Practical Applications of Chatbots in Drupal

Drupal + Component Module + Dialogflow + Rasa

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My Development History

I've been a Drupal Developer for 12 years, working on government agency Drupal websites, healthcare Drupal websites, machine learning applications, and software engineering.

ECS

- Senior Drupal Developer

TEKsystems

- Contractor at Florida Blue

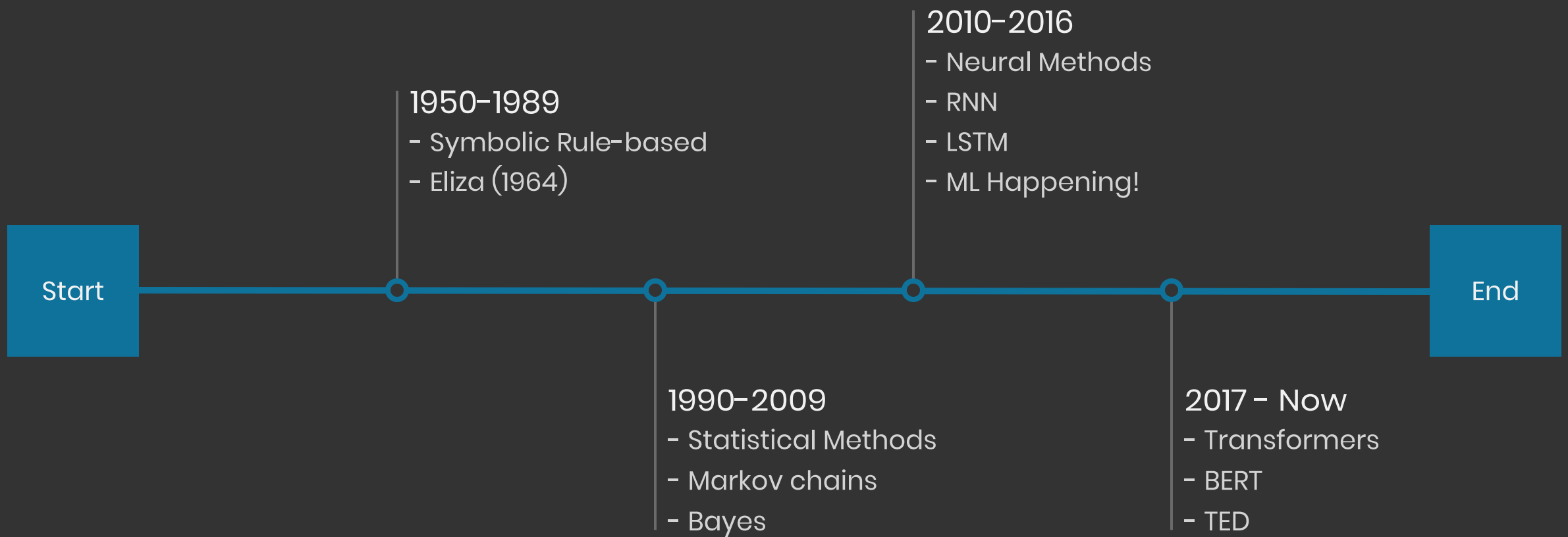
Scribe Fusion

- Software Engineer (Python)

Our Agenda

- History of Chatbots
- What is Machine Learning / Deep Learning?
- Why Use a Chatbot?
- How do Chatbots Work?
- How do Chatbots Learn?
- Demo
- Looking to the Future
- Resources

