Online Candidate Audio Interview System

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1. Introduction:

In current era of cutting edge technologies and ways of communication in multiple languages, between communities, between corporate world, many people around the world feel a discomfort to represent themselves online and offline when it comes to interviewing a person or provide a electronic surveys. There are many scenarios where a person is interviewed and face issues like in case of visa interviews for international candidates with respect to scheduling and getting a slot for the interview, delays in scheduling interviews in corporate world for job opportunities to wait until interviewers availability, clinical healthcare issues where a patient is suffering from severe disease and feels unsafe to reveal the same, woman empowerment areas where woman's feel scared to express their distress against violence in society(Blair,2020, Coppock, 2020, Moor,2020). Open-ended interviews are face-to-face interviews which are more costly way of data collection than human - computer interaction based interviews (Pickard, 2020,Roster, 2020). People hesitate to disclose their identity to share clinical issues, for example to record sexually transmitted disease in men where there is pressure to face any human or answer people with low emotional understanding. One effective solution to such problems is Audio based self interview system, which effectively enables interviewee or user to respond to set of questions verbally which is asked by faceless human interviewer and record audio answers, which will be then collected as set of data thus maintaining privacy without disclosing the identity in some cases and reducing delays geographically.

2. Problem Statement:

- To research and develop clinical digital tools to reduce a unmet needs of clinical issues between clinicians and patients can be identified(Worthington, 2023).
- To research and develop a system where face-to-face interview for woman's in low income countries are facing peer pressure to express their distress against violence will overcome using audio recorded answers for interviews(Steinert,2024, Shukla,2024, Satish,2024).
- To research in surveys with limited literacy areas of countries across the globe will inhibit a issue which has low literacy on use of computers and also which will allow the candidate to use headphones and record answers with the help of assistants.(Nickenig, 2024).

3. Identified approaches to address problem:

Online Candidate Audio Interview System is the study mainly focused on self interview system which helps to avoid open ended interviews,electronic surveys, accessibility in limited literacy areas, biased reports and use mainly recording audio based answers in interview system(Phoo et al.,2023).Literature specifies woman's in society to avoid disclosing their identity to express their distress face to face and retaliate from their partners against violence(Peterman et al.,2023). Studies include reporting men suffering from hepatitis C(HCV) a sexually transmitted disease to disclose their private information via audio based interview interview system to further verify the data to provide proper health care support and provide awareness among the people(Tieu et al.,2018). Research specifies open ended interviews has influence over the interviewer characteristics like political, gender, position, language, to avoid influence of interviewer over respondent or candidate,we record audio based interview to resolve this issue(Di Maio,2020, Fiala, 2020). Literature focused with respect to students migrating to foreign countries face issues like communication, language barrier, economical issues, different education system can conduct audio based student interview to analyze and resolve issues for better mental heath of a student(Demirtaş et al., 2024). When the police interview a suspect who doesn't speak a local language,the suspect can be asked the questions which the suspect may not understand as his native language is different, in such cases using audio interview would be beneficial for police to get it auto converted(Svennevig,2024, Urbanik,2024, Diepeveen, 2024).Research has found that emotions and confirmation bias aspects of interviewers who don't follow best practice in case of child abuse where emotions and psychology of child is not stable can conduct audio based interviews(Segal,2024).Sustainable farming decisions based on interviews where the farmers didn't claim exact sustainable remedies used, can record audio answers to provide the proper answers(Zanin et al.,2024). Audio based interview system which will reduce open ended interview issues and overcome the problem by providing a set of questions to the candidate and answer the questions in audio recording which will be evaluated further(Taware et al.,2024). Mental disorder in which clinical trials are performed to analyse the patients trauma by conducting audio interviews which can be of ease to patient and doctor to analyse further(Dia,2023, Khodabandelou,2023,Othmani,2023). Figure 1.the

flowchart developed for Online candidate audio interview system in which the candidate has to enter basic details and proceed for set of interview where set of defined question will be provided on screen. Each question will have start and stop recording button which will record the answer.

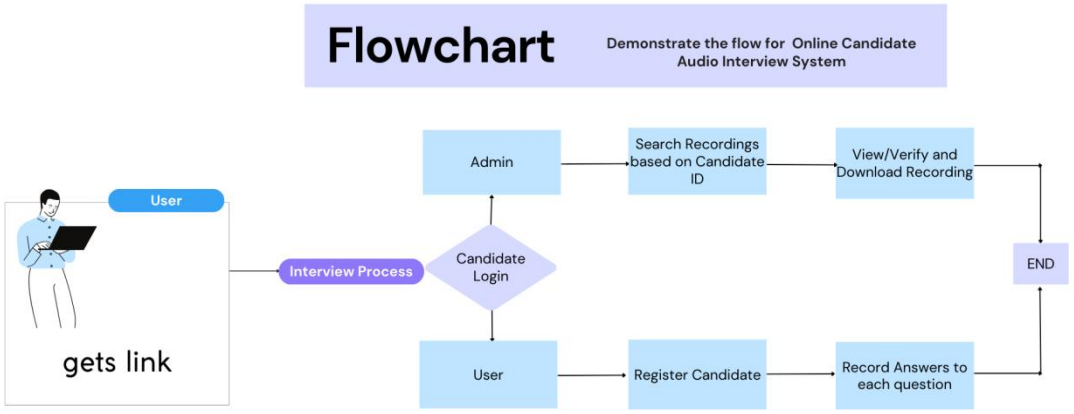

Figure 1. System Flowchart developed by author

4. Solution Design:

Solution design includes progress in research and development in multiple modules and phases as mentioned in below developed Gantt Chart Figure 2.

