

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 constraints, 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/1MyxZbfmB320Zcl3aJslkEzhp95gxX8Kn/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:

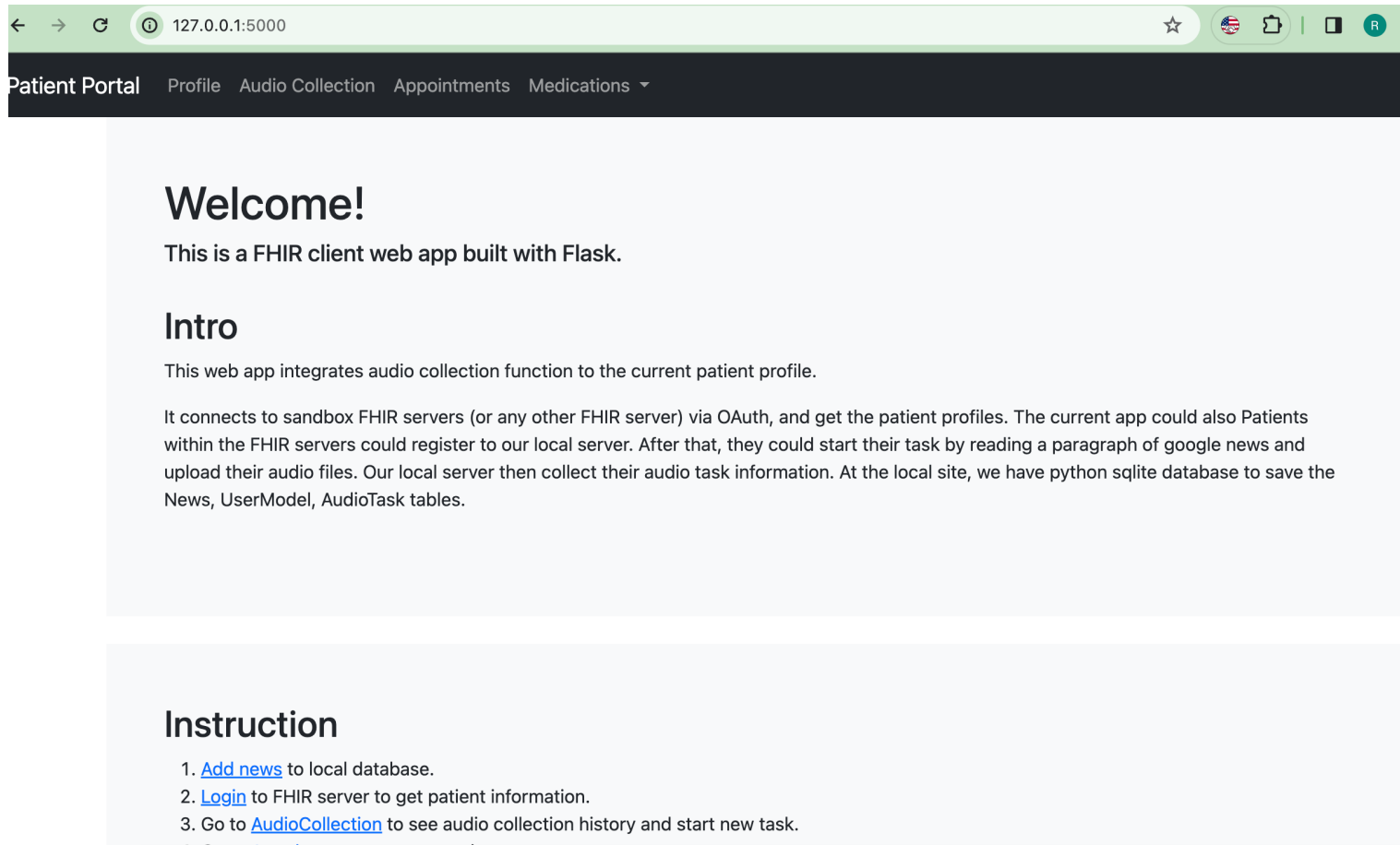
Python flask as the development environment.

