
Speech Pathology Application

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Value Proposition

Nearly 8% of children require some sort of speech therapy. The purpose of this project is to provide an inexpensive and visually appealing tool to make therapy and child speech data more accessible.

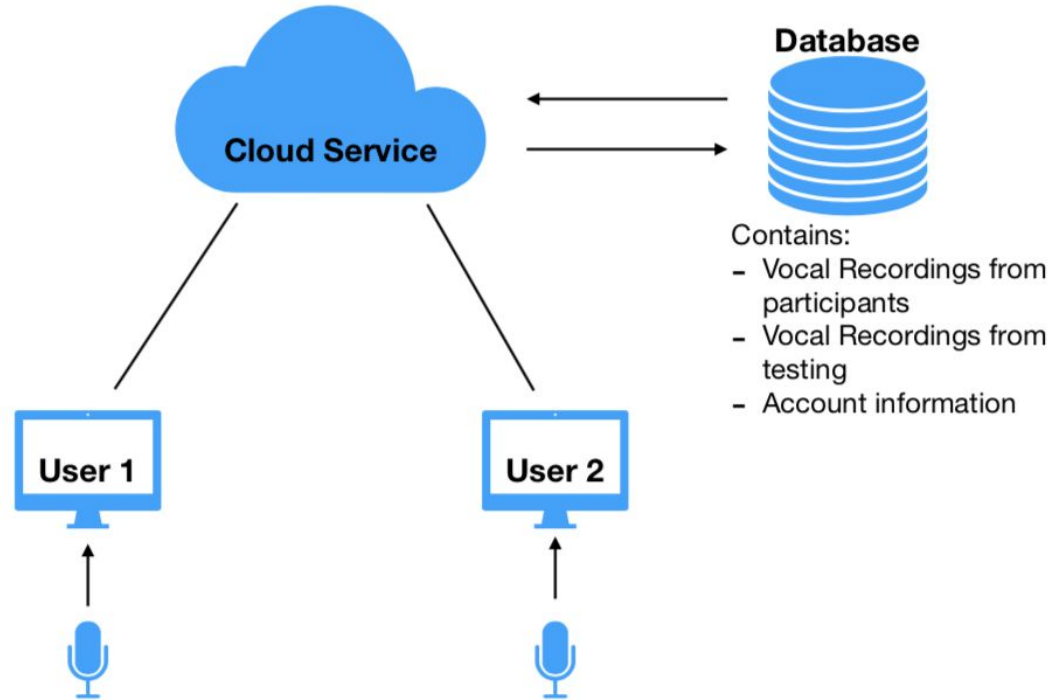


<https://nspt4kids.com/specialties-and-services/speech-language-pathology/>

Problem Definition

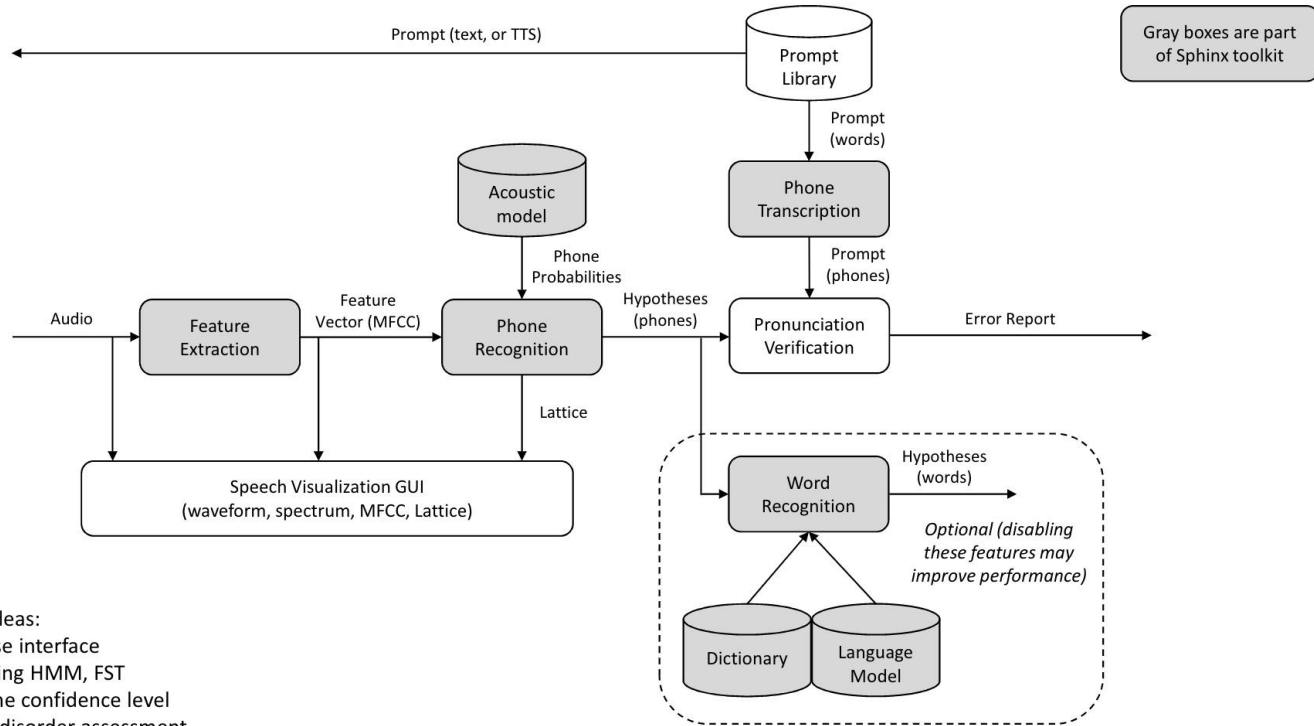
Our project consists of the development of a database that consists of:

1. Secure user account information.
2. Secure vocal recordings from user.
