

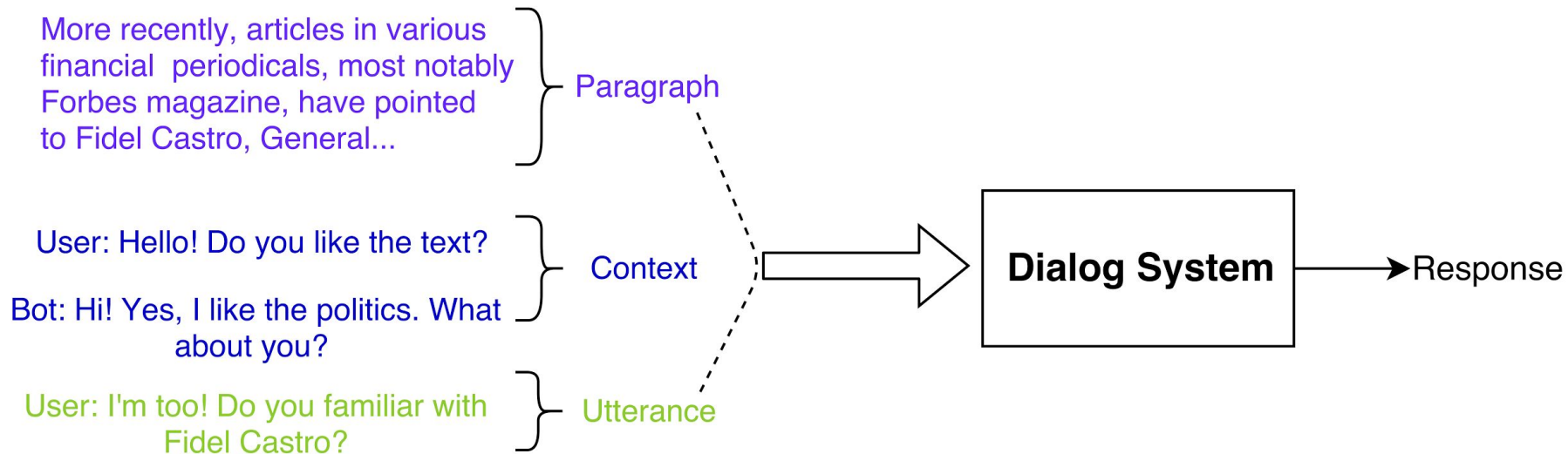
Skill-based Conversational Agent

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bot#1337

Task - Conversation about the text



Conversation about the text. Skills

- **What skills are required to discuss the text?**
 - Question answering
 - Question generation
 - Chit-chat
 - Summarization skill
 - Topic detection
 - Personality skill (name, birthday ...)
 - ...
- **Models for skills:**
 - Seq2Seq
 - Retrieval models
 - Templates
 - Rules

Dialog Manager

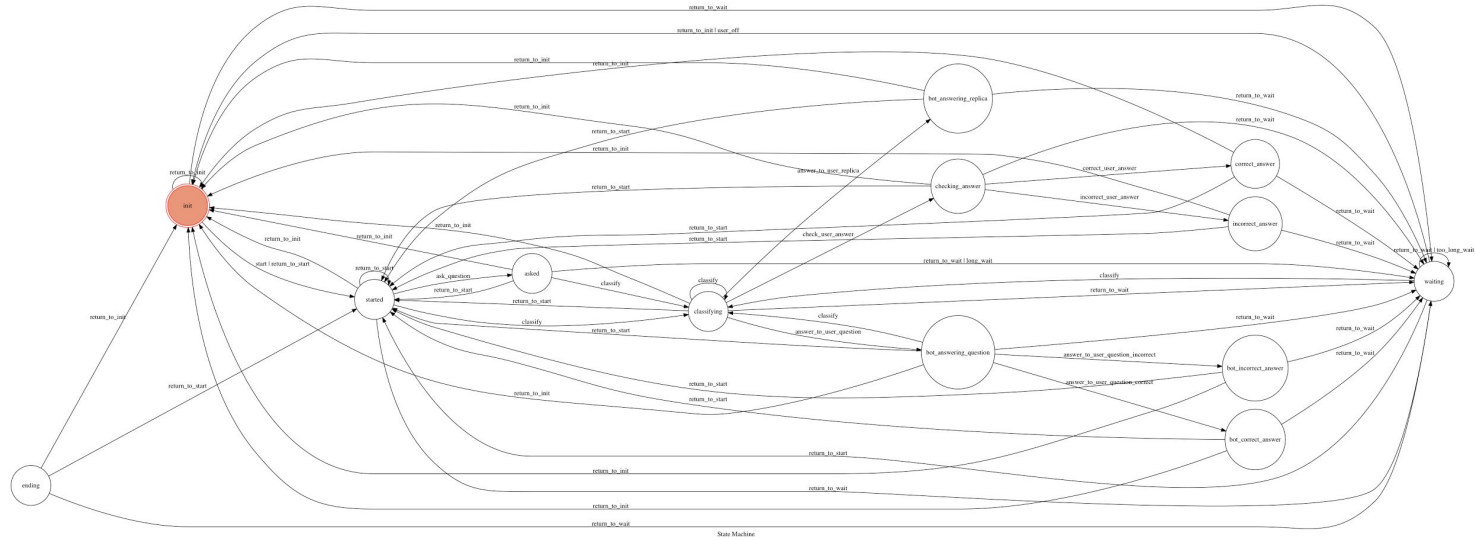
Answers to the question:

- What skill to use in the dialog?

