CS 6440 Project Final Submission

Developing an App to collect data for people at risk of Alzheimer's Disease

– Final Submission
Term: Spring 2024
Yuan Shang

Section I: Project Overview

Project Title: Developing an App to collect data for people at risk of Alzheimer's Disease

Team Members and Roles/Responsibilities (If Applicable)
- *Yuan Shang – Frontend, User Experience, Backend, Deployment*

TA Mentor: *Michael Romano*

Project Task Status

- Project initialization: set up softwares, github projects, etc.
- Finished Material and Background check.
- Information Flow Chart.
- Finished News Generation Module.
- Finished Audio recording Module as a Flash App.
- Finished login porter using smart FHIR
- Finished new patient registration
- Finished various module integration. Relationship database contraints, etc.
- Finished app deployment

Section II – Project Artifacts

Deployed Application URL: *(It's a standalone app.)*
GitHub Repository Link: *https://github.com/RaymondSHANG/AudioCollector*
GitHub Branch or Commit to Grade (If Applicable):
ffc6ea7977f771e17da2e99ab18908d9baf2dbba

Section III – Project Presentation

Presentation Link: *(GoogleDrive https://drive.google.com/file/d/1MyxZbfmB32OZcl3aJslkEzhp95gxX8Kn/view?usp=sharing)*

Provide a FULL URL, DO NOT EMBED THE LINK IN A WORD OR PHRASE.

Note: Convert Slides to PDF and Merge with this single submission. You could add the contents of this deliverable to the final slide deck and convert the whole thing to a PDF to submit. Just make sure all links are clickable and do not include the submission information in the video presentation. (This is to provide a backup to presentations, both to ensure smoother grading in case of an error in a presentation and to maintain a record in Canvas.)

Section IV – Project Documentation

Create a directory in your GitHub repository called "Documentation". Within this directory provide the following:

- Technical and/or User Manual
    - Provide information on deployment of the application.
    - Provide basic user instructions in order to utilize the application fully and show off all features.
    - Special Instructions for Grading ("navigate to this URL…type in the following…click on this...etc.") for the instructing team to follow in order to successfully deploy and run your application (in the event it is necessary, trust us it happens every semester). Include any special build or launch instructions. Please do not forget login information or anything such as FHIR patient IDs that may be needed.
        - **PLEASE USE MARKDOWN SO NO DOWNLOAD/CLONE IS REQUIRED.**
- Research
    - Any research done during the course of the project. This will vary heavily by project. As always, check with your TA mentor on expectations.
- Architecture Diagram
    - Include an up to date version of your architecture diagram from Sprint #2.

- Startup and Configuration Files
    - Dockerfile, docker-compose.yml, etc…, as applicable

For each item included, provide a labeled direct links. Use full URLs, do not embed the link in a word or phrase.

All of the documentation that you submit with your final project should be treated as an official deliverable – this includes the technical/user manual(s). Documentation that is not well structured or clearly written may result in point loss, as it can impact use and thus grading of the application.

PPT slice:

Developing an App to collect data for people at risk of Alzheimer's Disease

Yuan Shang

TA mentor:*Michael Romano*

CS6440, Spring 2024

Background

- Alzheimer's Disease (AD, here and after) is a chronic neurodegenerative disease and the most common cause of dementia.
- The early signs of the disease include forgetting recent events or conversations. Over time, it progresses to serious memory problems and loss of the ability to perform everyday tasks. This whole process may last for over 20 years.
- Timing of interventions to the disease are very critical to the clinical outcomes. However, there is no satisfying tool for the early diagnosis.
- Linguistic performance has been shown to be useful as an early biomarker of AD.
- A convenient tool that record the linguistic performance would largely fill the gap by: 1. Collect huge amount data of audio data, 2.establish the relations between audio data and cognitive function.

Development

- The web based app:

