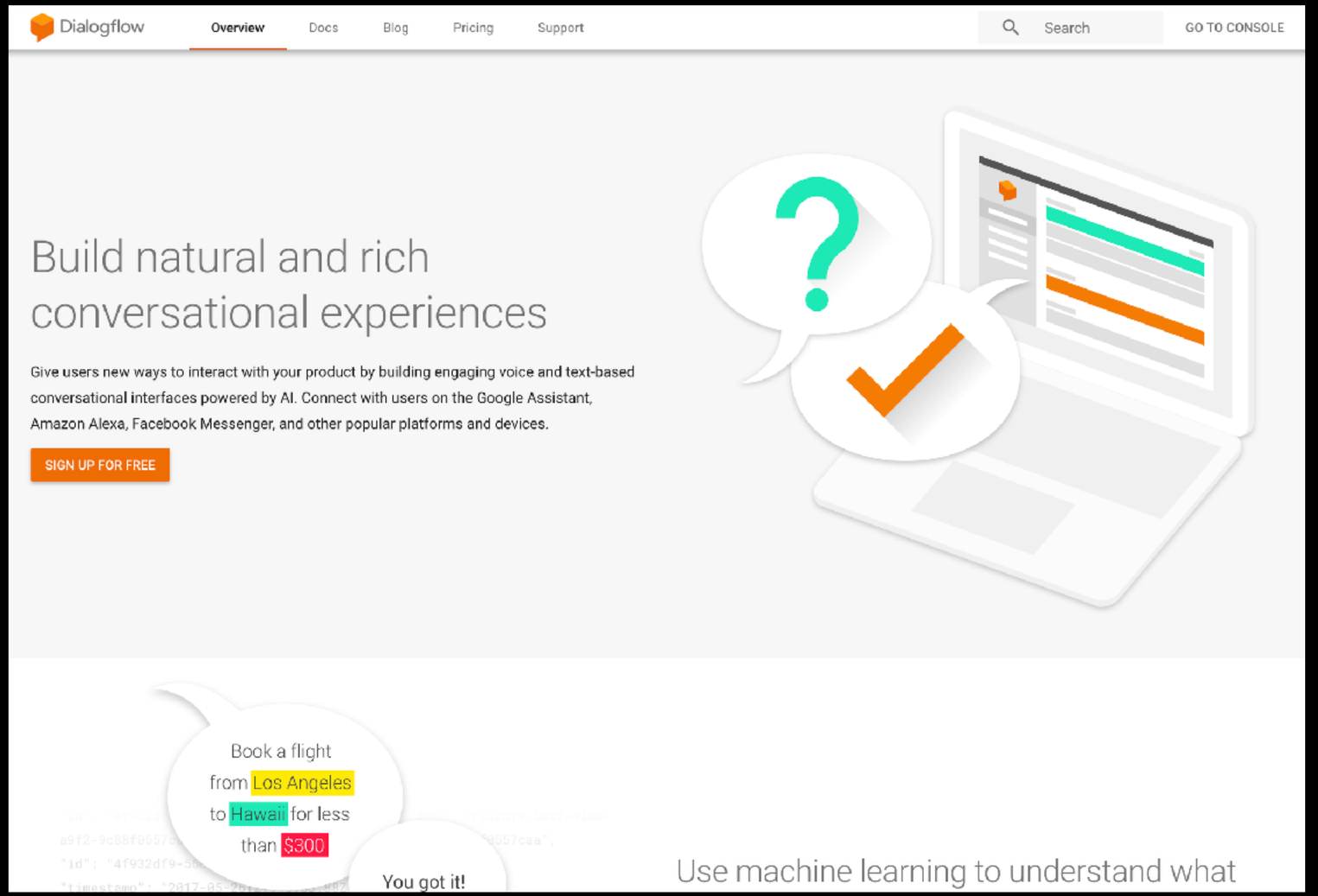
- Intents and slots/variables

"can i order a pizza"

"can i order a hamburger"

