Building a Chatbot with Rasa

Amogh Mannekote

What was your
“Alexa, why are
you so dumb?”
moment?

The Golden Goose

Turn	Dialogue
1	*usr:* Good morning!
	agt: Good morning, I hope you had a great weekend.
2	*usr:* not really.
	agt: You sound depressed. What can I do for you?
3	*usr:* I'd like to know where sales are lagging behind our forecast?
	agt: The worst region is [country], where sales are 15% below projections.
4	*usr:* Do you know why?
	agt: The forecast for [product] growth was overly optimistic.
5	*usr:* How can we turn this around?
	agt: Here are the 10 customers in [country] with the most growth potential, per our CRM model.
6	*usr:* Can you set up a meeting with the CTO of [company]?
	agt: Yes, I've set up a meeting with [person name] for next month when you are in [location].
7	*usr:* Thanks!

~~Divide~~ Roleplay and Conquer!

1. Question answering bots
2. Task-oriented bots
3. Chitchat-bots

ID the 3 Roles

A

B

C

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Rasa vs DialogFlow

- DialogFlow does a lot more handholding
- DialogFlow uses data from other users
- And that includes YOU
- NOT open sourced

- Fine-grained tweaking and control that require some ML/NLP knowledge
- You own the data
- Rasa runs on YOUR computer, not Google's
- Open source

The research scene - TL;DR

Deep Learning aka End-to-End Dialog

Great for chitchat and QA

Unreliable for task-oriented chatbots

Structured Dialog

Can’t handle growing complexity

But more reliable and trustworthy (at least for now)

RTFM

You are encouraged to keep the documentation for Rasa NLU and Rasa Core open throughout

Rasa NLU - rasa.com/docs/nlu

Rasa Core - rasa.com/docs/core

One Link to Rule Them All

bit.ly/rasa-msrit

<hands-on-1>

What You Will Need

- An *nix environment (preferably)
- Python 3.7 (older versions ARE supported, but today’s session hasn’t been tested on them)
- Git

Setup

Rasa NLU - rasa.com/docs/nlu

Rasa Core - rasa.com/docs/core

Rasa Starter Pack - github.com/msamogh/rasa-starter-pack

Create virtualenv

>> virtualenv --python=<PATH_TO_PYTHON3.7> .

>> virtualenv --python=python3.7 .

>> source bin/activate

ALWAYS CHECK IF YOU ARE IN THE VIRTUALENV BEFORE RUNNING ANY COMMANDS FROM NOW ON!

Some Assembly Required

Follow the setup instructions on the

GitHub link of the Rasa Starter Pack

```
pip install -r requirements.txt
```

```
python -m spacy download en
```