Python sqlite database to save data

Python fhirclient to communicate with FHIR server

Demo

Welcome



Show random news

→ ↺ ⓘ 127.0.0.1:5000/showNews

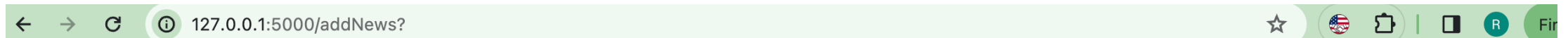
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Selected Random News

| 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



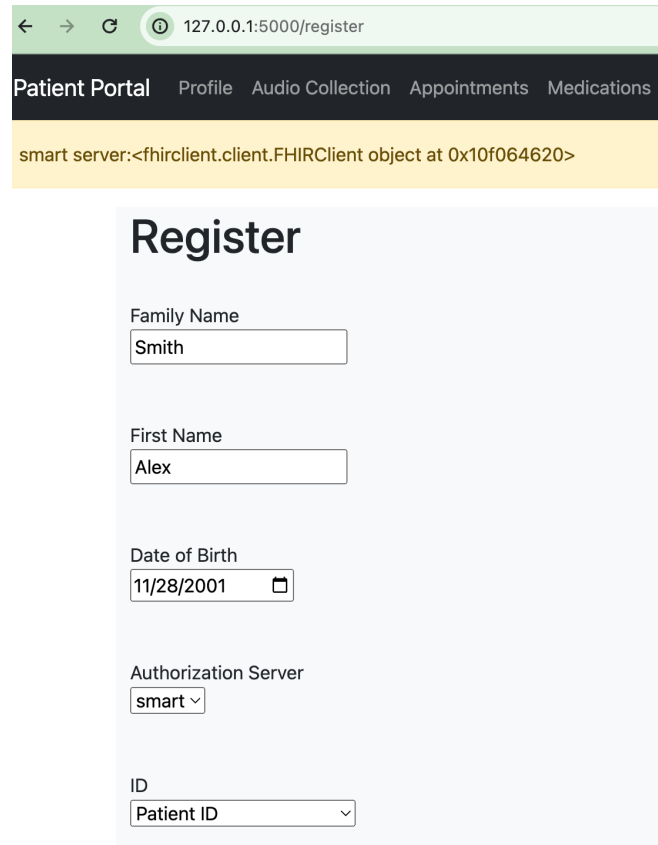
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Latest News from google news

| News Title | Text | Level |
|--|---|-------|
| Columbia University faces full-blown crisis as rabbi calls for Jewish students to 'return home' | Columbia University is facing a full-blown crisis heading into Passover as a rabbi linked to the Ivy League school urged Jewish students to stay home and tense confrontations on campus sparked condemnation from the White House and New York officials. The atmosphere is so charged that Columbia officials announced students can attend classes and even possibly take exams virtually starting Monday – the first day of Passover, a major Jewish holiday set to begin in the evening. Tensions at Columbia, and many universities, have been high ever since the October 7 terror attack on Israel by Hamas. However, the situation at Columbia escalated in recent days after university officials testified before Congress last week about antisemitism on campus and pro-Palestinian protests on and near campus surged. The latest crisis has opened Columbia President Minouche Shafik up to new attacks from her critics, with Republican US Rep. Elise Stefanik demanding she step down immediately because school leadership has “clearly lost control of its campus.” | 5 |
| Israeli strikes on the southern Gaza city of Rafah overnight killed 18 people, including 14 children, health officials said Sunday. Meanwhile, the United States was on track to approve billions of dollars of additional military aid to its close | | |

Patient registration

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



The screenshot shows a web browser window with the address bar displaying "127.0.0.1:5000/register". The page has a dark navigation bar with links: "Patient Portal", "Profile", "Audio Collection", "Appointments", and "Medications". Below the navigation bar is a yellow status bar with the text "smart server:<fhirclient.client.FHIRClient object at 0x10f064620>". The main content area is titled "Register" and contains several form fields: "Family Name" with the value "Smith", "First Name" with the value "Alex", "Date of Birth" with the value "11/28/2001" and a calendar icon, "Authorization Server" with a dropdown menu showing "smart", and "ID" with a dropdown menu showing "Patient ID".