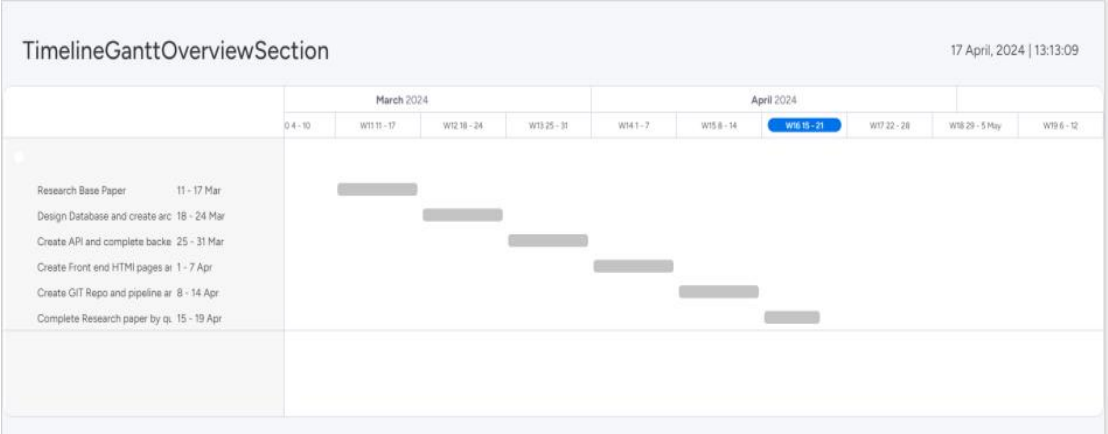

Figure 2. Gantt Chart developed by author

- **Week 1:**

In week1, started research on finding research papers and finalizing the base papers based on problem statement with respect to audio based self interview system and updated the paper accordingly.

- **Week 2:**

Creating project structure along with flowchart for front-end and back-end code and designing database to store form data and media data(audio) into database. Finalizing approach to divide the application in three modules mainly Login, Candidate Registration, View and Download Audio.Figure 3. represents azure SQL database tables credentials and candidate.

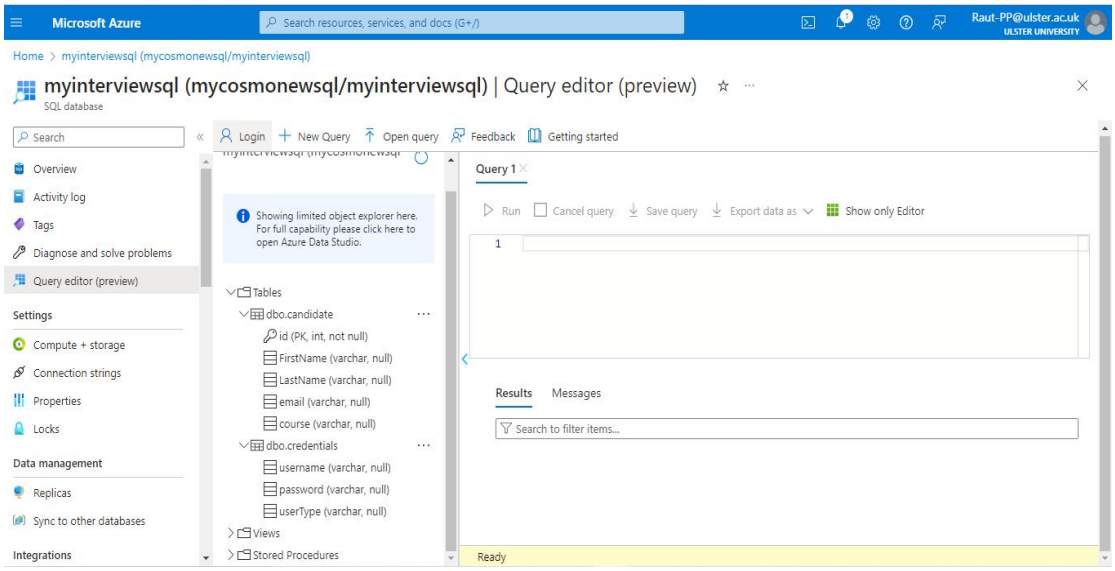

Figure 3. Azure SQL database tables developed by author

Figure 4. represents the Azure audio blob container containing audio recordings with name as recording+candidate ID_question number(For example: recording100_1)