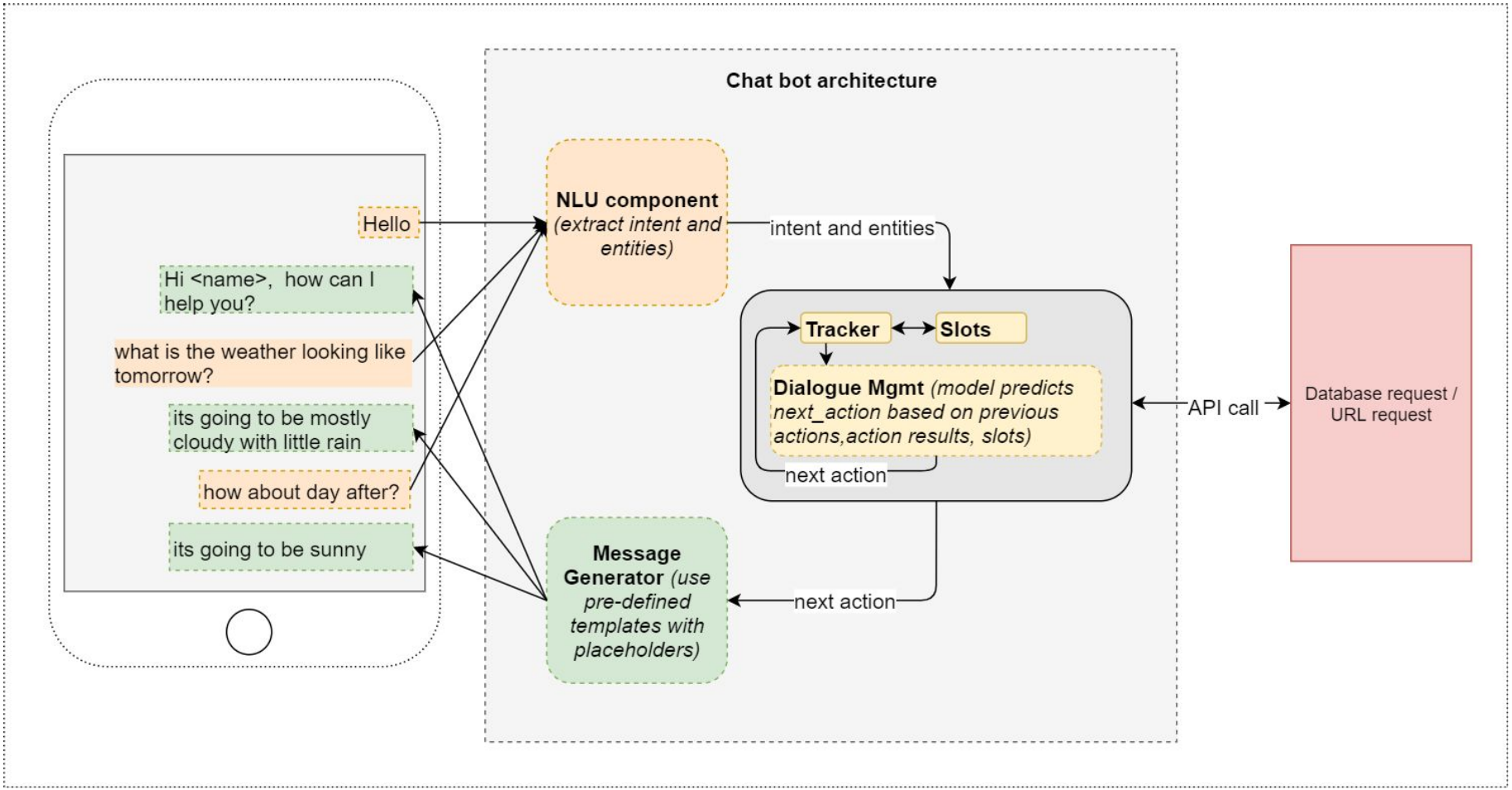
1. You can train the Rasa NLU model by running:
   `make train-nlu`
   This will train the Rasa NLU model and store it inside the `/models/current/nlu` folder of your project directory.