Types:

- Random
- If-else statements. Finite state machine (FSM)
- Supervised
- Reinforcement

FSM Dialog manager



- **Hard to maintain for large number of skills**

Supervised Dialog manager

Data:

- Labeled data: (utterance, skill)

Where to get?

- **Best:** Amazon MT, Yandex.Toloka
- **Free:** each skill dataset, e.g. (opensub_sent1, opensub_chitchat_skill)

Train skills classifier

Supervised Dialog manager

Some skills (topic detection) do not have necessary data to train skills classifier.

Solutions:

- Regular expressions
- Mean word2vec with k-nn - few handwritten phrases for the skill required

Tools

Dialog manager:

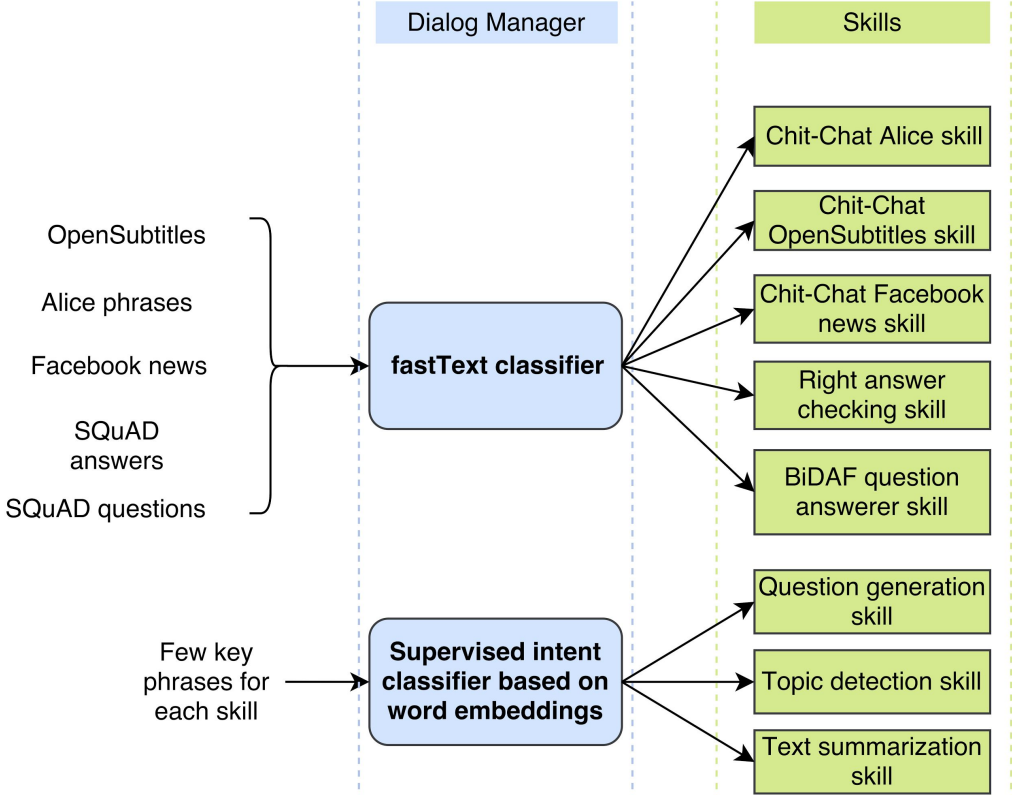
1. Joulin, Armand, et al. "Bag of tricks for efficient text classification." (2016)
2. Pennington, et al. "Glove: Global vectors for word representation." (2014)

Skills:

1. Klein, et al. "OpenNMT: Open-Source Toolkit for NeuralMachine Translation." (2017)
2. Wallace, et al. "The anatomy of ALICE." Parsing the Turing Test (2009)
3. Seo, et al. "Bidirectional attention flow for machine comprehension." (2016)
4. Vorontsov, Konstantin, et al. "BigARTM: open source library for regularized multimodal topic modeling of large collections." (2015)
5. ...

Dialog Agent

Dialog Agent



Results / Conclusion

- **Expensive human-annotated data is not used by the bot**
- **Focus on skills implementation, not FSM development**
- Previous version took 2nd place in ConvAI human evaluation round at summer
- Previous version has being used in DSTC 6 dialogue breakdown challenge for data collecting
- Current version took 1st place in ConvAI

Dialog Example

Text: In 2015-2016, Notre Dame ranked 18th overall among "national universities" in the United States in U.S. News & World Report's Best Colleges 2016. In 2014, USA Today ranked Notre Dame 10th overall for American universities based on data from College Factual. Forbes.com's America's Best Colleges ranks Notre Dame 13th among colleges in the United States in 2015 ... According to payscale.com, undergraduate alumni of University of Notre Dame have a mid-career median salary \$110,000, making it the 24th highest among colleges and universities in the United States. The median starting salary of \$55,300 ranked 58th in the same peer group.

Bot> Hiya!

Bot> Let's talk about culture, or I can ask you a question about this text.

User> Ask me then)

Bot> What is the median salary in notre dame?

User> 55,300

Bot> Show me your best! Hint: first 3 letters is \$1. Try again.

User> \$110,000

Bot> I think you mean: \$110,000 Good job. Ask me something or wait for my new question

User> What is the rank of Notre Dame?

Bot> It seems that correct answer is: 18th overall among ``national universities "in the united states in u.s. ...

User> Nice!

Bot> This is what happens when you don't want to be in the white house.

User> Very funny) This is very long text to read, can you summarize it in couple sentences?

Bot> I suppose that this article main idea is: University of notre dame's salary.

User> Hope you are not lying to me

Bot> This is what happens when you vote for a democrat.

User> You are so into politics

Bot> I will tell my the kind people in the lab you said i am into politics.

User> I have to go! Bye!