- intent = 'order'
- item = 'pizza/hamburger' - slot variable

DialogFlow (API.AI)



Do it yourself

- Simple Classification
- Needs you to define classes first
- Convert text in pipeline

Logistic Regression

Character CNNs

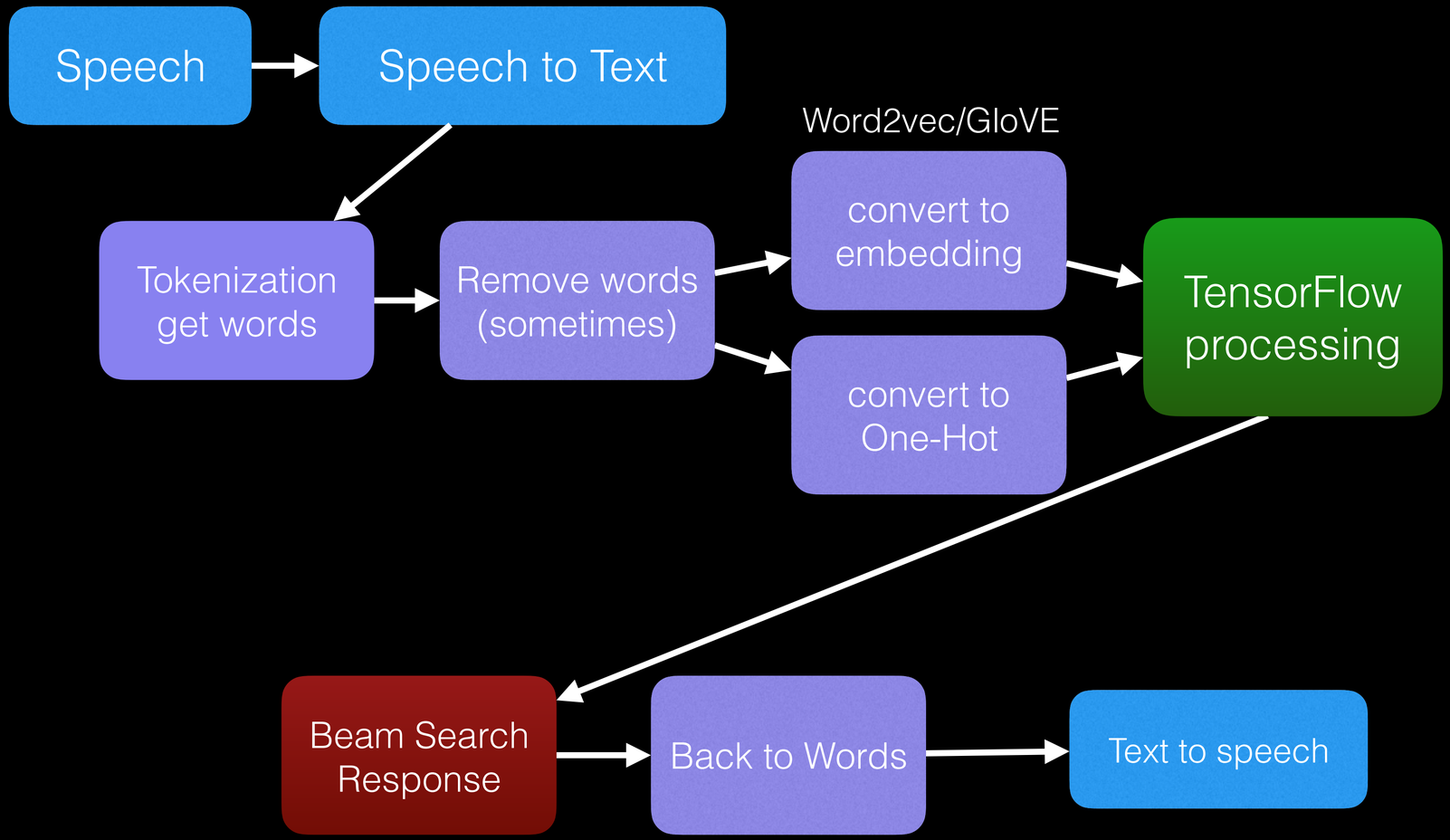
MLPs

RNNs

Pipeline

- Tokenize