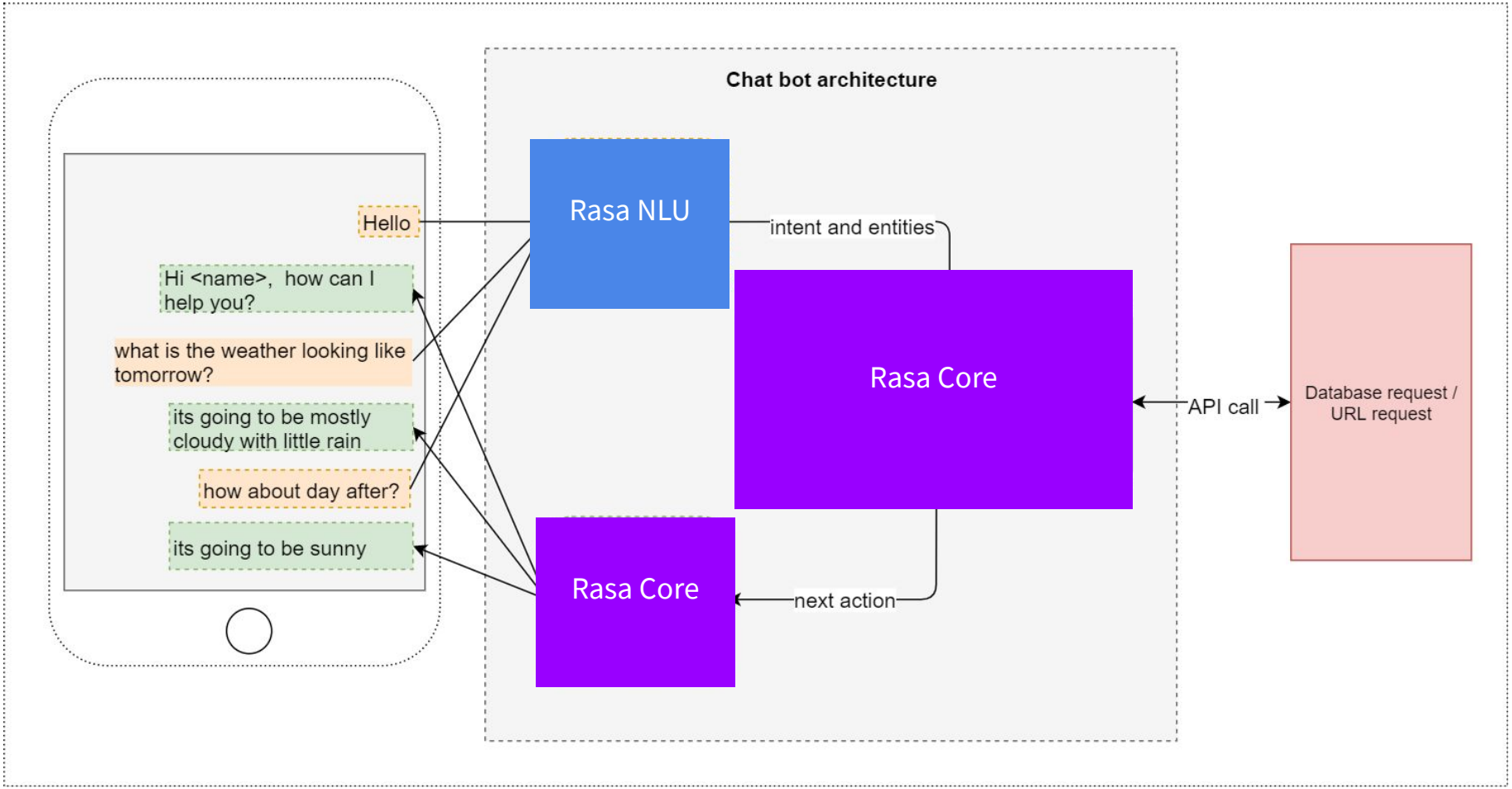
2. Train the Rasa Core model by running:
   `make train-core`
   This will train the Rasa Core model and store it inside the `/models/current/dialogue` folder of your project directory.

3. In a new terminal start the server for the custom action by running:
   `make action-server`
   This will start the server for emulating the custom action.

4. Test the assistant by running:
   `make cmdline`
   This will load the assistant in your terminal for you to chat.

</hands-on-1>


Chat bot architecture
Hello
Hi <name>, how can I help you?
what is the weather looking like tomorrow?
its going to be mostly cloudy with little rain
how about day after?
its going to be sunny
NLU component (extract intent and entities)
intent and entities
Tracker
Slots
Dialogue Mgmt (model predicts next_action based on previous actions,action results, slots)
next action
API call
Database request / URL request
Message Generator (use pre-defined templates with placeholders)
next action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intent and entities
Rasa Core
API call
Database request / URL request
Rasa Core
next action

Rasa NLU

“What on earth is this human trying to say?”

User Input

I want to book six seats for the Big Comedy Night at The Big Pitchers tomorrow.

NLU Magic

Entity Extraction

six CARDINAL

the Big Comedy Night LOC

tomorrow DATE

+

Intent Recognition

“The human wants me to perform the `book_tickets` action”

The NLU Philosophy

"Reduce the user's input to the SIMPLEST form possible."

- Preprocessing
- Regex Features
- Synonyms
- Lookup Tables

“I’m looking for hotels in NYC from 29th December to 31st December”

“I’m looking for hotels in New York City from 29/12 to 31/12”

“I’m looking for <accomodation:hotel> in <location:New York City, USA> from <date:2019-12-29> to <date:2019-12-31>”

“I’m looking for lodging in New York from December 29 to New Year’s Eve”

“I’m looking for a hotel in The Big Apple from Dec 29 to Dec 31.”

<hands-on-2>

Start NLU server

```
make run-nlu
```

Start chatting

```
python parse_text.py
<your input here>
```

</hands-on-2>

Recipe for an NLU system

Take some time to look at the following files in **`rasa-starter-pack/`**

- domain.yml - Defines the intents, entities, and action
- data/nlu_data.md - Training data lives here
- nlu_config.yml - The juice of the NLU

nlu_config.yml - NLU Pipeline

Defines the pipeline containing all components of the NLU. These include tokenizers, entity extractors, intent classifiers, synonym mappers, etc.

rasa.com/docs/nlu/components lists all the components. Check it out!