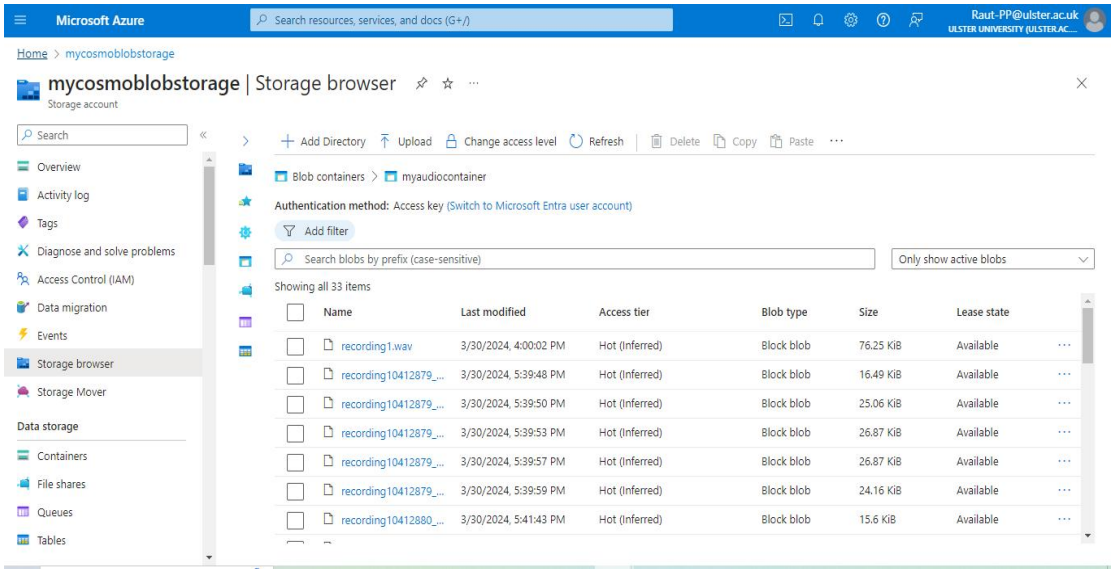

Figure 4. Azure blob storage developed by author

- **Week 3:**

Designed and developed a micro services based architecture to define two services:
1. Login and Registration
2. View and Save audio recordings from database

Login and Registration micro service consist of RDBMS(SQL) database to validate user credentials based on user type.Figure 5. represents a login page.

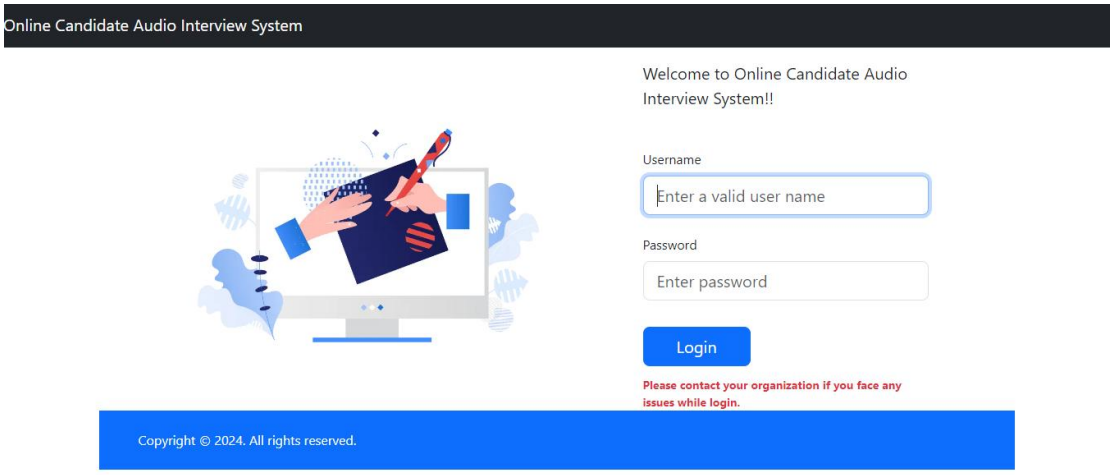

Figure 5. Login Page developed by author

Figure 6. represents login page HTML code in angular front end component

Figure 6. Login Page HTML code developed by author

Figure 7. represents database has user and admin credentials if we provide any incorrect candidate id which is not an user or admin it gives a validation error like “Invalid Credentials.Please try again”.

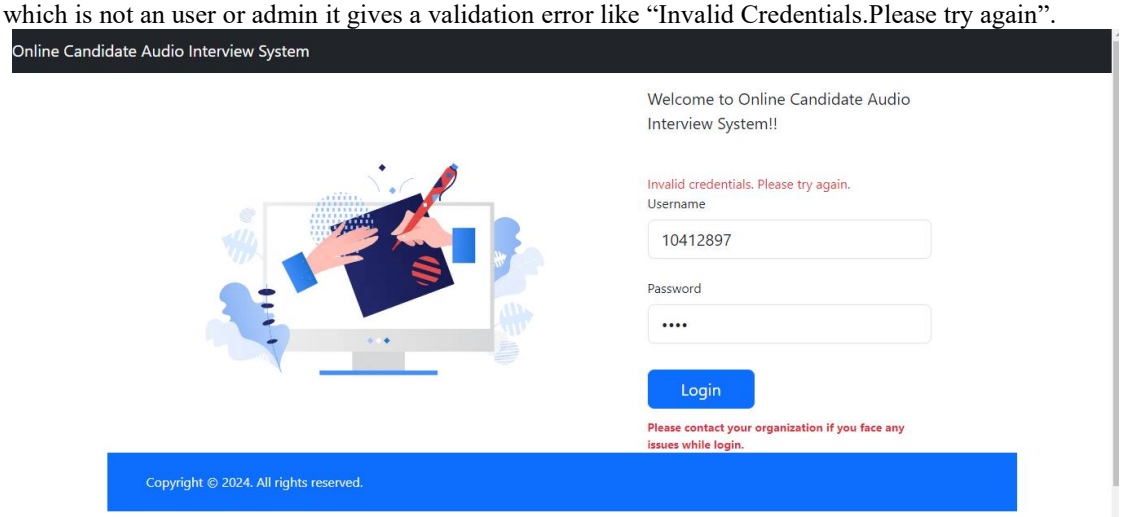

Figure 7. Incorrect Credentials developed by author

Figure 8. represents the login back end controller code which will connect to azure SQL and java spring boot API to validate the credentials.