127.0.0.1:5000/register

Patient Portal Profile Audio Collection Appointments Medications

smart server:<fhirclient.client.FHIRClient object at 0x10f064620>

Register

Family Name
Smith

First Name
Alex

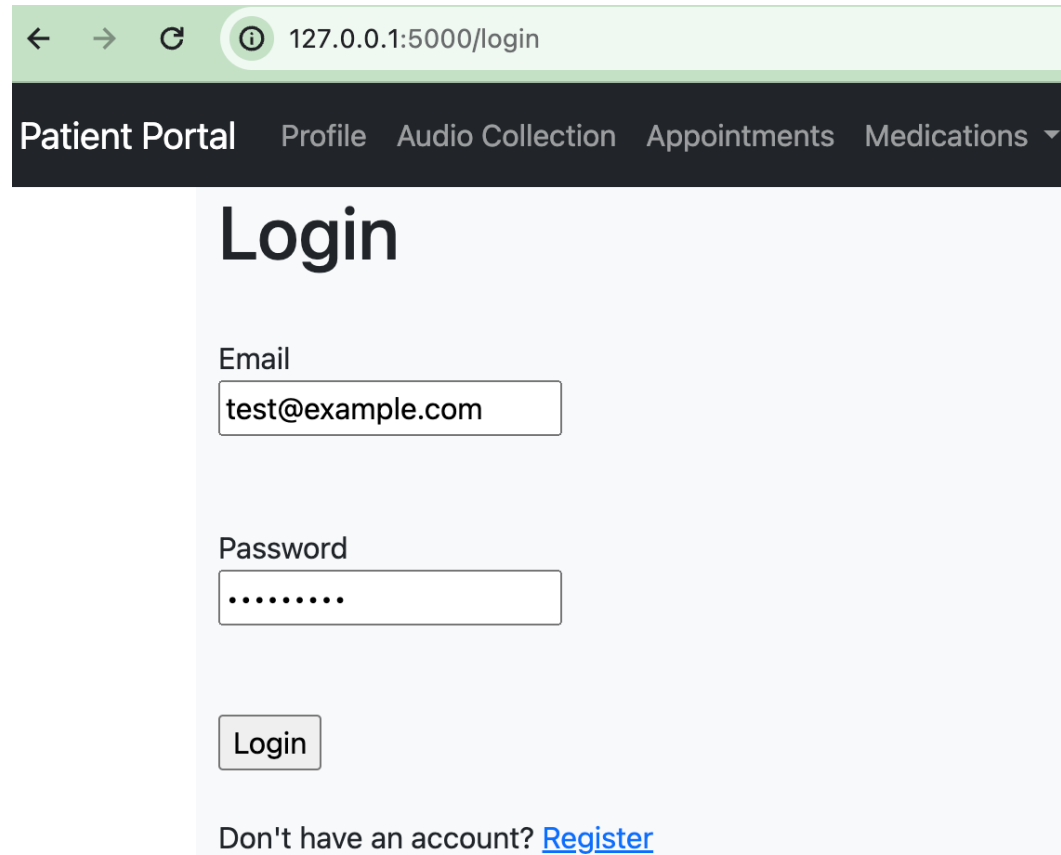
Date of Birth
11/28/2001

Authorization Server
smart

ID
Patient ID

Patient login

Returning patient could login with their email and password



A screenshot of a web browser displaying a patient login portal. The browser's address bar shows the URL '127.0.0.1:5000/login'. The page has a dark navigation bar with the text 'Patient Portal' and several menu items: 'Profile', 'Audio Collection', 'Appointments', and 'Medications' with a dropdown arrow. The main content area is light gray and features the heading 'Login'. Below the heading are two input fields: 'Email' containing 'test@example.com' and 'Password' containing a series of dots. A 'Login' button is positioned below the password field. At the bottom, there is a link that says 'Don't have an account? [Register](#)'.