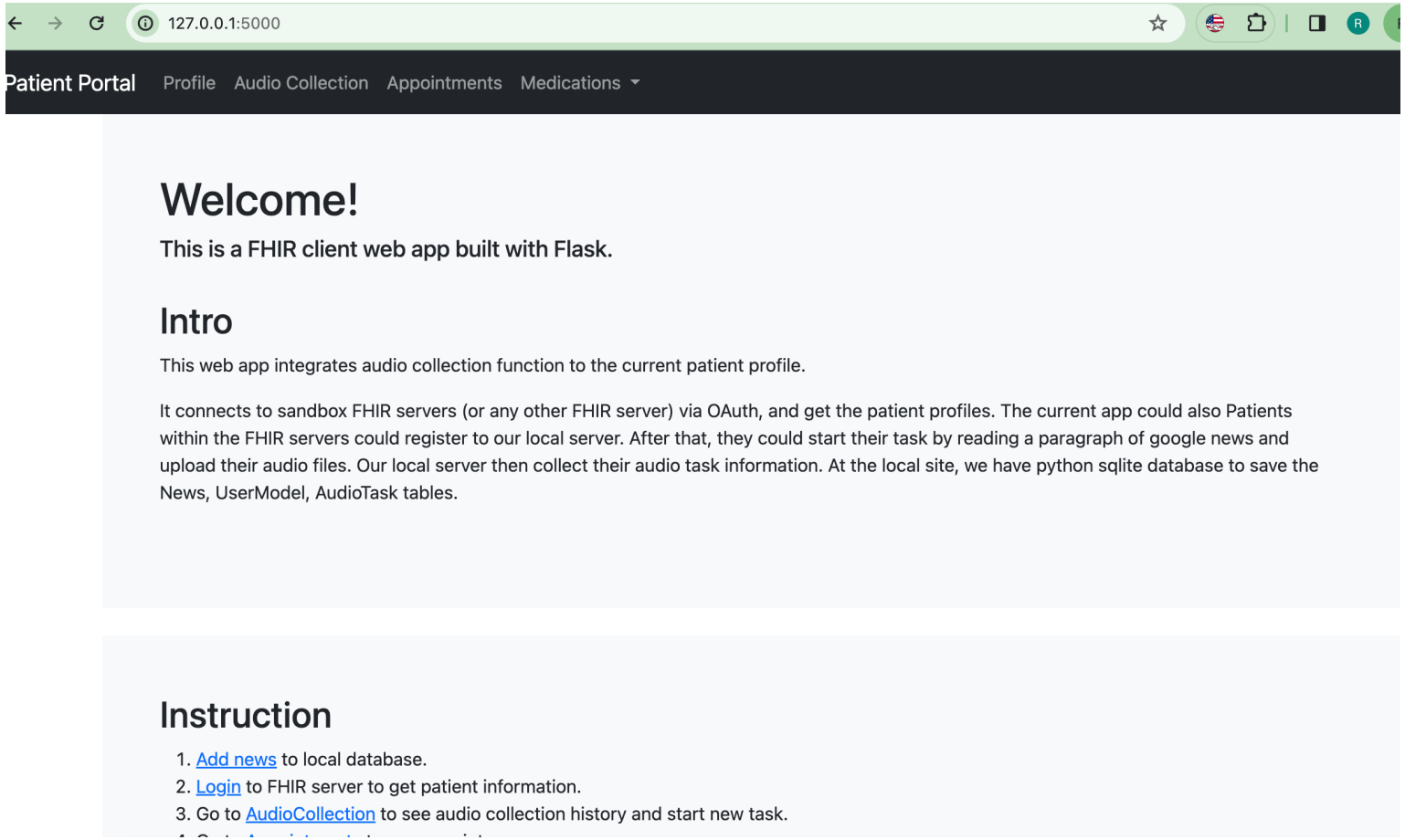
  Python flask as the development environment.

  Python sqlite database to save data

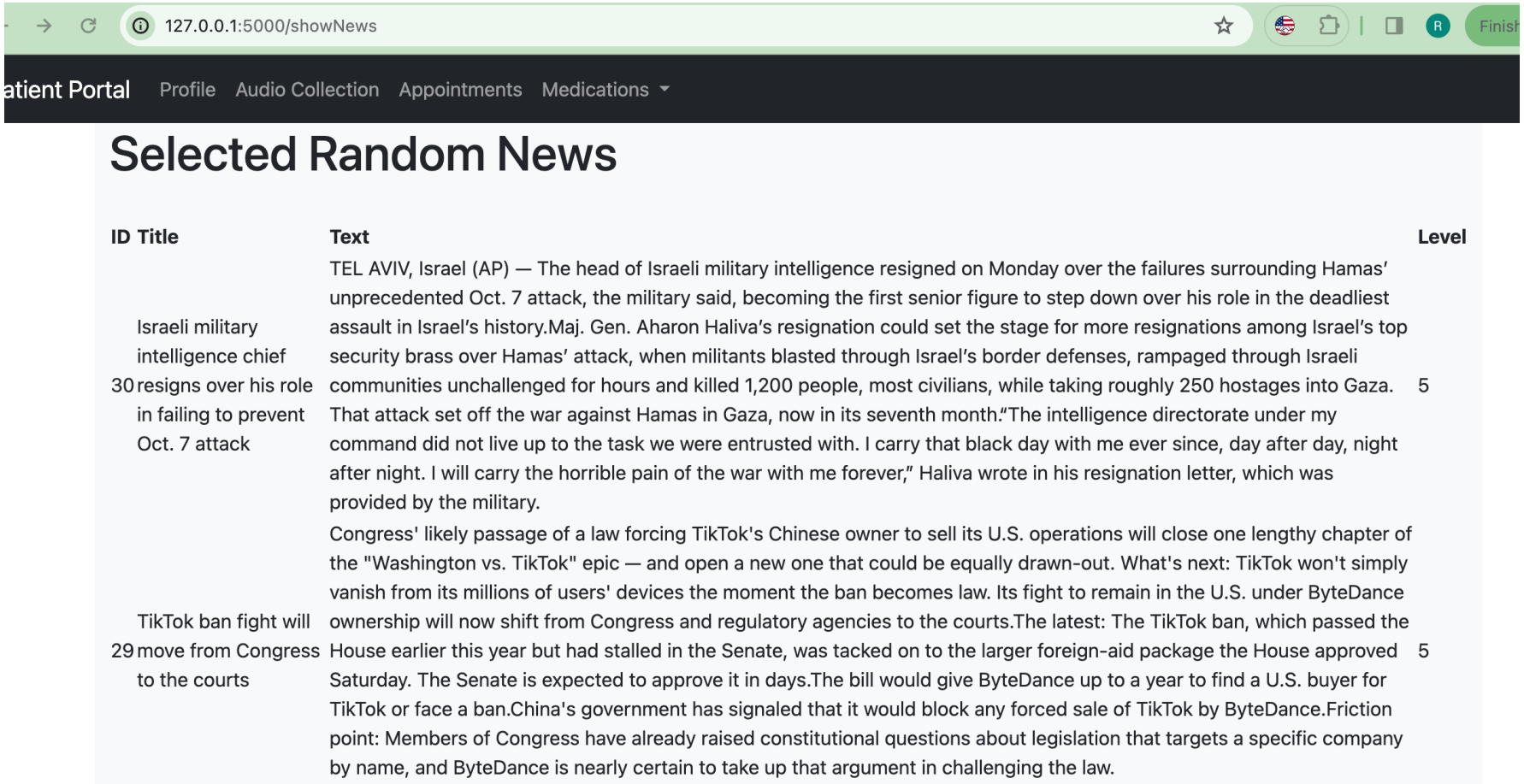
  Python fhirclient to communicate with FHIR server