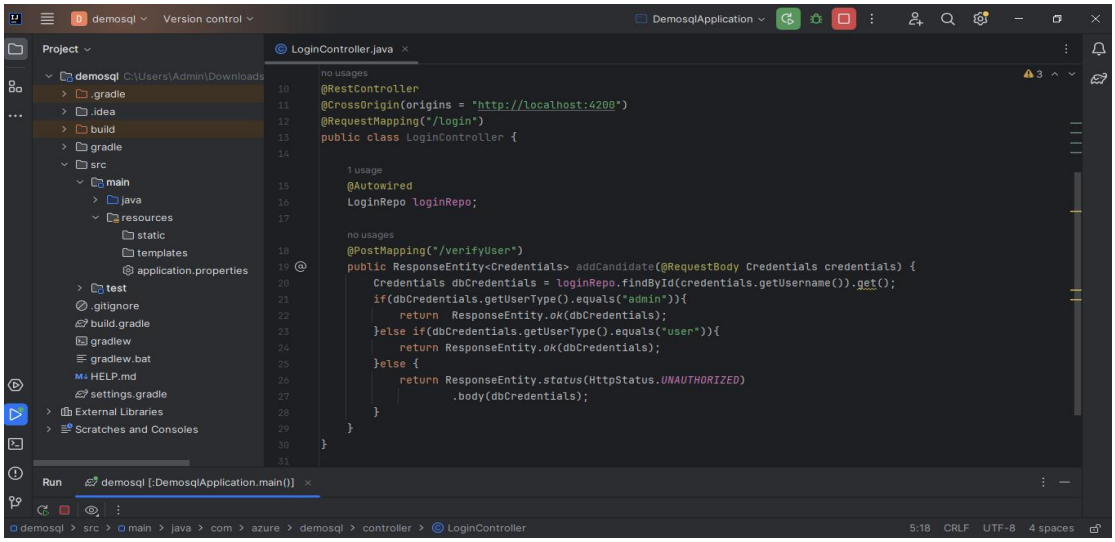

Figure 8. Login back end Controller developed by author

Figure 9. represents azure SQL connection properties in spring boot

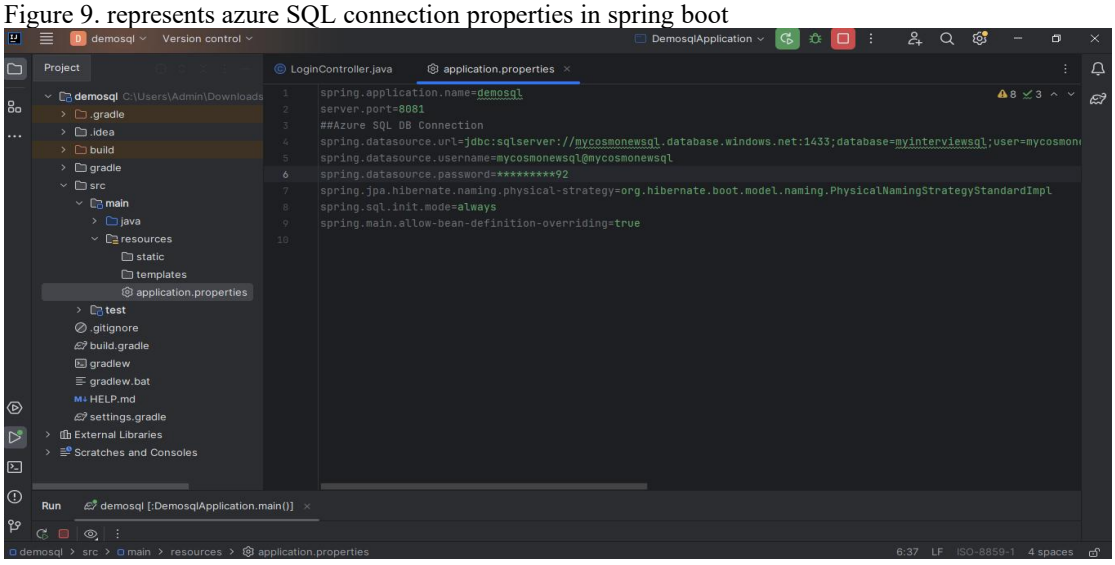

Figure 9. azure SQL properties developed by author

Figure 10.represents page when login via user type to register a new candidate save in azure SQL for interview process where candidate id can be used for further audio recordings.

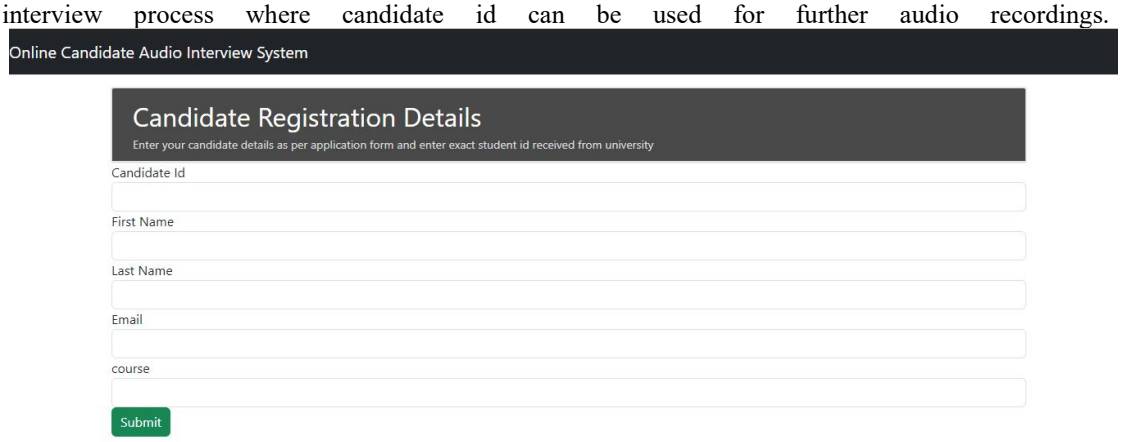

Figure 10. Candidate Register Page developed by author

Figure 11. after registration, candidate can read questions and record answers by clicking on particular questions and start or stop audio which will save the audio.