- Vectorize words
- Embeddings
- Word2vec / GloVE

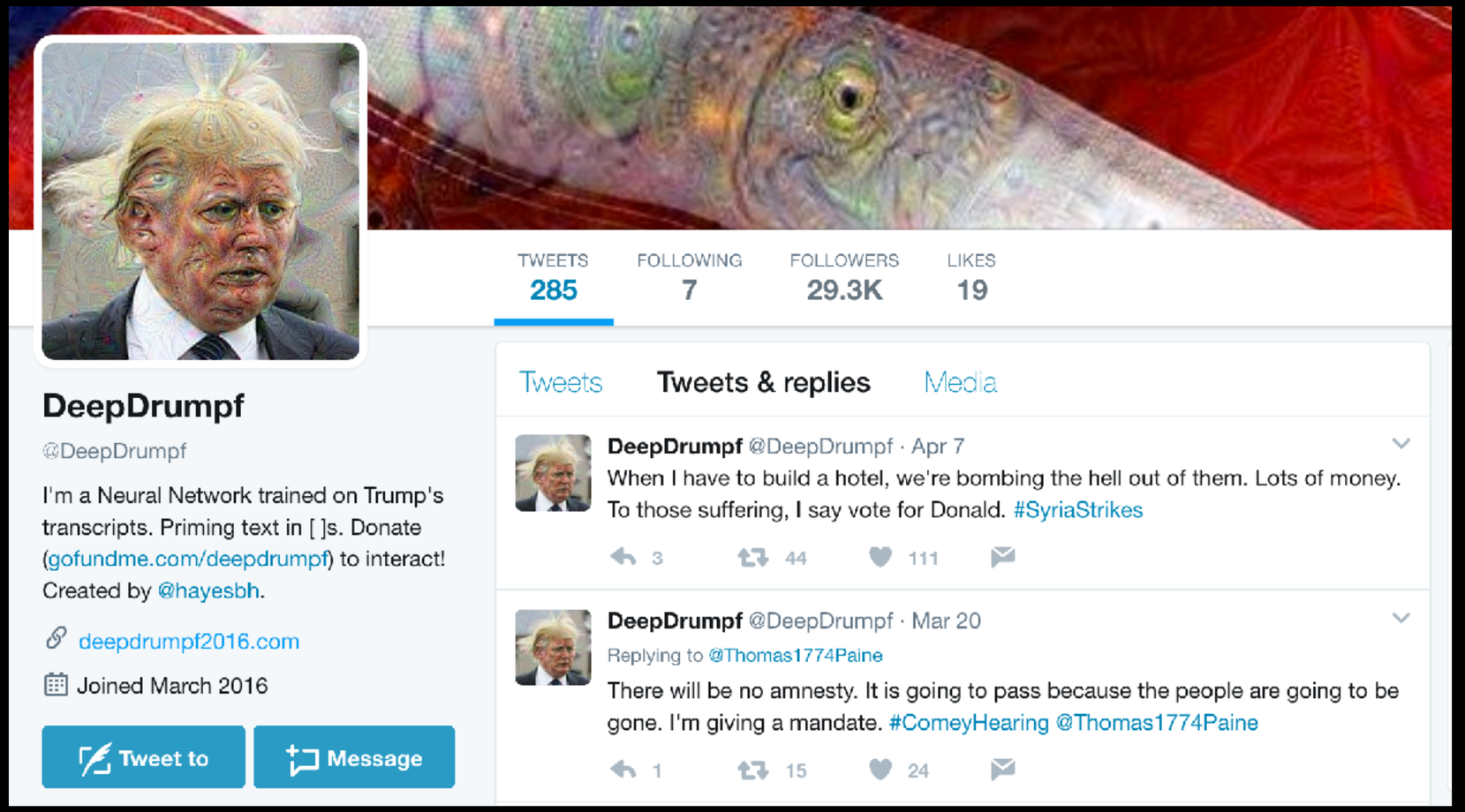
Example Text Pipeline



Simple Chatbots

- DialogFlow / Google does these kinds of bots pretty simply
- They only tend to work on a very closed domain
- Good for simple tasks like ordering pizza, booking flights etc

