INTERNATIONAL UNIVERSITY OF APPLIED SCIENCES

Weather forecast task

DLMAIPAIUC01

Project AI Use Case

Phase 2

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Agenda

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What can this bot do?

Answer questions related to:

- temperature
- humidity
- wind
- weather

In a certain city, in current conditions or forecast for future date.

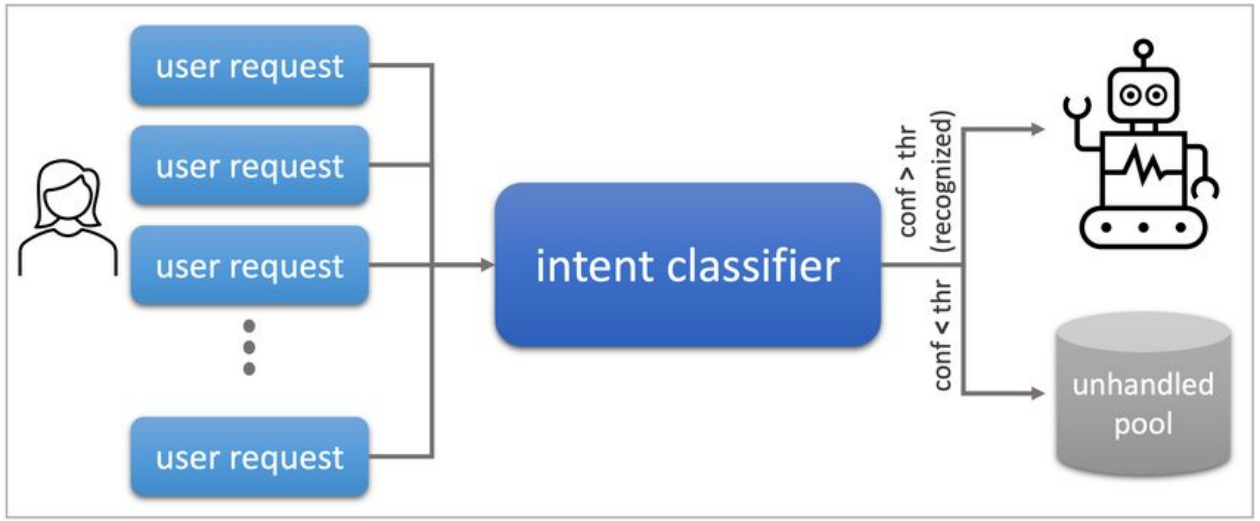
Also, if asked, it provides informations on what it can do.

About the model used

The model used for the chatbot is the zero-shot classifier Bart (https://huggingface.co/facebook/bart-large-mnli).

Reasons:

- no training needed
- works well with small, clearly defined intents
- lightweight



[1] Diagram showing a generic intent classifier (Rabinovich et al. 2022).

Weather data

The weather data comes from API calls from Open Weather Map (https://openweathermap.org/), using a free-tier API key (monthly rate limit).

The API used are two:

- Current weather: http://api.openweathermap.org/data/2.5/weather?q={city}&appid={API_KEY}&units=metric
- Forecast: http://api.openweathermap.org/data/2.5/forecast?q={city}&appid={API_KEY}&units=metric

Full docs: https://openweathermap.org/api

Flow, first step: identifying the intent

The first step is do identify the intent among the followings:

- "What's the weather like?"
- "What's the temperature?"
- "Will it rain?"
- "Is it windy?"
- "What's the humidity?"
- "What can you do?"

Score threshold used: 0.3, mutually exclusive (it’s chosen the best score).

Flow, second step: extracting city and date

From the user query, the city and the date are extracted.
We have the following cases:

- city found, date found: forecast query on the city (must be after the current date and at most 6 days after the current date).
- city found, date not found: current date query
- city not found: error

The extraction happens using RegEx matching, cleaning the sentence from punctuation and using stopwords that are not considered candidates for the city.

The RegEx matching for the date accepts certain common words as synonyms of dates (for example, “tomorrow”).

Flow, third step: building the response

The API is called in the following way: if date is present, forecast API is called, otherwise current weather API.

The response from the API is a JSON that is then filtered according to user's query, and returned as output.

Possible improvements

- More intents (e.g. asking a report for temperature for all the following week, or ask for historical data).
- Automatic tests (through unit testing, using mocked data to not call every time the external API).
- Provide the possibility to see temperature using Fahrenheit degrees or other scales.

The actual work can be seen in the following repository:
https://github.com/AlessandroCasonato/project_ai_use_case

References

[1]: Rabinovich. E. & Vetzler. M. & Boaz. D. & Kumar. V. (2022), “Gaining Insights into Unrecognized User Utterances in Task-Oriented Dialog Systems”, https://www.researchgate.net/publication/359890937_Gaining_Insights_into_Unrecognized_User_Utterances_in_Task-Oriented_Dialog_Systems?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6Il9kaXJlY3QiLCJwYWdlIjoiX2RpcmVjdCJ9fQ

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Thank you for your attention!