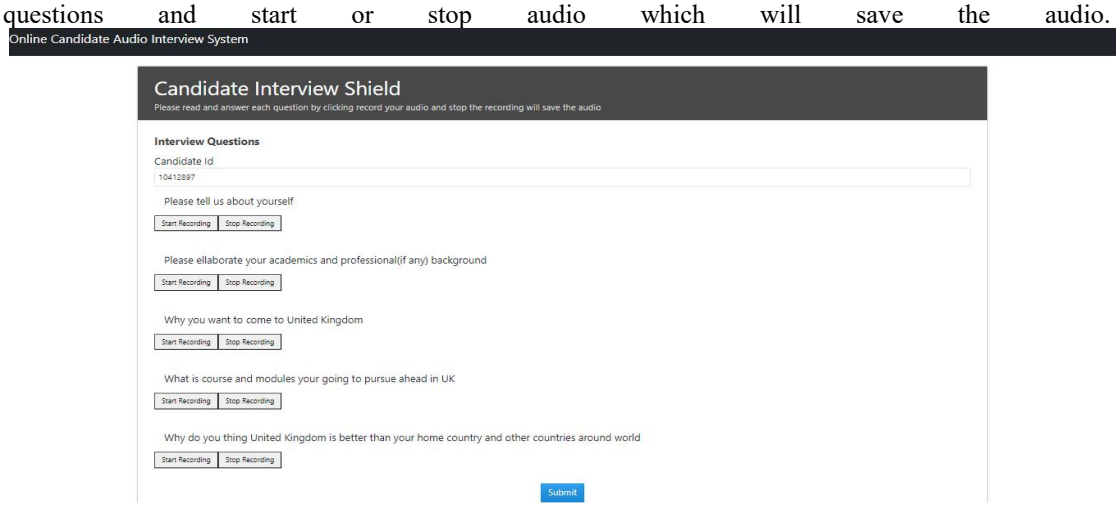

Figure 11. Record Audio developed by author

Figure12. represents audio controller which will save the audio recording for each question in azure blob storage container as per candidate id and question number in .WAV format.

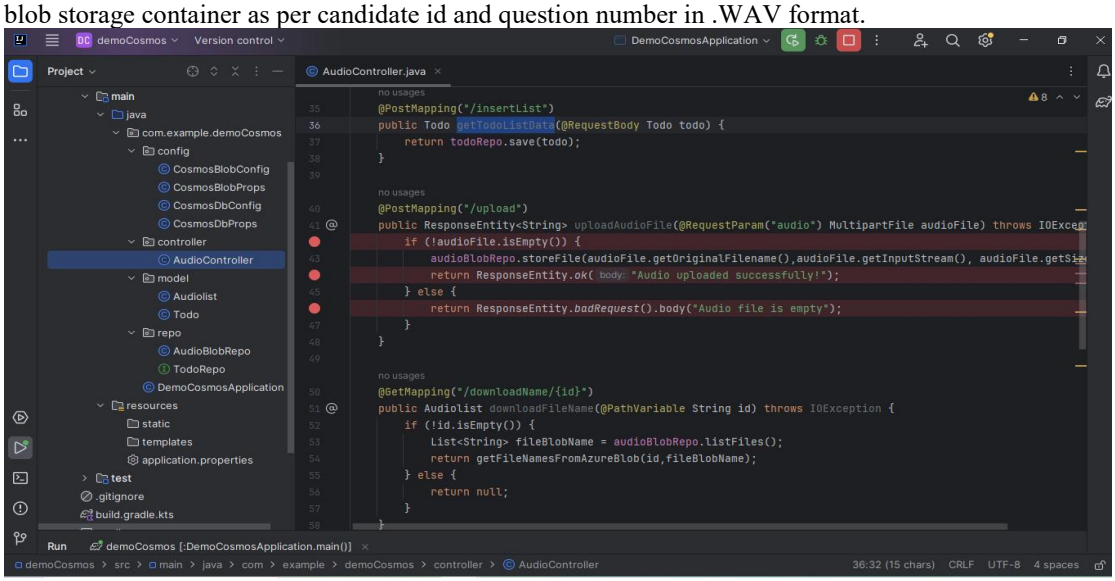

Figure 12. Audio Controller developer by author

Figure13. represents the azure blob container connection properties in spring boot.