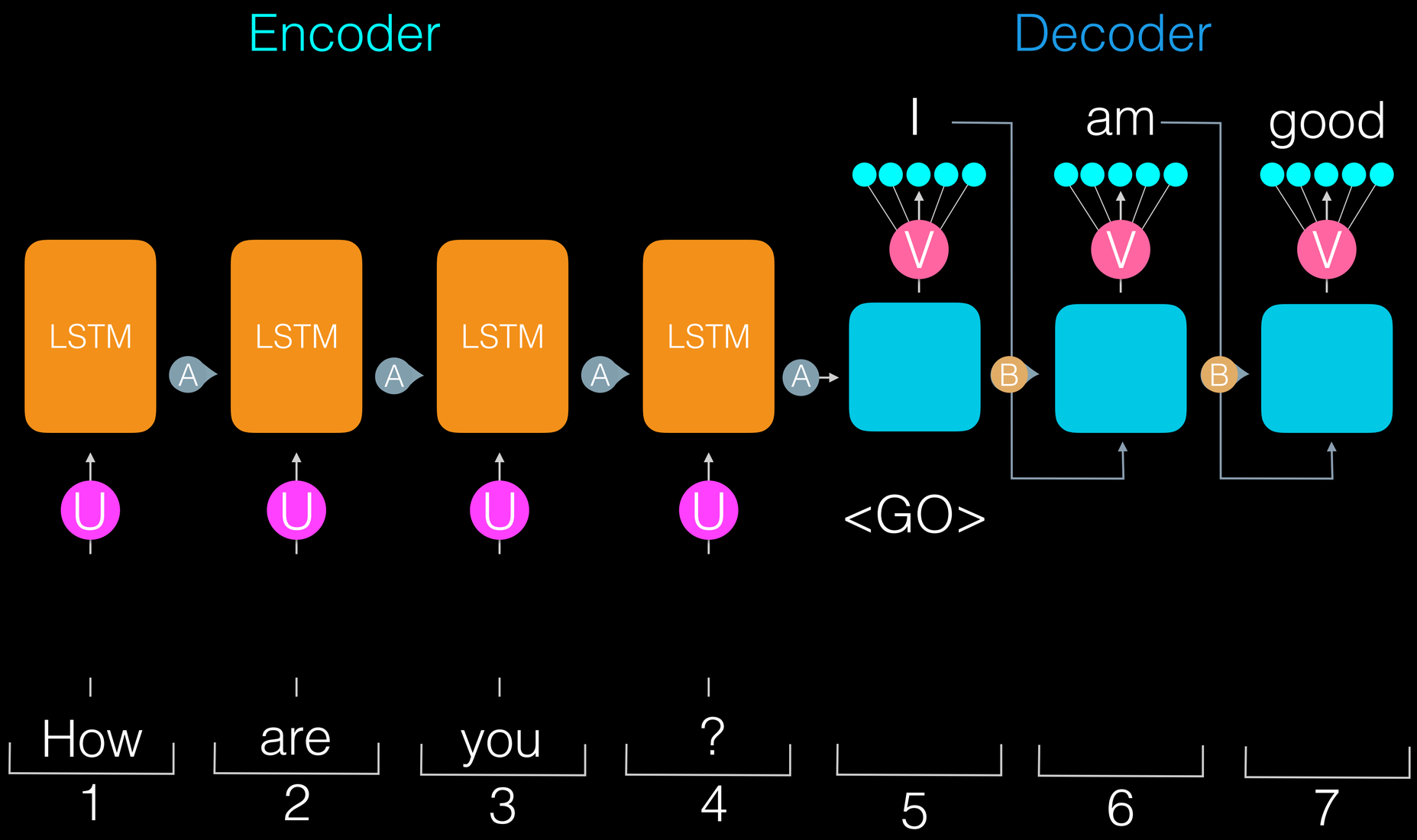
Generative Chatbots



Generative Chatbot

- Twitter bots made from speeches etc
- LSTMs (char-RNN) or Seq2Seq
- Large amount of training and data needed
- Beam search on the response
- Some token system for variables like names