Demo

Welcome

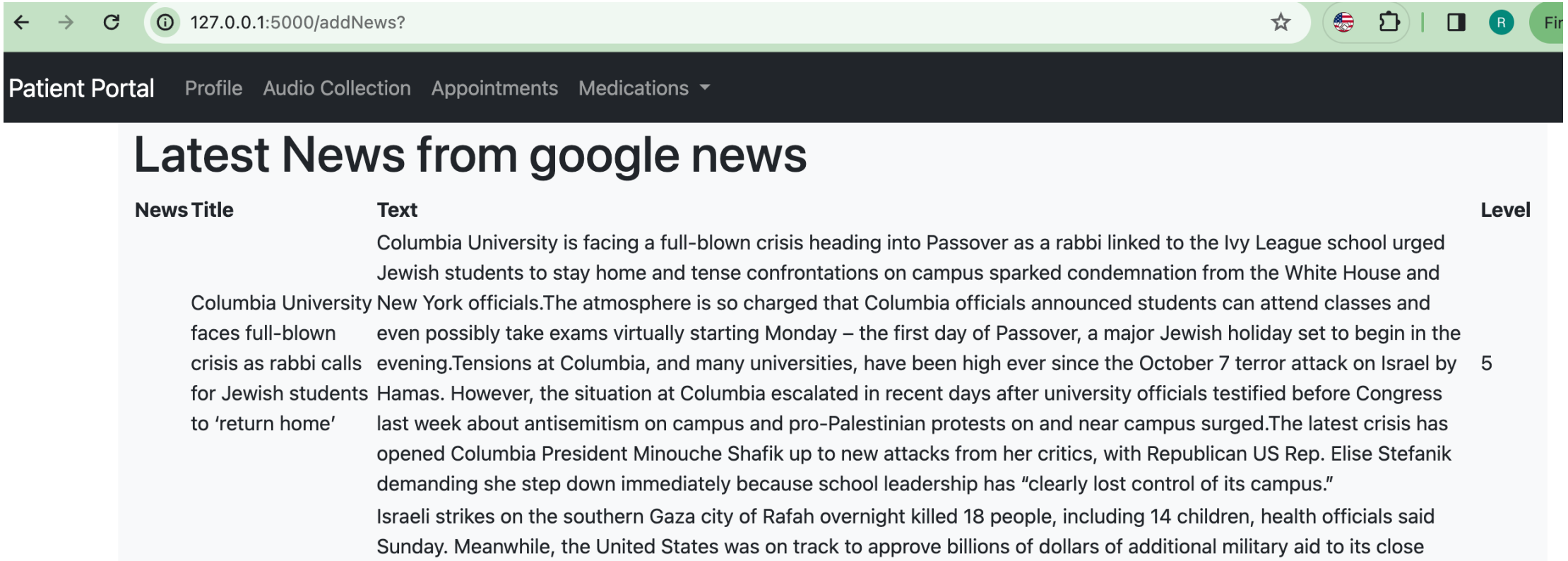

127.0.0.1:5000
Patient Portal
Profile
Audio Collection
Appointments
Medications
Welcome!
This is a FHIR client web app built with Flask.
Intro
This web app integrates audio collection function to the current patient profile.
It connects to sandbox FHIR servers (or any other FHIR server) via OAuth, and get the patient profiles. The current app could also Patients within the FHIR servers could register to our local server. After that, they could start their task by reading a paragraph of google news and upload their audio files. Our local server then collect their audio task information. At the local site, we have python sqlite database to save the News, UserModel, AudioTask tables.
Instruction
1. Add news to local database.
2. Login to FHIR server to get patient information.
3. Go to AudioCollection to see audio collection history and start new task.