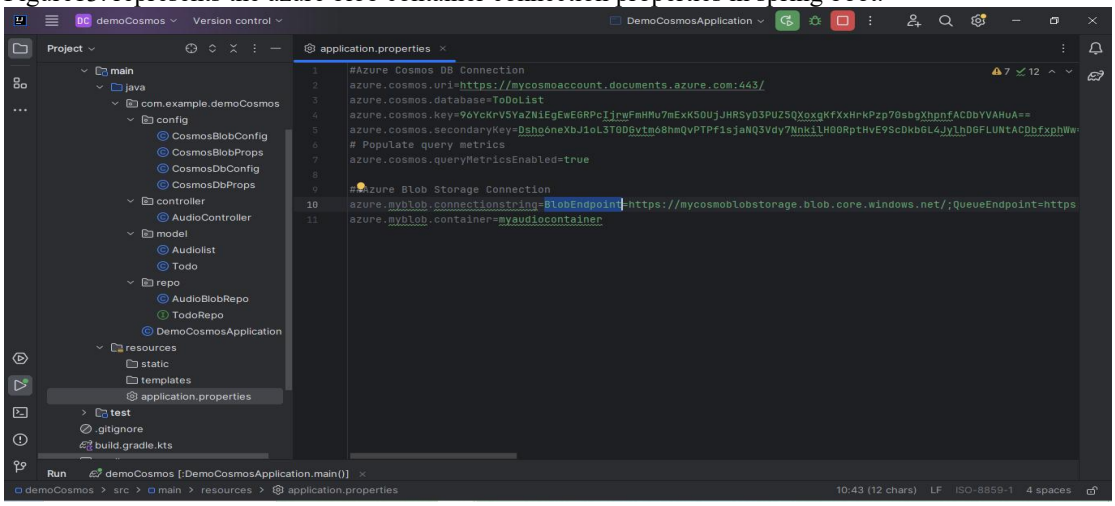

Figure 13. Azure blob connection properties developed by author

Figure 14. submit will save the recordings as per the candidate id and question numbers in sequence.

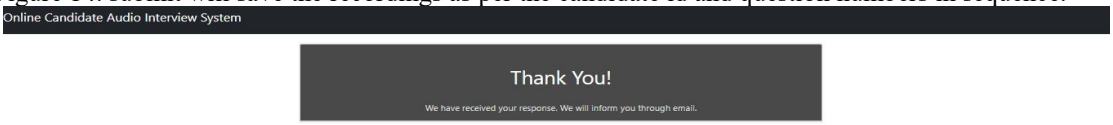

Figure 14. Save response developed by author

Figure 15. represents a page when login via user type as admin to view recordings based on candidate id from azure blob container with a hyperlink on it. This login will be handled by admin to verify audio.

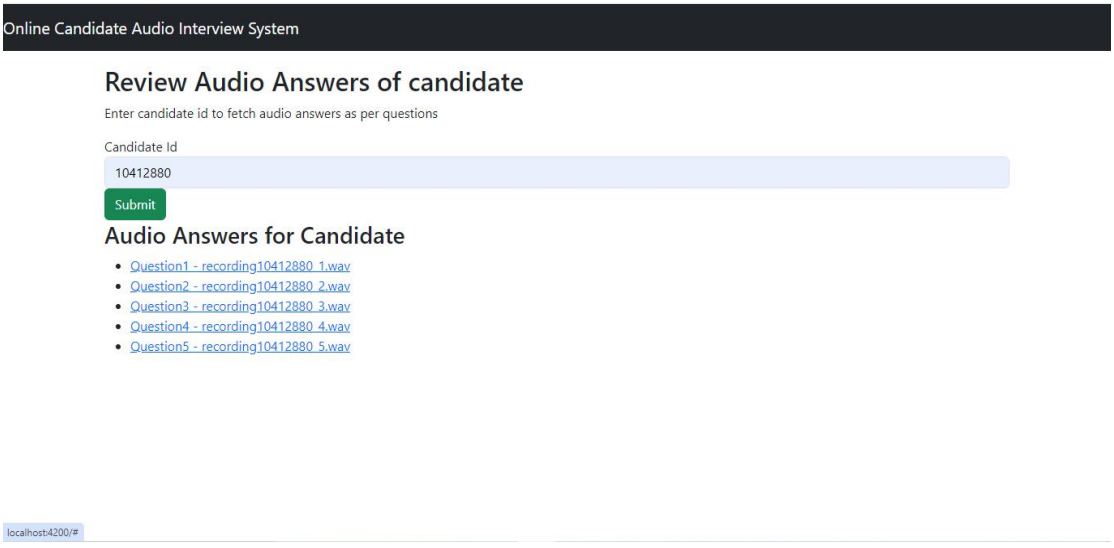

Figure 15. Recordings List developed by author

Figure 16. represents audio controller API to get the list of audio file names list from azure blob storage container which is in build provided by azure blob services.

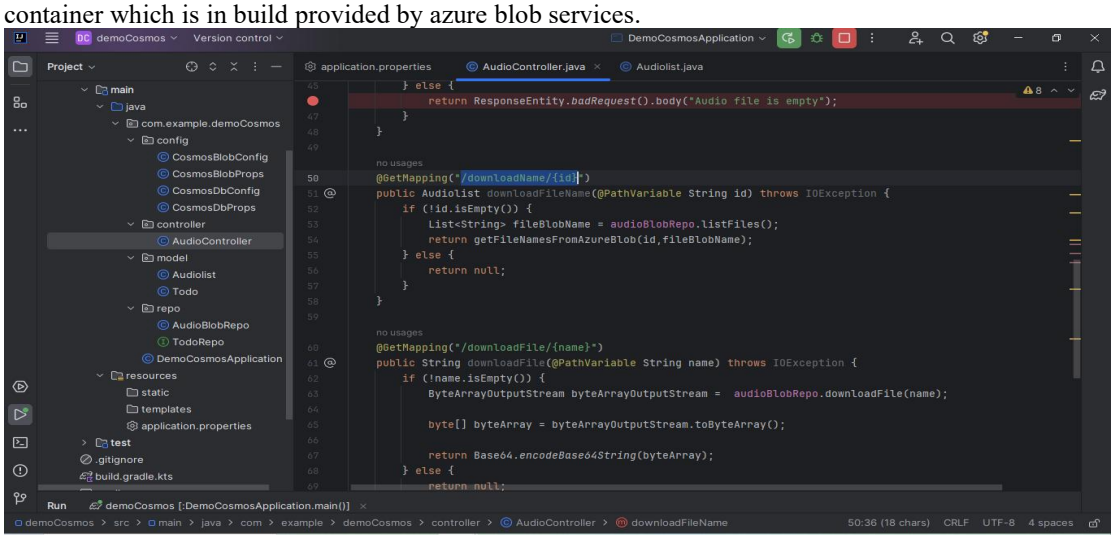

Figure 16. Download file name developed by author

Figure 17. represents downloading a file from azure blob storage container when clicked on the link.