Seq2Seq



Often La

Generative Chatbot

- Great for fun
- Not ideal for business cases unless you have amazing data
- Still a long way to go

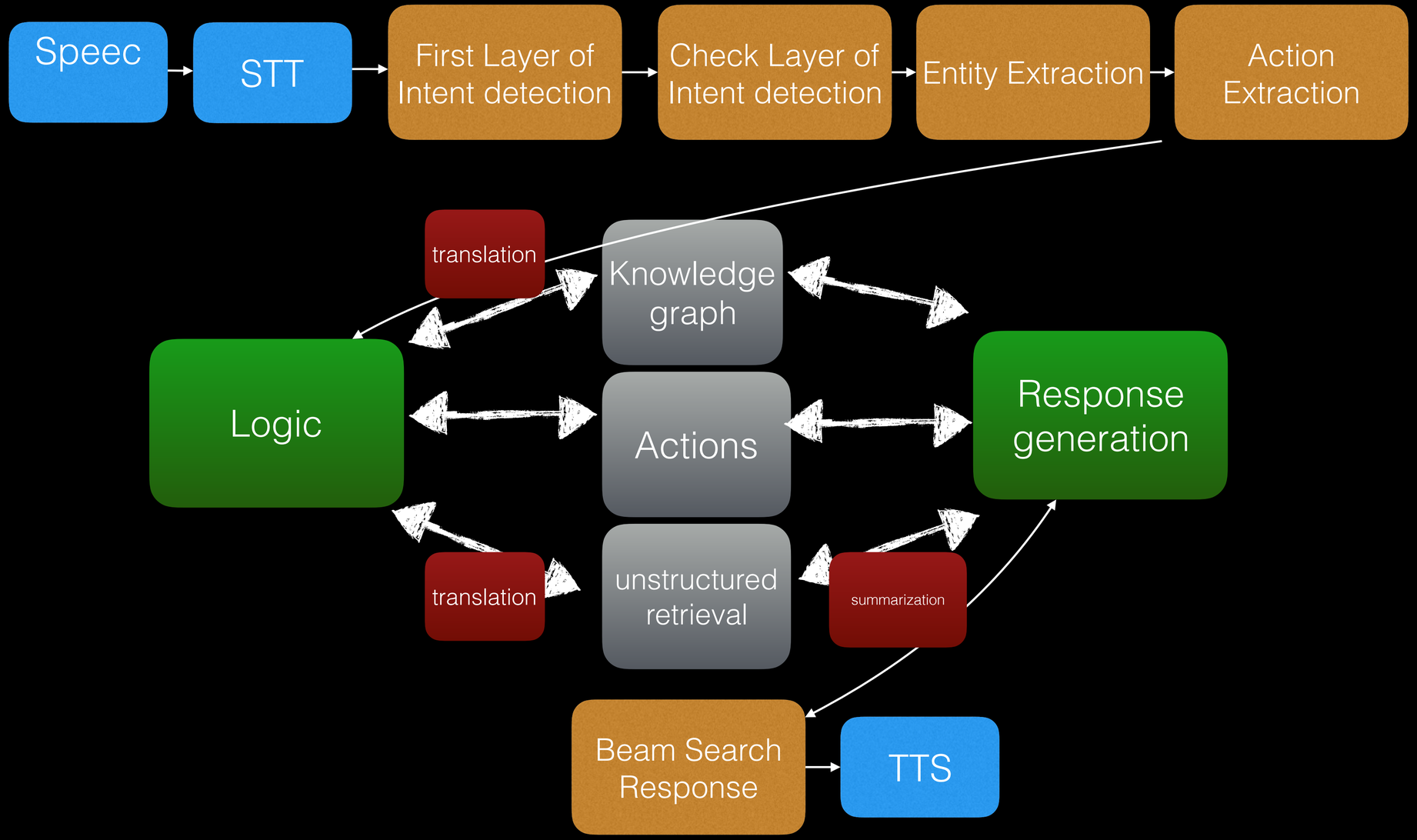
Hybrid Agent

- Speech to Text
- Has the ability to access wider info
- Custom NER, POS for extracting variables (deep learning)
- Graph system - for info and memory