History of NLP/Chatbots



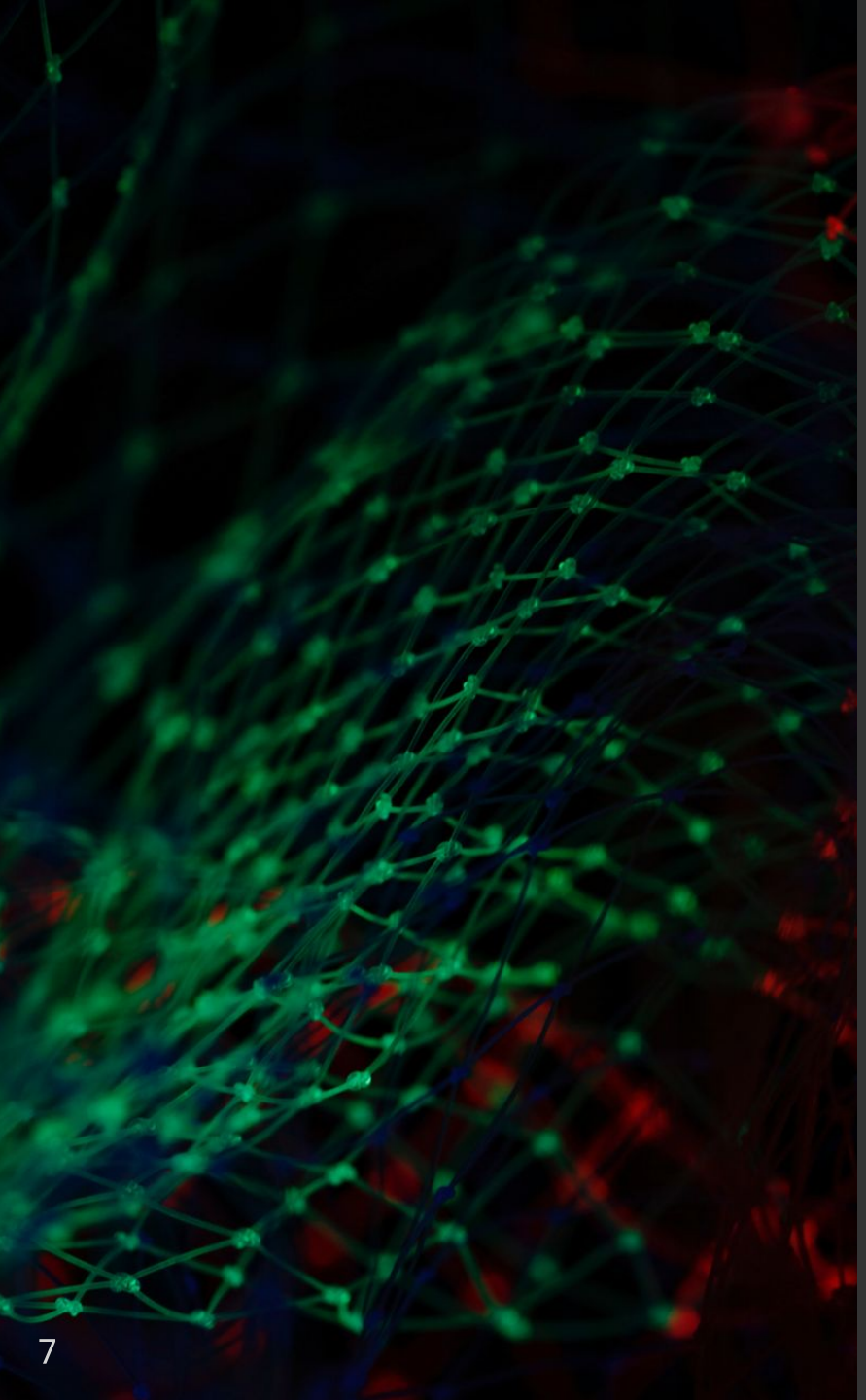
Intro to Machine Learning

- “Machine learning focuses on applications that learn from experience and improve their decision-making or predictive accuracy over time.” - IBM

Intro to Machine Learning

- “Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don't think AI will transform in the next several years.” - Andrew Ng

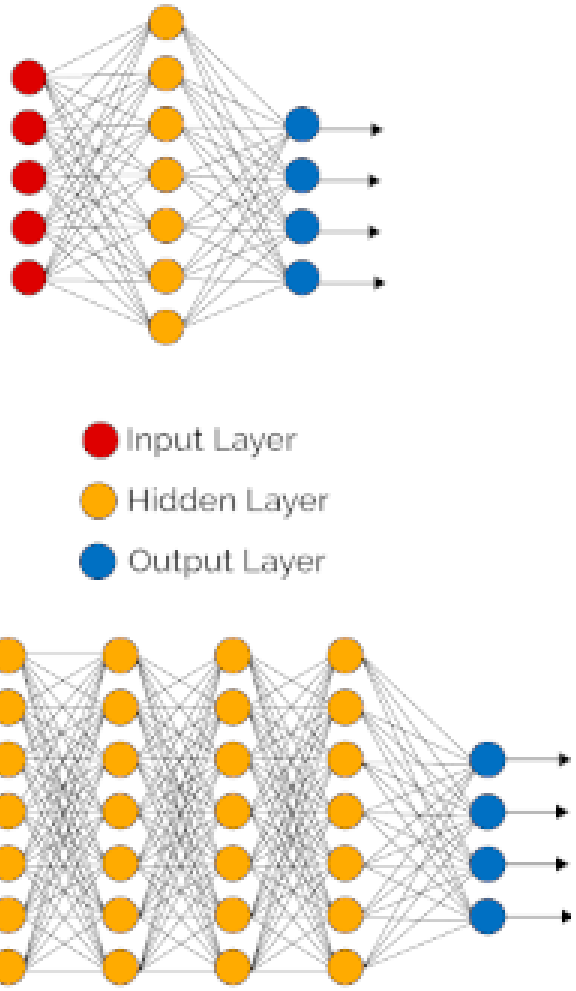
Andrew Ng - Stanford Professor & Co-founder of Coursera