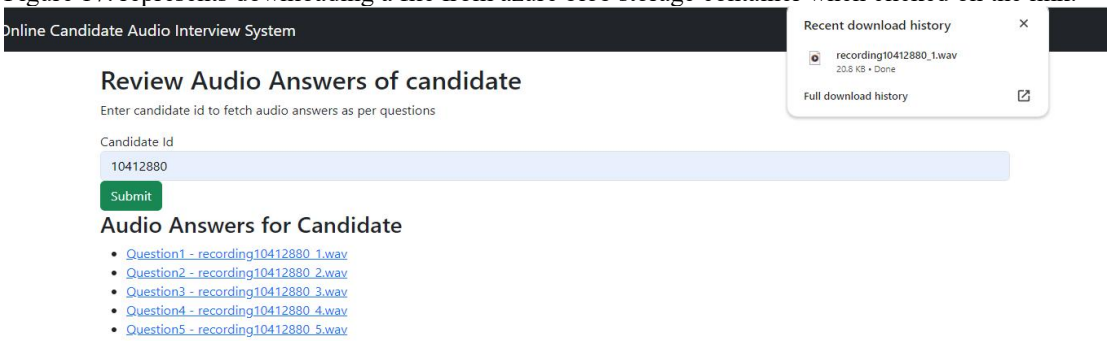

Figure 17. Download audio files developed by author

Figure 18. represents audio controller to download a file from azure blob storage container.

Figure 18. Download file controller developed by author

View and Save audio Recordings micro service will save the audio recording specific to question number and candidate id in Azure Blob Storage. Recordings can be viewed by admin based on candidate id. Admin can download recording by clicking on hyperlink which will download from Azure Blob Storage. All micro services are based on REST API to communicate via MVC(Model-View-Controller) architecture and render data from database using Java 21 and spring boot framework for web connectivity to back end. Database to create and save entries to Azure SQL where we have two tables created in database credentials & candidate.

- **Week 4:**

Front end connectivity done using Angular 17(JavaScript, HTML, CSS) which will consume data from back end spring boot REST API and accordingly render the data. Corresponding to back end code there is each component in angular like login, view and download audio, candidate registration. Components will fetch data from API designed in spring boot. Create request and response based on each API input and according display the response.Figure 19. represents front end service page which connects to all rest API endpoints in spring boot.Also it shows the project structure of each component designed to fetch data and render the HTML page for the same.

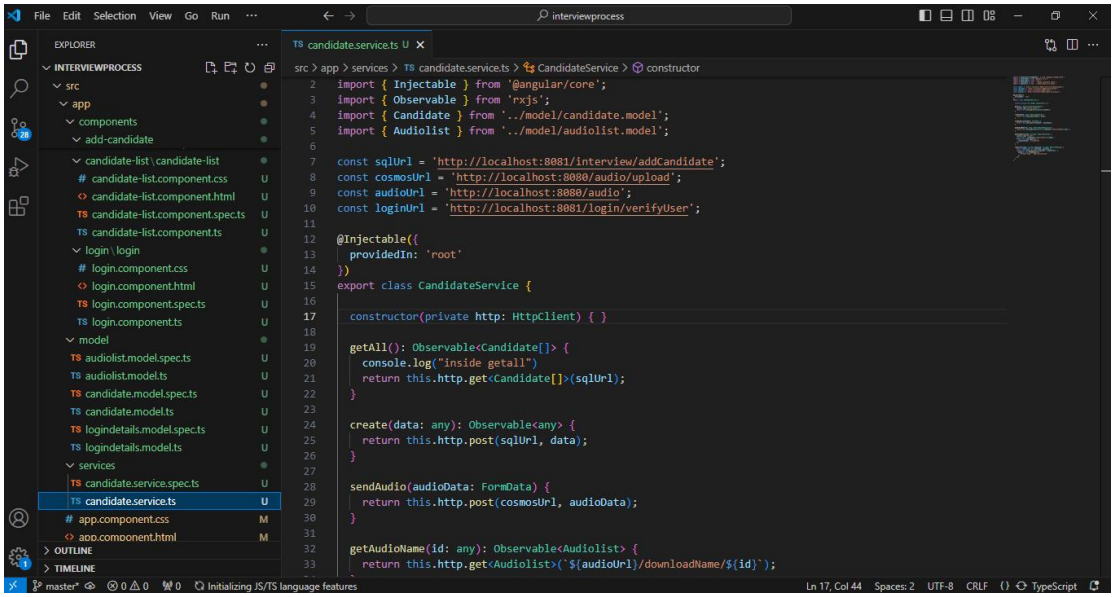

Figure 19. Front end Services developed by author

- **Week 5:**

Create and push git repositories to GitHub and create pipelines in Azure DEVOPS and deploy the pipeline in azure web apps service. Figure 20. represents three repositories created on GIT with local repository pushed to remote and Figure 21. represents all three repository connected with azure pipelines and jobs executed successfully.Initiate the literature survey for the paper and find the literature related to topic and completed some key highlights of the paper.