3. Secure vocal recordings from training.



*Note: Can have multiple users.

Project Learning



- Other ideas:
- Database interface
 - Visualizing HMM, FST
 - Phoneme confidence level
 - Speech disorder assessment

Project Learning

MySQL:

- ◆ open-source relational database management system (RDBMS)
- ◆ Using Structured Query Language (SQL)
- ◆ Small size, fast speed, low cost of ownership
- ◆ SQL: Grammar (CREATE TABLE my_table; to create a table)
- ◆ Functions (AVG (numericTerm),The average (mean) value.)
- ◆ Data Types (CHAR Type,A fixed length String)

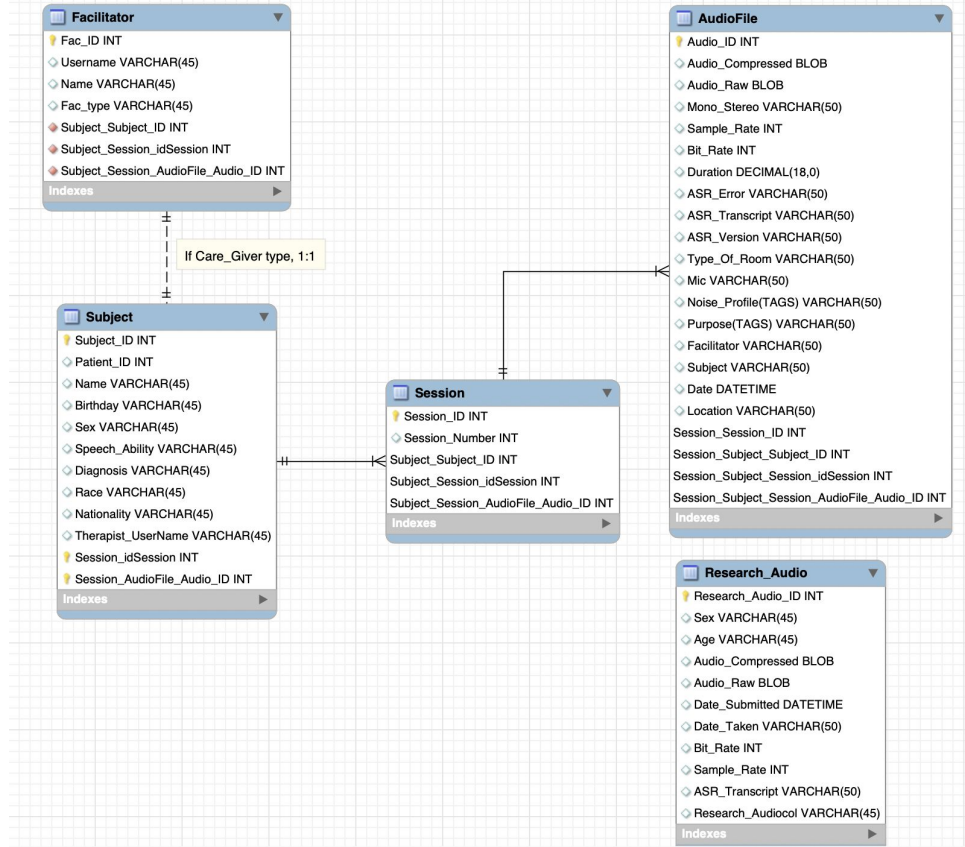
Cloud platforms:

- ◆ Flexible: price, location, time, and cloud configuration
- ◆ Choices: Amazon Web Services (AWS), Google Cloud Platform (GCP) and Microsoft Azure.
- ◆ Provide many related service for our chosen product (security, and disaster recovery for cloud database product)
- ◆ The cloud provides multiple layers of security including, but not limited to data communication encryption, identity management, and threat detection.



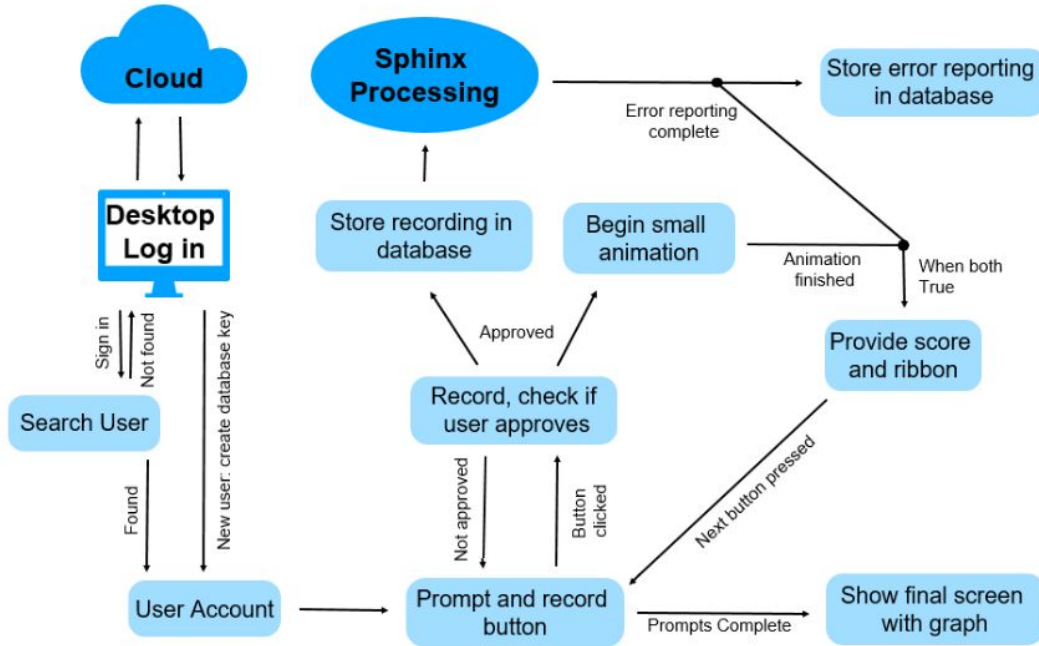
Database Specifications

- ◆ Cloud based system
 - ◆ Has set up the environment for our application (we could use the MySQL database immediately)
 - ◆ Must have a 12 month free period
 - ◆ Must be relatively cheap after 12 months and easy to expand size
 - ◆ Must be able to use and port to anywhere else