Show random news



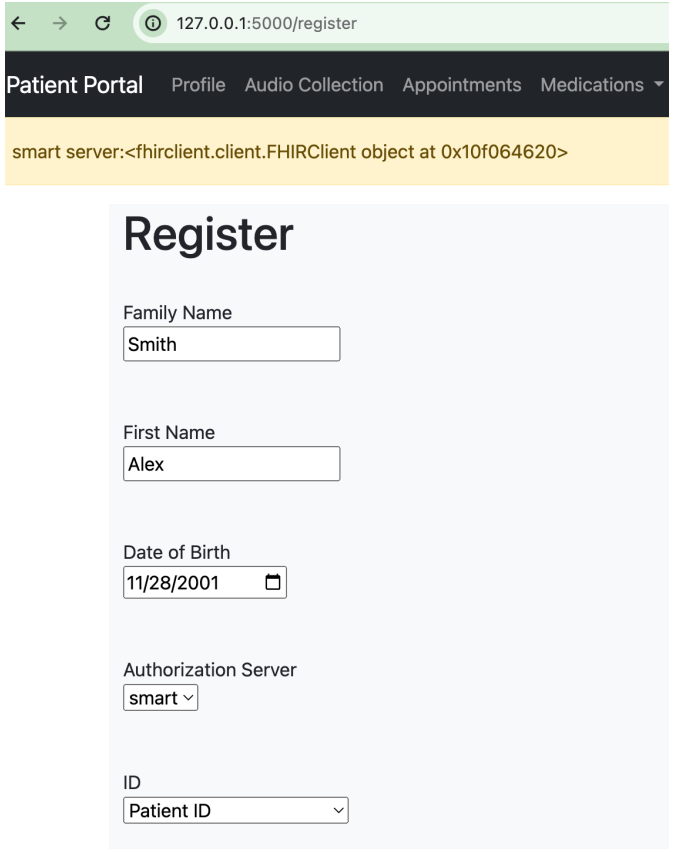
ID	Title	Text	Level
30	Israeli military intelligence chief resigns over his role in failing to prevent Oct. 7 attack	TEL AVIV, Israel (AP) — The head of Israeli military intelligence resigned on Monday over the failures surrounding Hamas' unprecedented Oct. 7 attack, the military said, becoming the first senior figure to step down over his role in the deadliest assault in Israel's history.Maj. Gen. Aharon Haliva's resignation could set the stage for more resignations among Israel's top security brass over Hamas' attack, when militants blasted through Israel's border defenses, rampaged through Israeli communities unchallenged for hours and killed 1,200 people, most civilians, while taking roughly 250 hostages into Gaza. That attack set off the war against Hamas in Gaza, now in its seventh month."The intelligence directorate under my command did not live up to the task we were entrusted with. I carry that black day with me ever since, day after day, night after night. I will carry the horrible pain of the war with me forever," Haliva wrote in his resignation letter, which was provided by the military.	5
29	TikTok ban fight will move from Congress to the courts	Congress' likely passage of a law forcing TikTok's Chinese owner to sell its U.S. operations will close one lengthy chapter of the "Washington vs. TikTok" epic — and open a new one that could be equally drawn-out. What's next: TikTok won't simply vanish from its millions of users' devices the moment the ban becomes law. Its fight to remain in the U.S. under ByteDance ownership will now shift from Congress and regulatory agencies to the courts.The latest: The TikTok ban, which passed the House earlier this year but had stalled in the Senate, was tacked on to the larger foreign-aid package the House approved Saturday. The Senate is expected to approve it in days.The bill would give ByteDance up to a year to find a U.S. buyer for TikTok or face a ban.China's government has signaled that it would block any forced sale of TikTok by ByteDance.Friction point: Members of Congress have already raised constitutional questions about legislation that targets a specific company by name, and ByteDance is nearly certain to take up that argument in challenging the law.	5

Add new google news



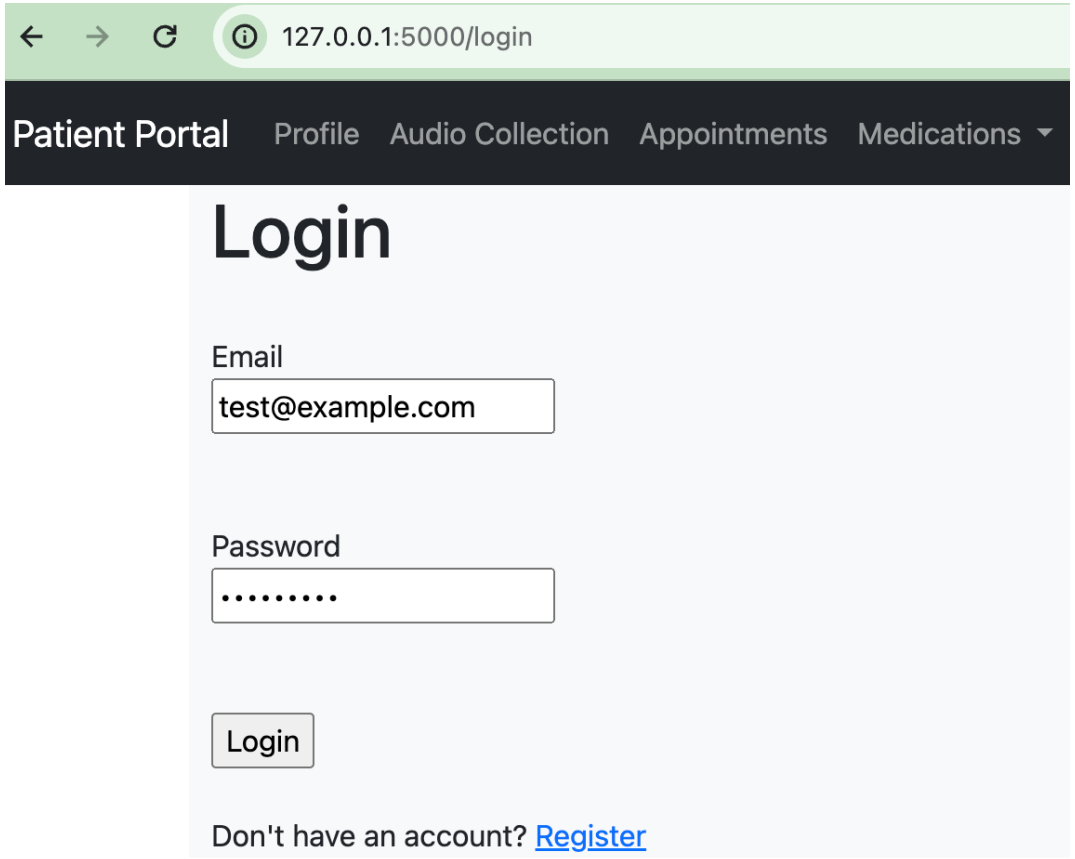
Patient registration

- First check patient in FHIR. Only patient authorized at FHIR could register in the server