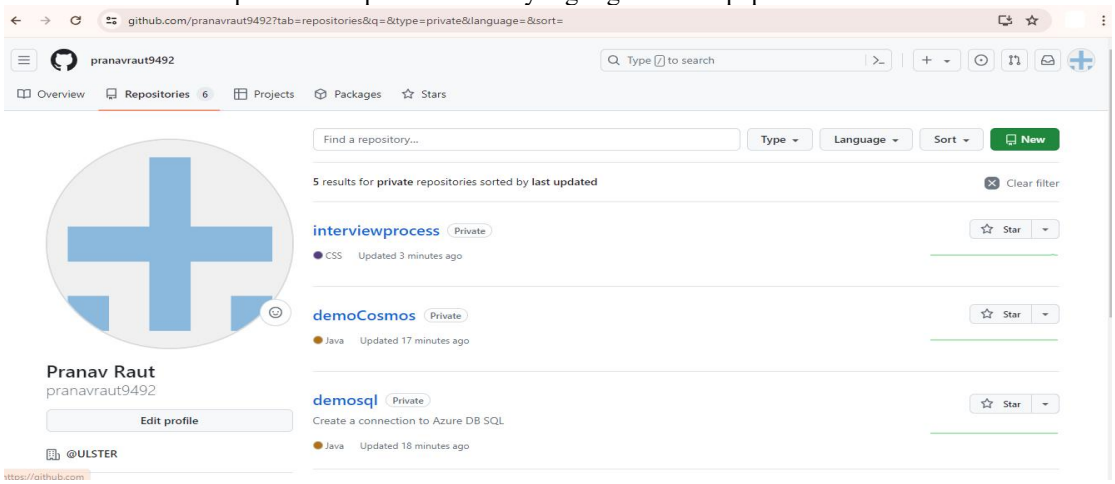

Figure 20. Git repository developed by author

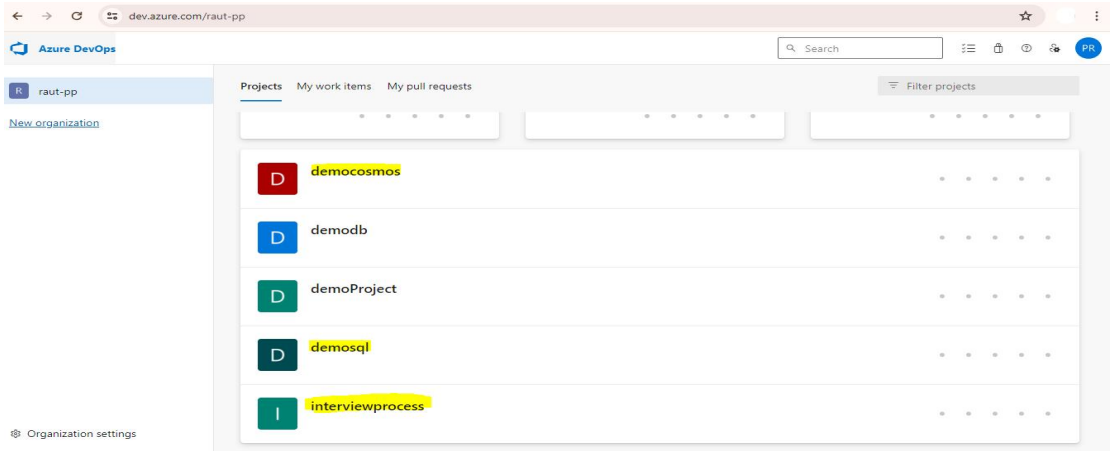

Figure 21. Azure Pipelines developed by author

- **Week 6:**

Completing the whole paper by adding all solution design evidences with test case performance and creation of gantt chart as per weekly implementation. Adding proper formatting as per standards and uploading the assignment for first level review. Resolving similarity issues and re uploading to meet the standards.

5. Quantification of solution performance:

Solution provided include a blend of azure services and functions for future cloud native application development. Azure blob storage allows cost efficient storage of media files for long term use of media files. It provides a great platform form for data lakes and data analytic on these files in future to enhance the application. Azure SQL stores structured data to maintain consistency. Performance testing of the API with Katalon test UI. Performed manual testing with test cases to check if user validated properly during login or else show error message. Robust application to change input parameters in near future to enhance the API and add extra security using authentication tokens.

Manual Test Case Scenarios:

- ✓ Validate login details
- ✓ Check if candidate lands on admin or user page
- ✓ On User page
- ✓ fill in proper details and submit and verify database entries
- ✓ Record audio for random question and all questions and submit the candidate data.
- ✓ On Admin Page
- ✓ Enter candidate id
- ✓ Verify if I get only recorded audio clips hyperlink with candidate Id and question number
- ✓ Click on hyperlink and check if it gets downloaded
- ✓ Check Response for API returns required JSON values.

6. Conclusion:

Online Candidate Interview System is solution for interviews in student interviews, corporate companies, social empowerment surveys and activities, international criminals to communicate with local police and clinical trials. It will however fulfill the requirements for audio based interviews to reduce human intervention as a interviewer,but the interviewer every time has to set the questions for the interviewee. Considering in near future the first step would be admin importing writing set of questions in a file and uploading a file will show those questions which allows interviewer to just change the file and upload file on portal. Later we can enhance and add augmented reality(AR) and virtual reality(VR) options where the candidate can visualize the interviewer and listen the audio question.

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