NLU Helpers

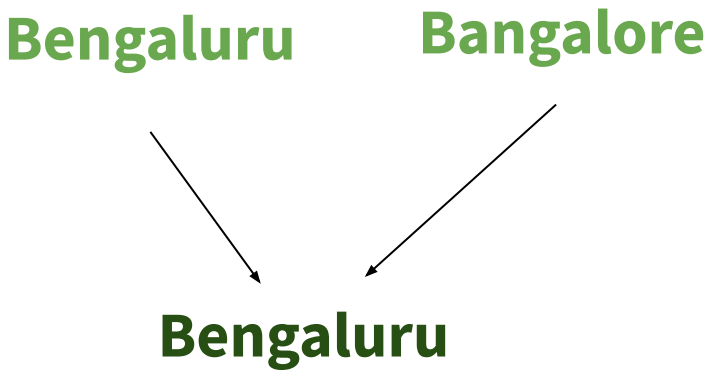
NLU Helpers

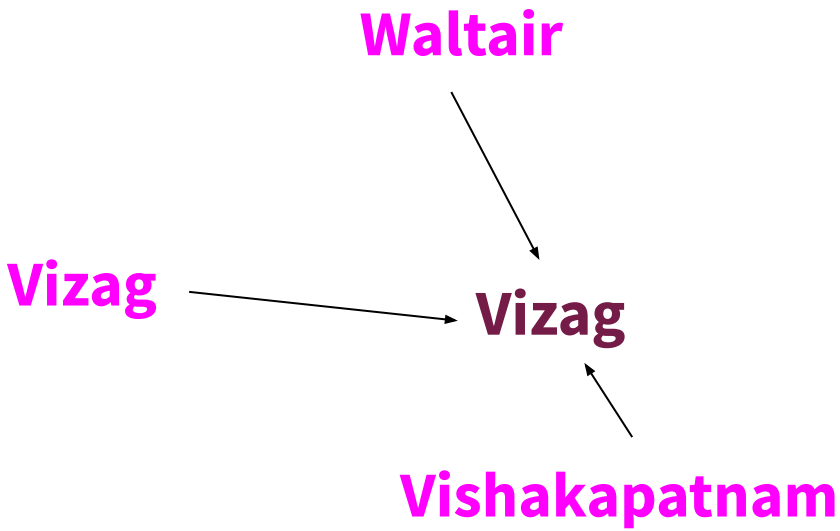
Each of the below “helpers” contribute their share to the COMMON POOL of features.

The combined information is used to make a decision.

- Common examples
- Synonyms
- Regex features
- Lookup tables

Synonyms


Bengaluru
Bangalore
Bengaluru


Waltair
Vizag
Vizag
Vishakapatnam

Synonyms

synonym:vizag
- vishakapatnam
- waltair

synonym:bengaluru
- bangalore

Regex Features and Lookup Tables

regex:indian_license_plate
- ^[A-Z]{2}[-][0-9]{1,2}(?: [A-Z])?(?: [A-Z]*)? [0-9]{4}$

lookup:currency
- INR
- USD
- GBP

TL;DR

You are making the NLU’s learning easier by providing it with these cues.

But you are ONLY giving it a helping hand, NOT authoritatively controlling its behavior.

<hands-on-3>

Challenges

Extract **`hands-on-3.zip`**. There, you will find a chatbot set up with its domain file, NLU config file, and NLU training data file.

Run **`train-nlu`** and **`run-nlu`** and input the 2 sentences in "**`data/test.txt`**" to it from "**`python parse_text.py <INPUT>`**"

Challenge 1

“I am looking for open tech roles”

Currently, the entity is being picked up as “tech”, but it is essential that “tech” and “technical” are treated as the same value.

Without adding extra training examples, perform the LEAST number of changes for it to treat them as the same.

Challenge 2

“Are there any openings here for a sales role in my pincode of 332211?”

The pincode is not picked up by the entity extractor.

Without adding extra training examples, perform the LEAST number of changes for it pick up the pincode as an entity.

</hands-on-3>