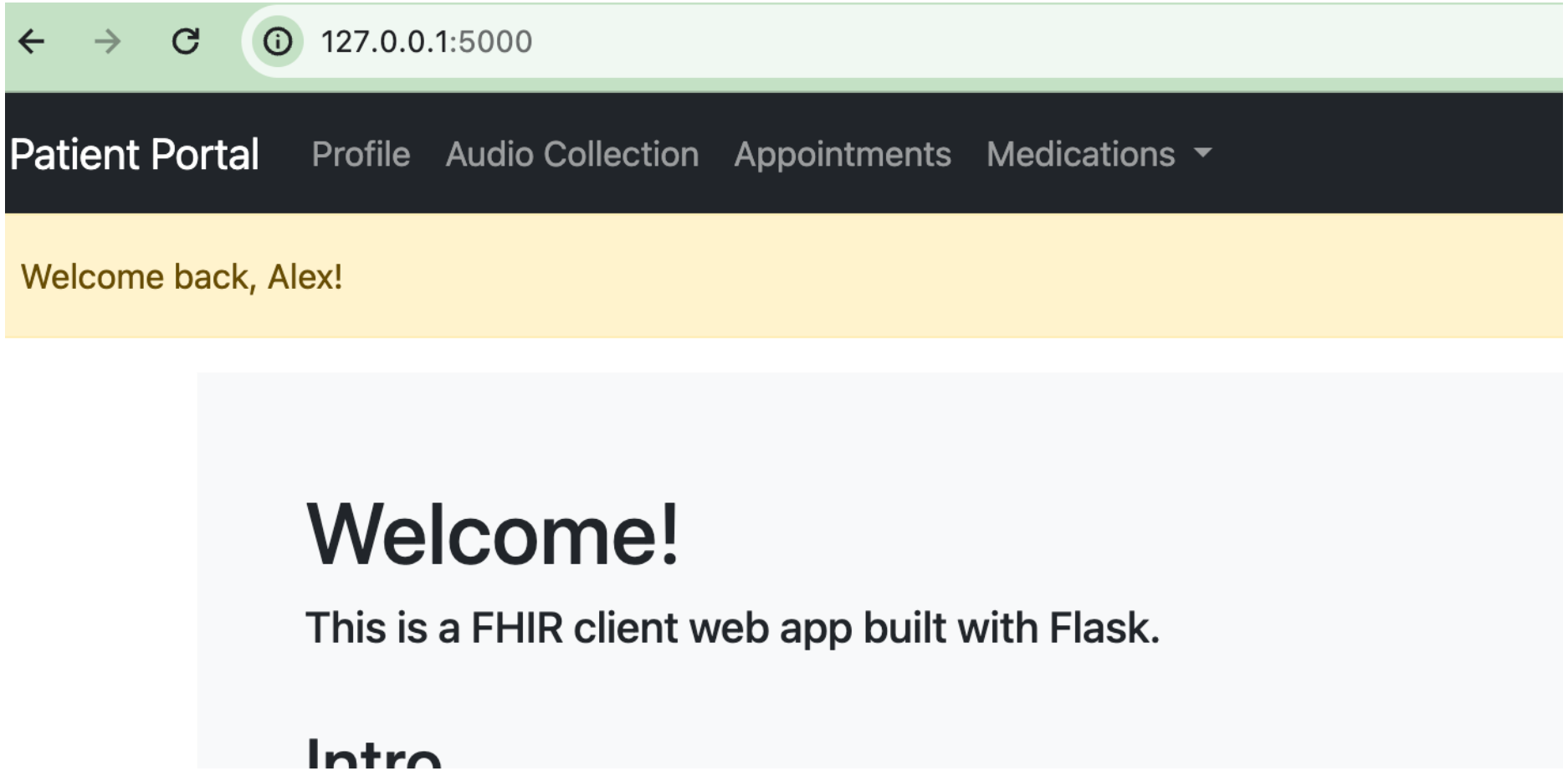


Patient login

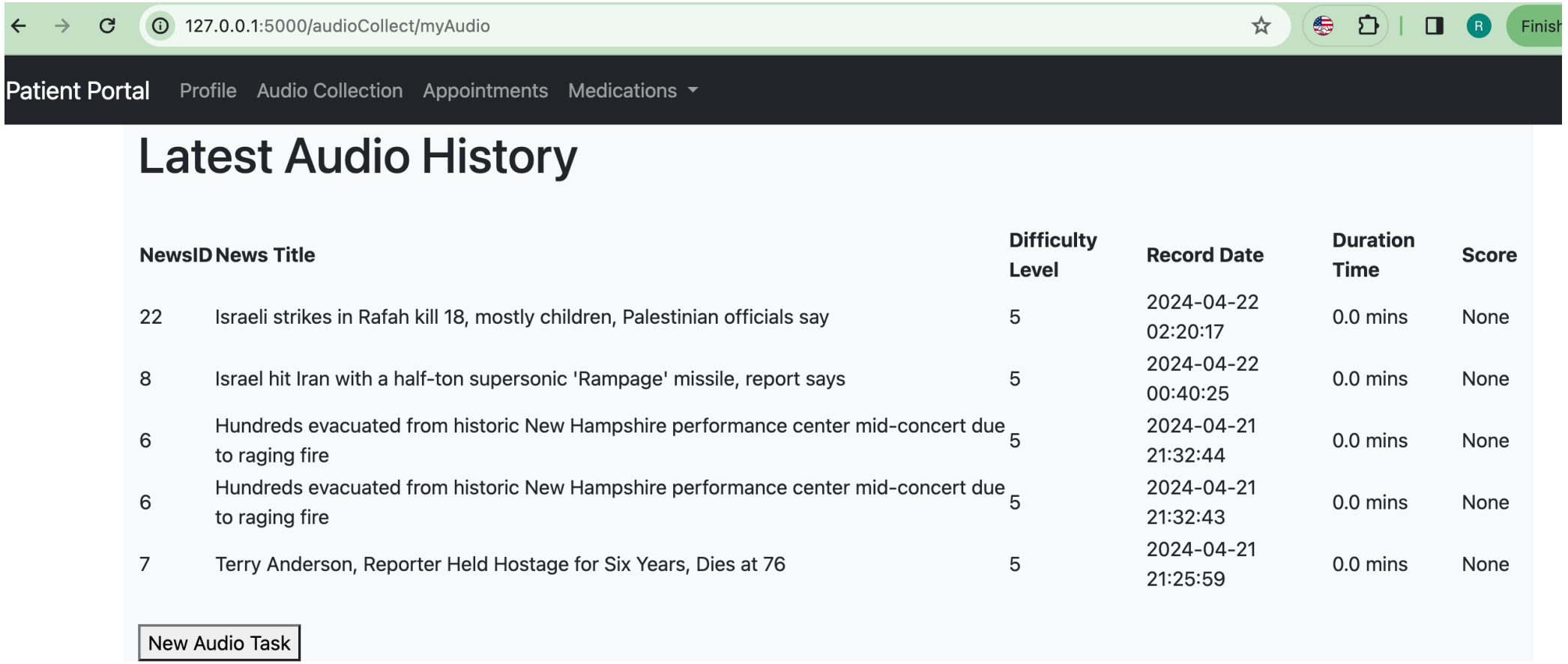
Returning patient could login with their email and password