← → ↻ ⓘ 127.0.0.1:5000/login

Patient Portal Profile Audio Collection Appointments Medications ▾

Login

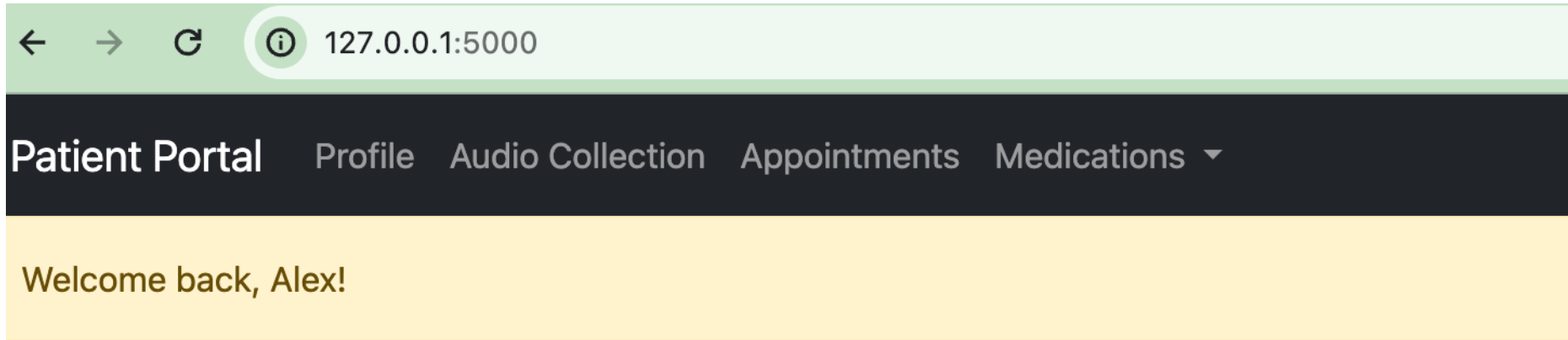
Email

Password

Login

Don't have an account? [Register](#)

After login, show login credential



Welcome!

This is a FHIR client web app built with Flask.

Intro

Audio task history for the current patient


←


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127.0.0.1:5000/audioCollect/myAudio

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R

Finish

Patient Portal

Profile

Audio Collection

Appointments











Medications ▾

Latest Audio History

| NewsID | News Title | Difficulty Level | Record Date | Duration Time | Score |
|--------|--|------------------|---------------------|---------------|-------|
| 22 | Israeli strikes in Rafah kill 18, mostly children, Palestinian officials say | 5 | 2024-04-22 02:20:17 | 0.0 mins | None |
| 8 | Israel hit Iran with a half-ton supersonic 'Rampage' missile, report says | 5 | 2024-04-22 00:40:25 | 0.0 mins | None |
| 6 | Hundreds evacuated from historic New Hampshire performance center mid-concert due to raging fire | 5 | 2024-04-21 21:32:44 | 0.0 mins | None |
| 6 | Hundreds evacuated from historic New Hampshire performance center mid-concert due to raging fire | 5 | 2024-04-21 21:32:43 | 0.0 mins | None |
| 7 | Terry Anderson, Reporter Held Hostage for Six Years, Dies at 76 | 5 | 2024-04-21 21:25:59 | 0.0 mins | None |

New Audio Task

New Audio task for the current patient

    127.0.0.1:5000/audioCollect/audioCollect?      

Patient Portal Profile Audio Collection Appointments Medications ▾

Welcome, Alex

Please record the following News: (Total 169 words)

Terry Anderson, AP reporter abducted in Lebanon and held captive for years, has died at 76

He was snatched in war-torn Lebanon in 1985 and held for nearly seven years. NEW YORK -- Terry Anderson, the globe-trotting Associated Press correspondent who became one of America's longest-held hostages after he was snatched from a street in war-torn Lebanon in 1985 and held for nearly seven years, has died at 76. Anderson, who chronicled his abduction and torturous imprisonment by Islamic militants in his best-selling 1993 memoir "Den of Lions," died on Sunday at his home in Greenwood Lake, New York, said his daughter, Sulome Anderson. Anderson died of complications from recent heart surgery, his daughter said. "Terry was deeply committed to on-the-ground eyewitness reporting and demonstrated great bravery and resolve, both in his journalism and during his years held hostage. We are so appreciative of the sacrifices he and his family made as the result of his work," said Julie Pace, senior vice president and executive editor of the AP.

Start Recording

Stop Recording

Play Recording

0:00 / 0:00

Play recorded audio before submit

Please record the following News: (Total 169 words)

Terry Anderson, AP reporter abducted in Lebanon and held captive for years, has died at 76

He was snatched in war-torn Lebanon in 1985 and held for nearly seven years. NEW YORK -- Terry Anderson, the globe-trotting correspondent who became one of America's longest-held hostages after he was snatched from a street in war-torn Lebanon in seven years, has died at 76. Anderson, who chronicled his abduction and torturous imprisonment by Islamic militants in his best-selling book "The Siege of the Trenches of Lion's Head," died on Sunday at his home in Greenwood Lake, New York, said his daughter, Sulome Anderson. Anderson died of complications from heart surgery, his daughter said. "Terry was deeply committed to on-the-ground eyewitness reporting and demonstrated great bravery in his journalism and during his years held hostage. We are so appreciative of the sacrifices he and his family made as the result of his work as a senior vice president and executive editor of the AP."