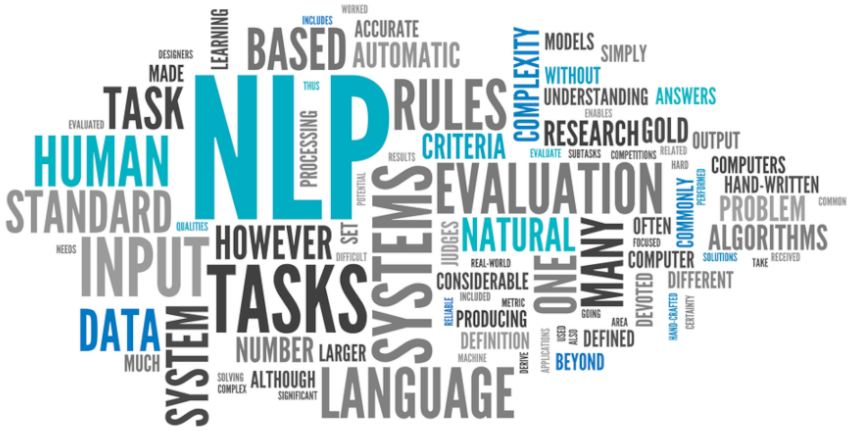
Intro to Machine Learning

- Types of Machine Learning
  - Supervised Learning - for a set of data, the outcome is known (linear regression)
  - Unsupervised Learning - outcome unknown, but interested in how input data clusters together or anomoly detection (Principle Component Analysis, K-Nearest Neighbor)

Intro to Deep Learning



- A subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called “artificial neural networks”
  - Input Layer – Images, text, audio, video, numbers, etc. Must be quantifiable.
  - Hidden Layers – Filters for feature extraction
  - Output Layer – Classification, prediction
  - Activation function



The Three NLs

- ## Natural Language Processing (NLP)

  NLP is a subset of AI and is what happens when computers *read language.* NLP turns language into structured data.

  Parsing, tokenizing, stemming, text summarization, text categorization, wordclouds etc.

- ## Natural Language Understanding (NLU)

  NLU is a subset of NLP and is what happens when computers *understands language.*

  Sentiment detection, topic classification, entity detection are examples

- ## Natural Language Generation (NLG)

  NLG is what happens when computers *writes language.* NLP turns structured data into language.

  Examples include text generation, story generation, music generation and chatbot responses.