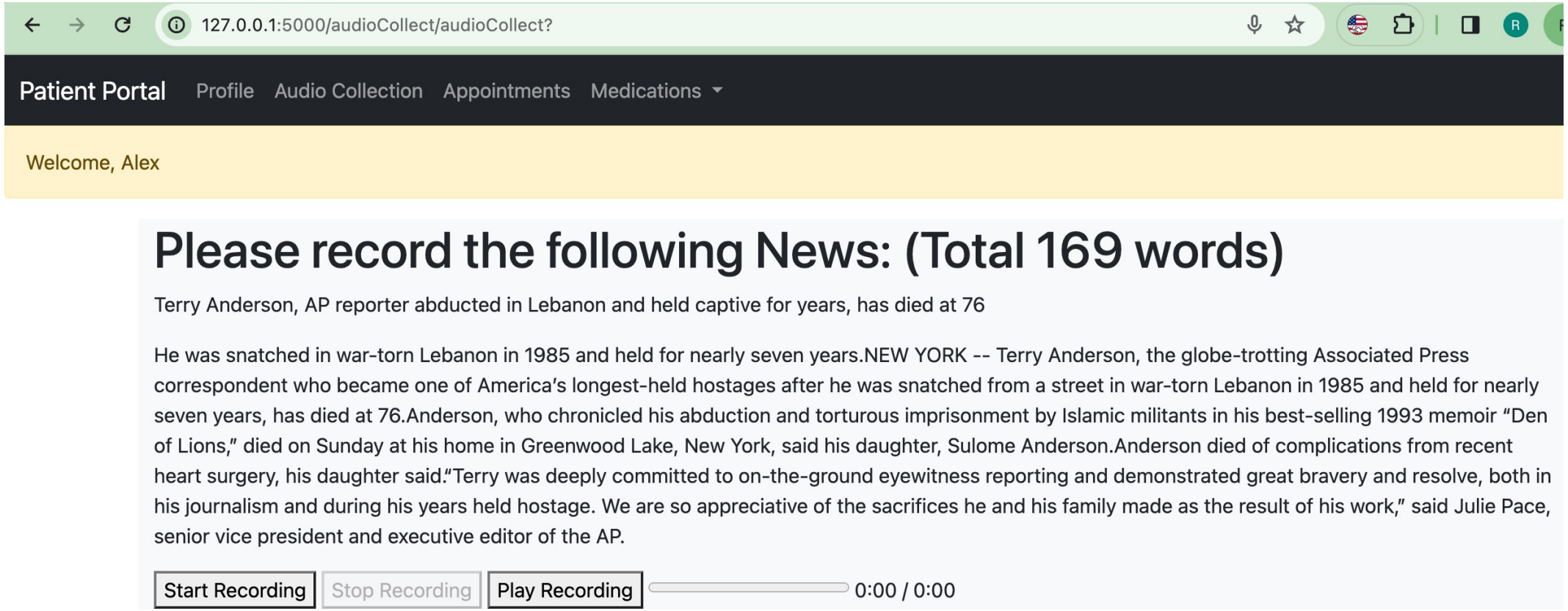
After login, show login credential



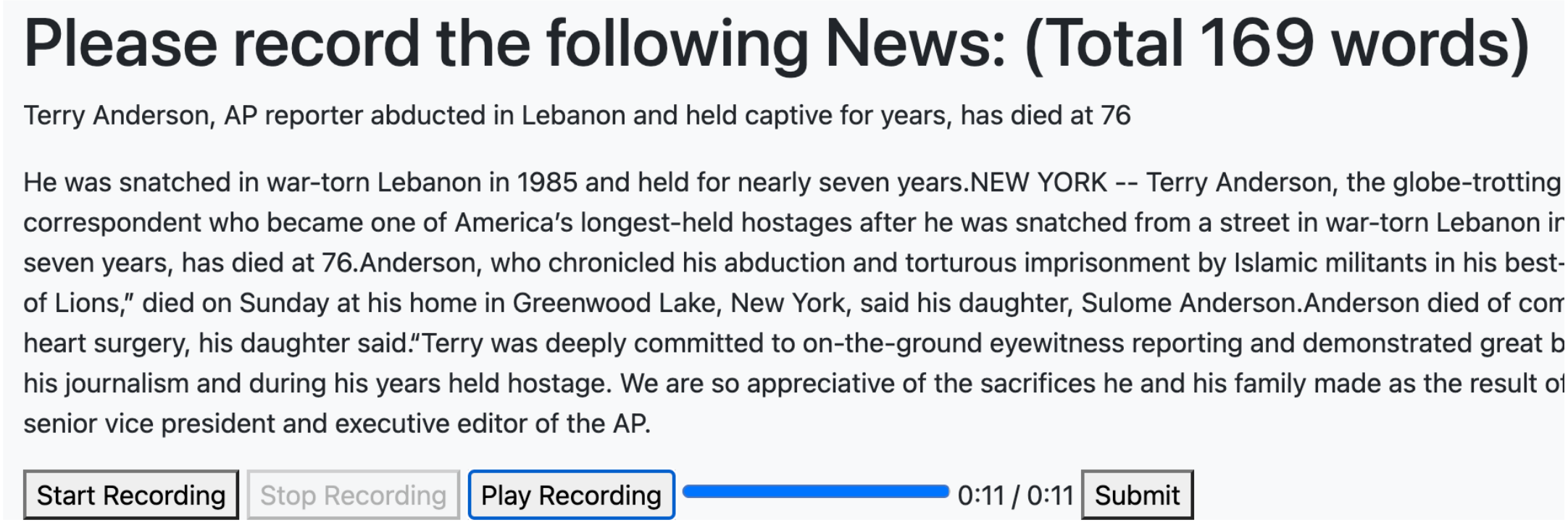
Audio task history for the current patient



