Filament technical test - Alex Nicol

Brief
A large pharmaceutical company has noticed they spend a lot of time handling internal requests for time off. They would like to create a chatbot to help automate this process.

We'd like you to propose and implement a proof of concept around this requirement, which includes basic integration with a database of your choosing.

Proof of concept

Product assumptions for the proof of concept

- All employees work 5 days per week Monday to Friday

- Bank holidays are ignored

- There are no particular automated rules about the maximum number of employees on leave at the same time

- Everyone starts with with 25 days of annual leave.

- Annual leave is for a minimum of 1 day (no half days)

- No notion of annual leave year.

All of the assumptions above would need to be taken in consideration for the implementation of a working product.

Technical choices for the proof of concept

- Slack will provide the UI.

- DialogFlow will proved the NLP engine.

- There's no integration with the company's HR system which would normally manage annual leave, and possibly login with Single Sign-On.

- The bot's DB will hold employees' requests and their statuses and annual leave quota.

- The Bot's DB will also hold the conversation state and the short term memory (context).

- There are 2 types of user, **employees** (who can **make annual leave request**s) and **line managers** (who can make annual leave requests, and **approve/decline**

requests from the people they manage). Some line managers don't need to have their requests approved.

- There's no particular initial setup or tutorial. Annual leave allowance and managers are set up manually.

Conversation design

(See attached document - conversation.png)

Not all path present in the document are implemented in the prototype.

The time off booking flow is designed to use random access navigation, so users would be able to use the following sentences to start the flow:

- I want to book some time off

- Book some holiday between tomorrow and next Friday

- Take some time off from 5th December and for 5 days

- I would like to request some time off starting next Monday

The bot would automatically gathered missing details from the initial request using the following prompts:

- When would you like your annual leave to start?

- When would you like to return to work.=?

Technical Architecture

(See attached document - architecture.png)

Database design

(See attached document - DB-schema.png)

For ease of use and rapidity to setup, the prototype actually uses AWS DynamoDB and a DocumentDB interpretation of the database schema.

Code

https://github.com/alexandrenicol/filament-pharma-bot

It is written using TypeScript, and it is using the Serverless Framework (AWS Provider).

The code itself isn't particularly documented, it doesn't include TSDocs, it doesn't include unit tests, and is structured to a prototype standard rather than to a fully finished product.

The sources of the code are in the *src* folder.

The 'queue.ts' file receives the Slack Events, with is dispatched to the Event Queue is relevant.

The `index.ts` receives the relevant Slack Events from the queue and process them:

1. Fetch the User from the DB using the event's SlackID (db.ts)

2. Call Dialogflow to get the intent and the slots from the user's message (nlp.js)

3. Uses the user's data (including conversation state and short term memory), the intent and the slots to determine the next step in the conversation, and the actions to execute. (engine.ts + all files in the conversation folder)

4. Sends back messages using the Slack Web Api (slack-api.ts)

5. Save the new data to the DB (db.ts)

Demo

See screen recording attached.

Access to the Slack App will be given upon request.