Start Recording

Stop Recording

Play Recording




0:11 / 0:11

Submit

Updated audio history

127.0.0.1:5000/audioCollect/myAudio

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R

Finish update

Patient Portal

Profile

Audio Collection

Appointments

Medications ▾

Latest Audio History

| NewsID | News Title | Difficulty Level | Record Date | Duration Time | Score |
|--------|--|------------------|------------------------|---------------|-------|
| 35 | Terry Anderson, AP reporter abducted in Lebanon and held captive for years, has died at 76 | 5 | 2024-04-22 02:34:20 | 0.0 mins | None |
| 22 | Israeli strikes in Rafah kill 18, mostly children, Palestinian officials say | 5 | 2024-04-22 02:20:17 | 0.0 mins | None |
| 8 | Israel hit Iran with a half-ton supersonic 'Rampage' missile, report says | 5 | 2024-04-22 00:40:25 | 0.0 mins | None |
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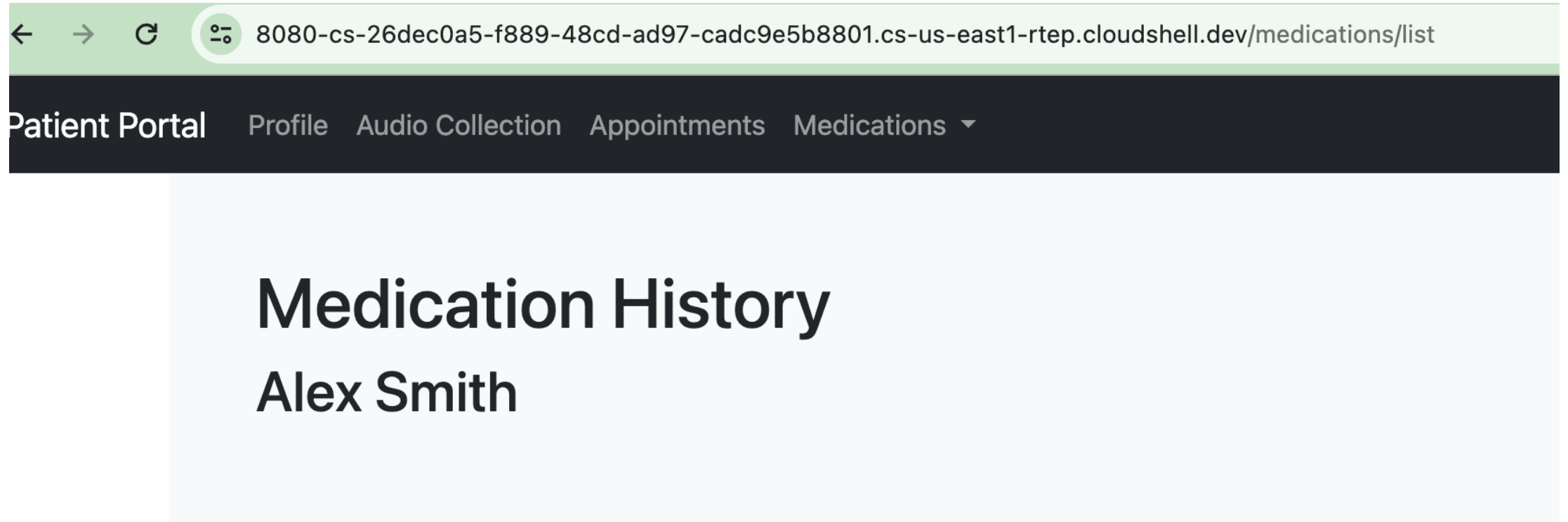
New Audio Task

Others: appointments

| <div>← → ↻ 8080-cs-26dec0a5-f889-48cd-ad97-cadc9e5b8801.cs-us-east1-rtep.cloudshell.dev/appointments/list ☆ 🇺🇸 📦 📱 R</div> <div>Patient Portal Profile Audio Collection Appointments Medications ▾</div> | | | |
|--|------------|--------|----------|
| <div>Appointment History</div> <div>Alex Smith</div> | | | |
| <div>Previous 1 Next</div> | | | |
| Time | Type | Reason | Provider |
| 2019-01-06T15:13:09Z | GP | | None |
| 2019-01-05T15:13:09Z | OutPatient | | None |

Local test: Error; Google cloud test: no error

Others: medications



Thanks!