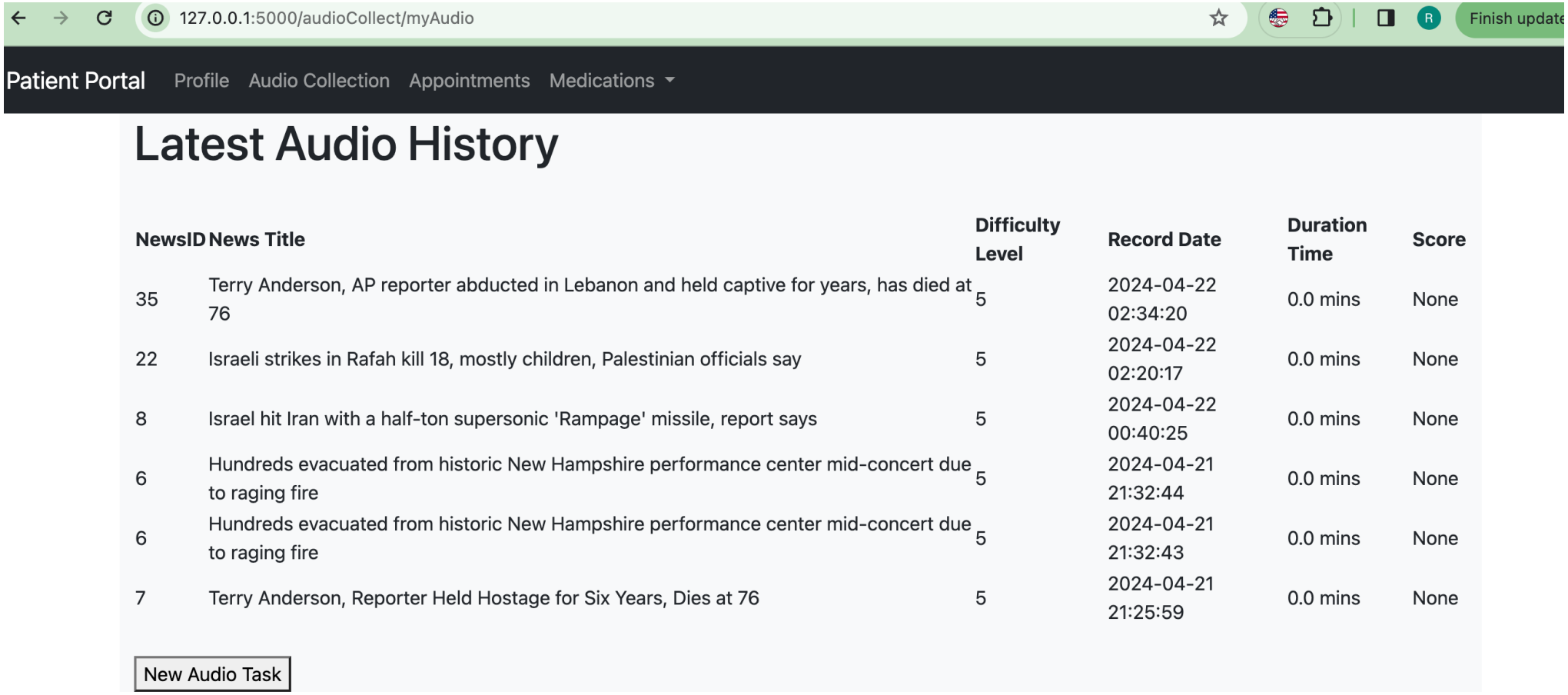
New Audio task for the current patient



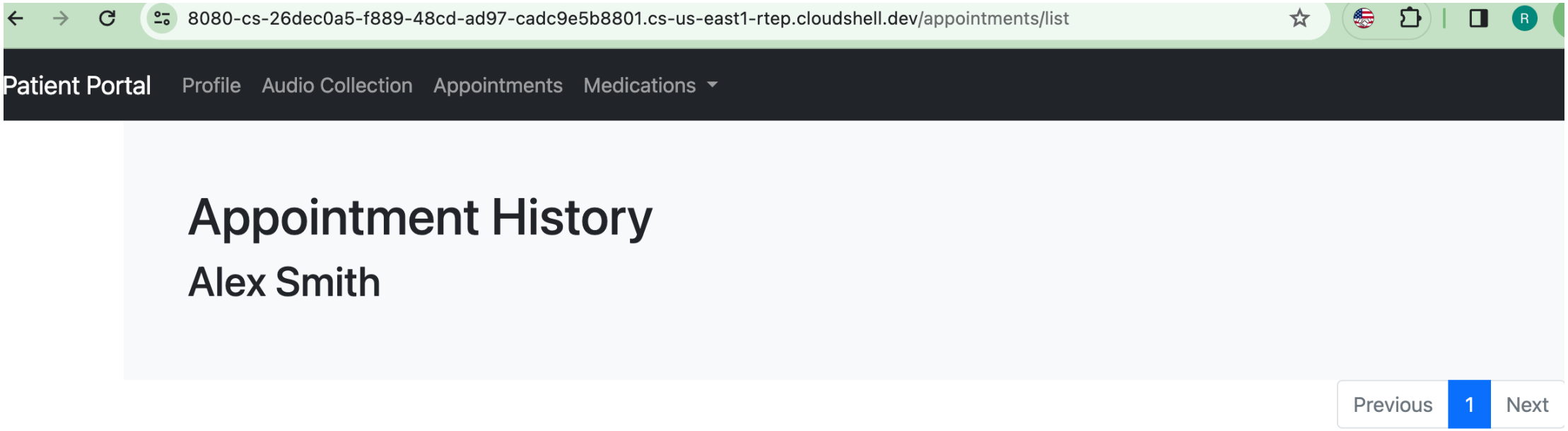
Play recorded audio before submit