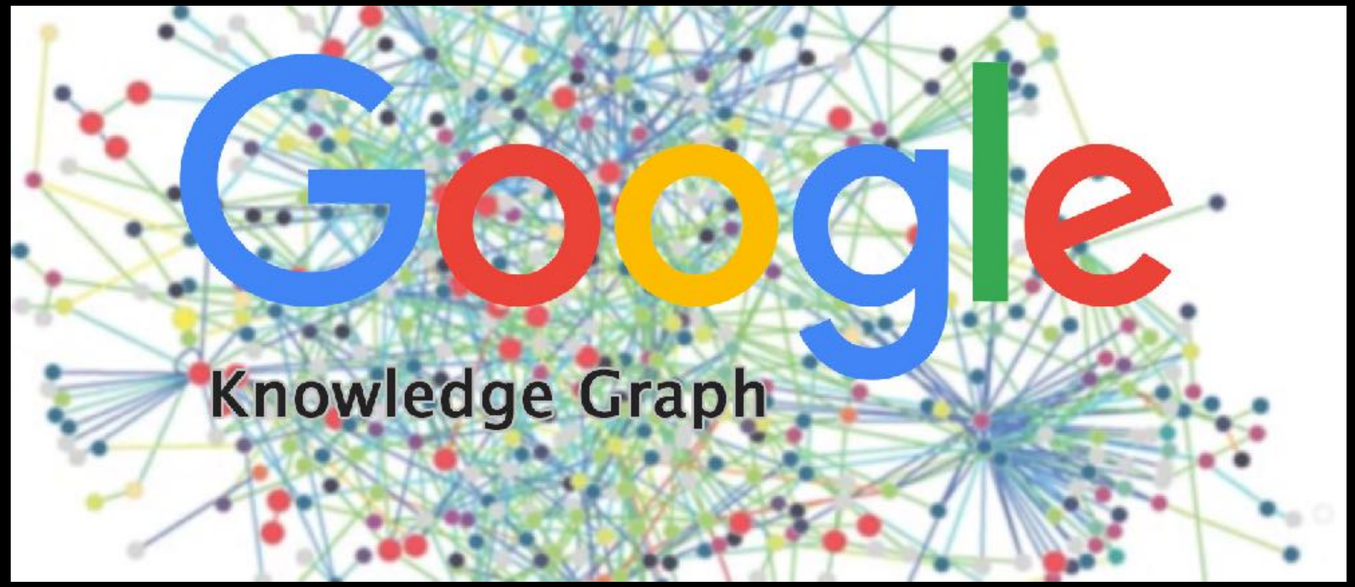
Intent Ensemble

- Ensemble system for classifying the input
- LSTM Classification
- Character CNN Classification
- Bag of words