AI Chatbot Platforms/Frameworks

Some of the most popular companies in chatbot market

Amazon Lex

MS Power Virtual Agents

Google Dialogflow

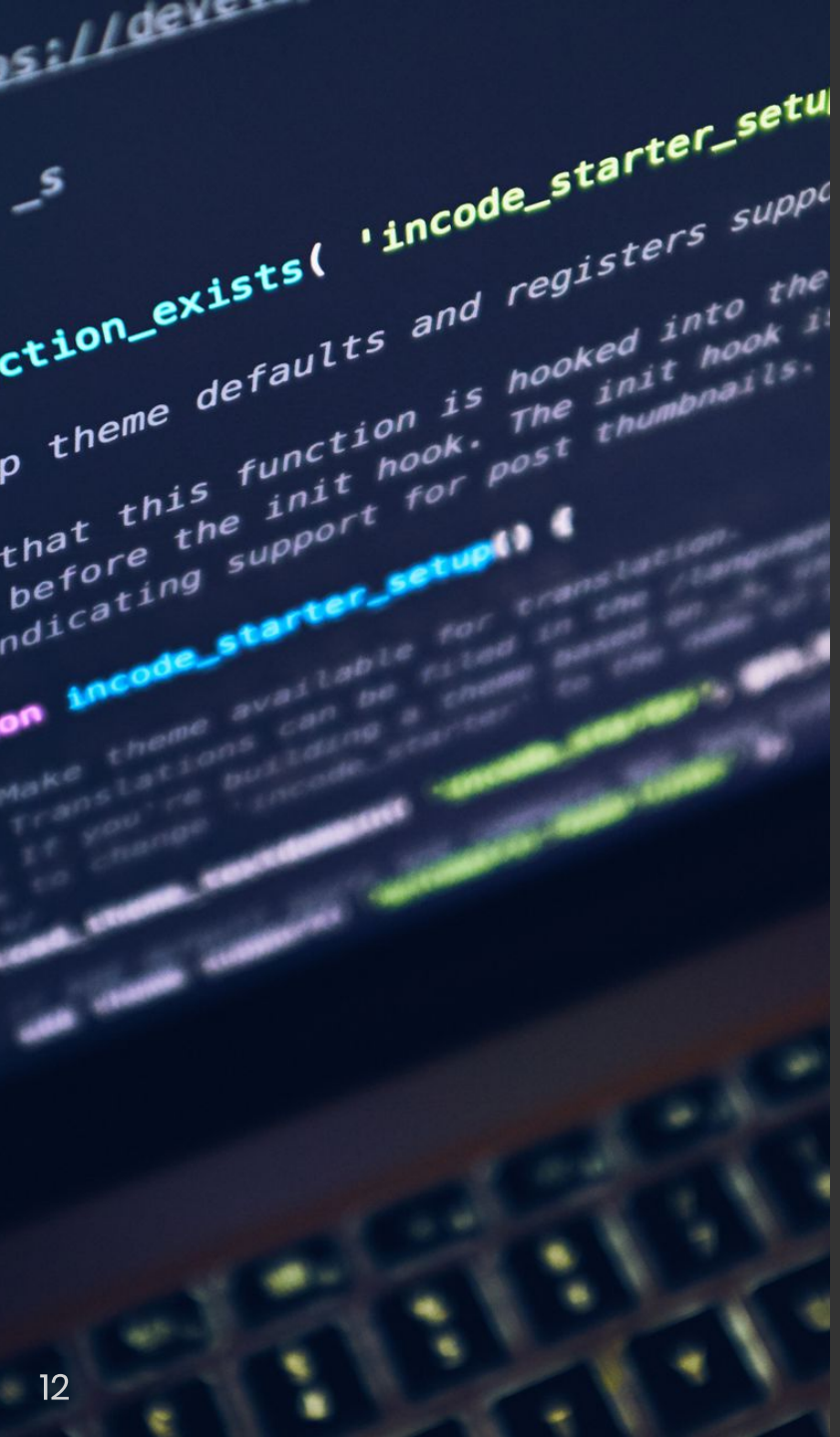
Rasa

Open Source

Rasa X (Enterprise)