Updated audio history

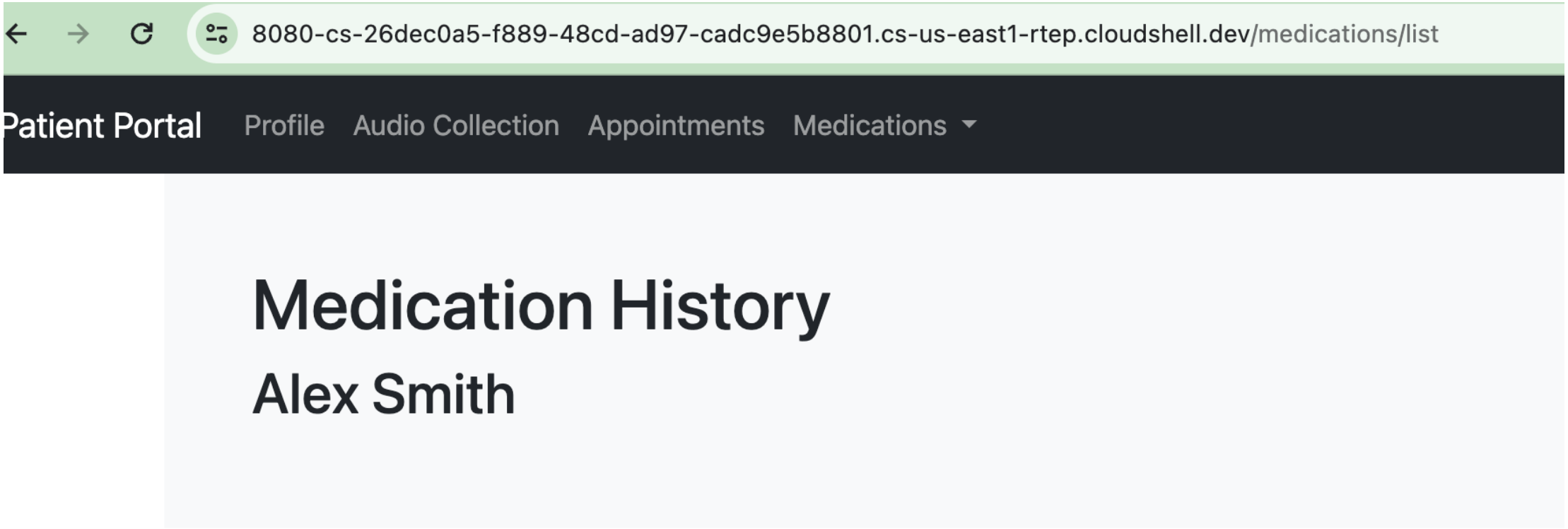


Others: appointments



Local test: Error; Google cloud test: no error

Others: medications



Thanks!