Intelligent Agent



Knowledge bases



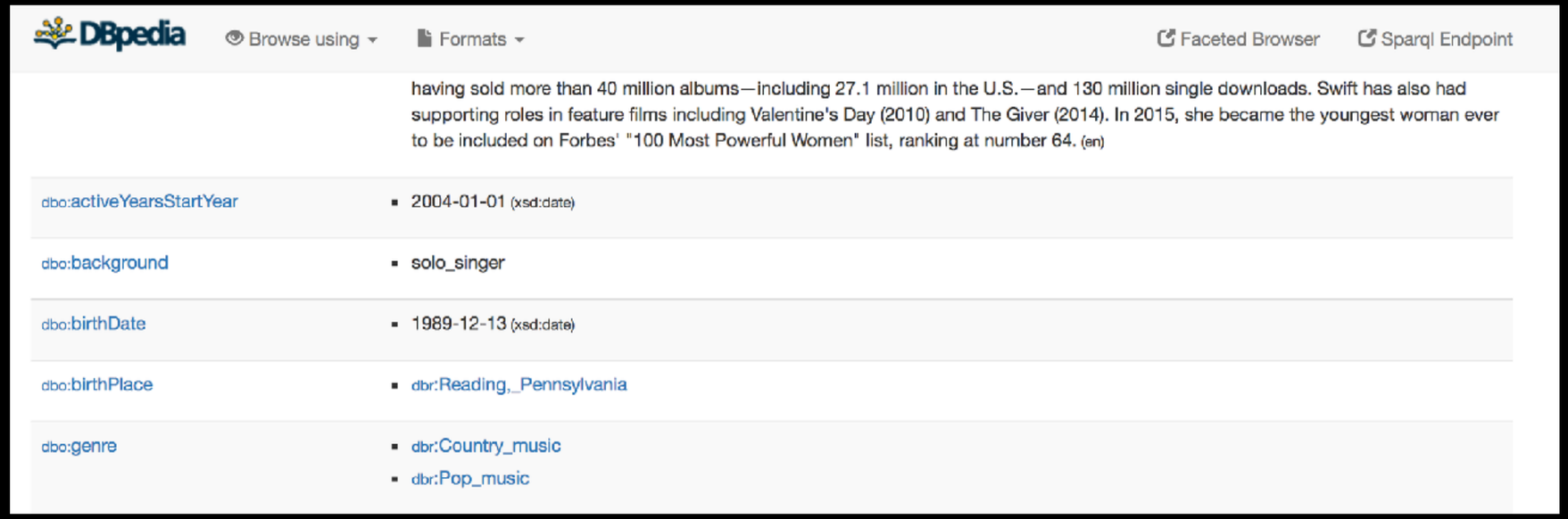
- Get info for returning to user
- Alternative: Freebase, DBpedia

Google Knowledge API


```
{
  "@context": {
    "@vocab": "http://schema.org/",
    "goog": "http://schema.googleapis.com/",
    "resultScore": "goog:resultScore",
    "detailedDescription": "goog:detailedDescription",
    "EntitySearchResult": "goog:EntitySearchResult",
    "kg": "http://g.co/kg"
  },
  "@type": "ItemList",
  "itemListElement": [
    {
      "@type": "EntitySearchResult",
      "result": {
        "@id": "kg:/m/0dl567",
        "name": "Taylor Swift",
        "@type": [
          "Thing",
          "Person"
        ],
        "description": "Singer-songwriter",
        "image": {
          "contentUrl": "https://t1.gstatic.com/images?q=tbn:ANd9GcQmVDAhjhWnN2OWys2ZMO3PGAhupp5tN2L
          "url": "https://en.wikipedia.org/wiki/Taylor_Swift",
          "license": "http://creativecommons.org/licenses/by-sa/2.0"
        },
        "detailedDescription": {
          "articleBody": "Taylor Alison Swift is an American singer-songwriter and actress. Raised i
          "url": "http://en.wikipedia.org/wiki/Taylor_Swift",
          "license": "https://en.wikipedia.org/wiki/Wikipedia:Text_of_Creative_Commons_Attribution-S
        },
        "url": "http://taylorswift.com/"
      },
      "resultScore": 896.576599
    }
  ]
}
```

Translation text to query

- Similar to language translation
- “How old is Taylor Swift?”
- Entity: ’taylor swift’ , info.age



The harder stuff

- Stateful Conversations (G-Assistant)
- Context
- Detecting different users (G-Home)

Tips

- Try to limit the domain of conversation
- Use Google Cloud for speech
- Make use of off the shelf wherever possible
- Use your own models for anything unique eg. NER, vocab etc.
- Get as many example conversations as possible