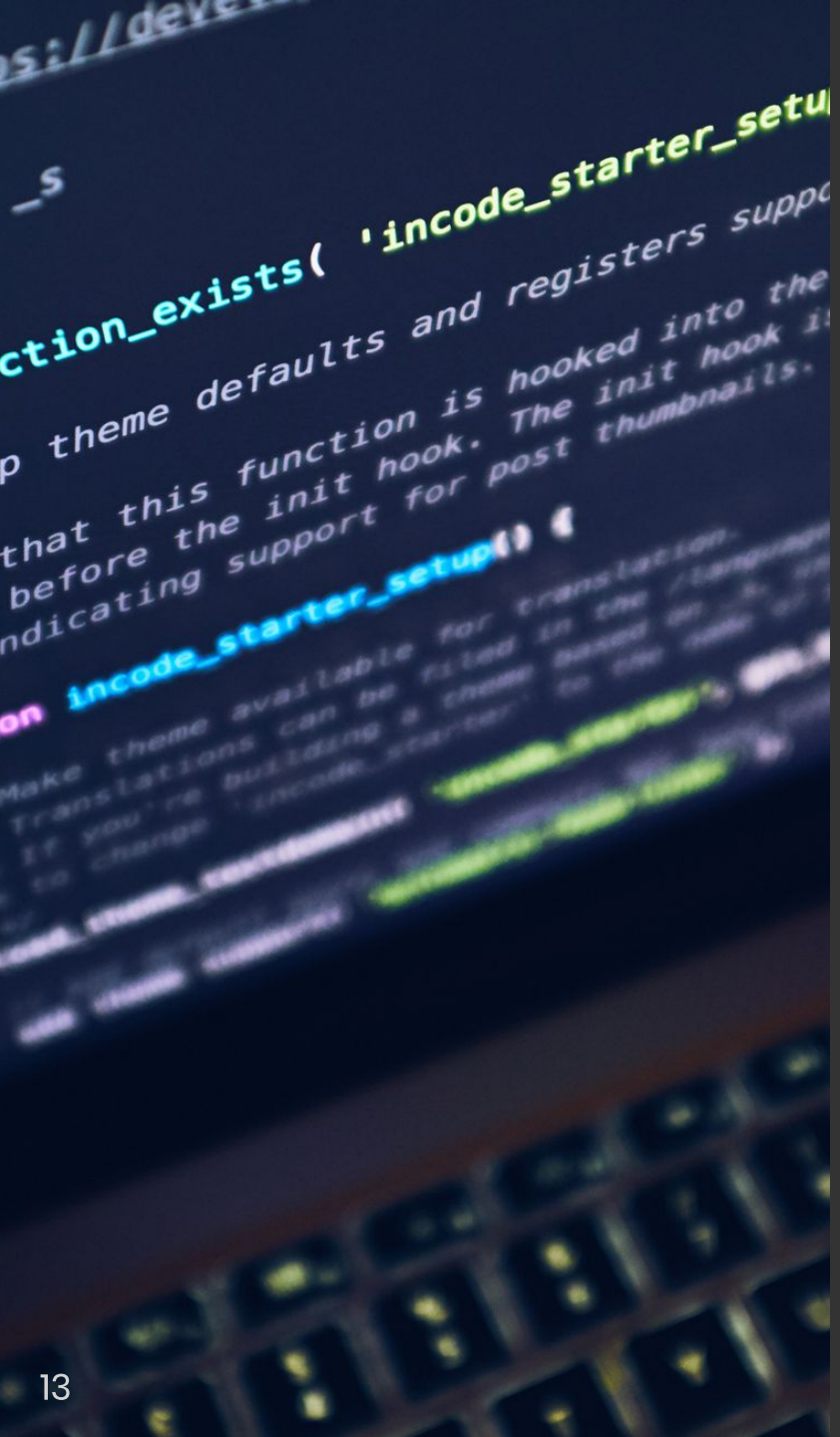
Why Use a Chatbot?*

1. Available 24/7
2. Generate More Conversations
3. Handle Multiple Customers
4. Not Subject to Mood Swings
5. Can Collect and Analyze Data
6. Personalize Conversations
7. Speak Multiple Languages
8. Automate Many Processes
9. Can be Deployed Anywhere



How Do Chatbots Work?

- Natural Language Understanding (NLU)
  - Raw text in, machine readable information out
  - Rule-based: regex
  - Neural Models such as transformer based models (BERT, DIET)
  - Use both
- Deciding how to respond
  - Dialogue Policy - what should the chatbot do next based on the conversation
  - Rule-based
  - Transformer Embedding Dialogue (TED) Policy - selects which action to take next
  - Requires training examples



How Do Chatbots Learn ?

Chatbots learn through ML training just like other neural base models.

- Intents
  - What the user wants to do
- Entities
  - Important pieces of information
- Stories
  - Ways the conservation can go
- Actions
  - What action the chatbot should take

Demo Time!

Questions?

THANK YOU!

Special thanks to Matthew Pritchard, Chris McGrath,

Jitesh Doshi and my Esteemed Colleagues!

Resources and References

Top 9 reasons why you should use a Chatbot in your business
https://www.ideta.io/blog-posts-english/top-9-reasons-why-you-should-use-a-chatbot-in-your-business

Effortlessly Build Chatbots With Rasa 2.0: A Step-by-Step Tutorial
https://towardsdatascience.com/chatbots-made-easier-with-rasa-2-0-b999323cdde

Rasa Learning Center
https://learning.rasa.com/

Kong, X. & Wang, G.(2021). *Conversational AI with Rasa.* Packt Publishing.