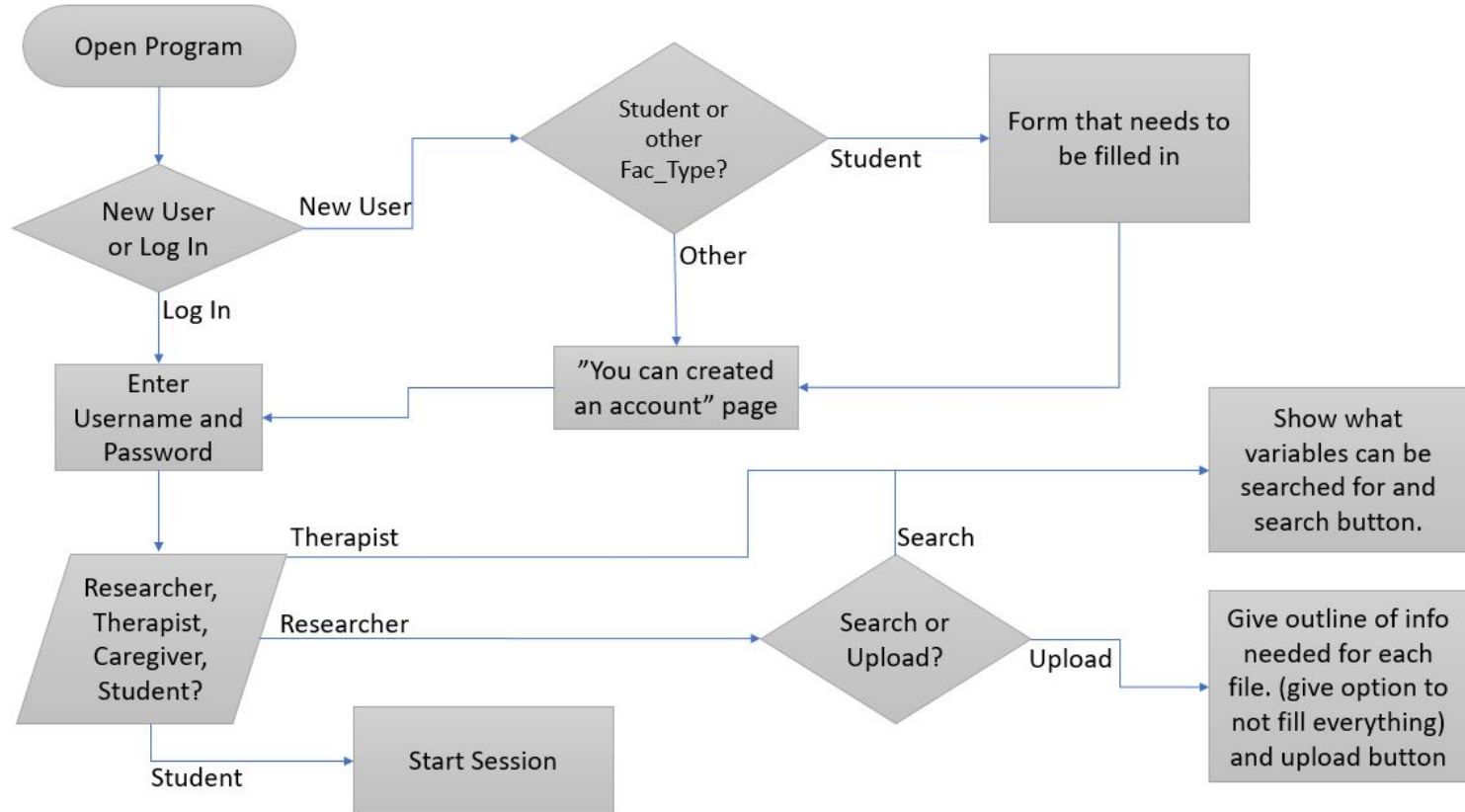
User Interface Flowchart

High Level Flow Diagram For User Interface



*NOTE: animation must take longer than Sphinx processing

User Interface Log In

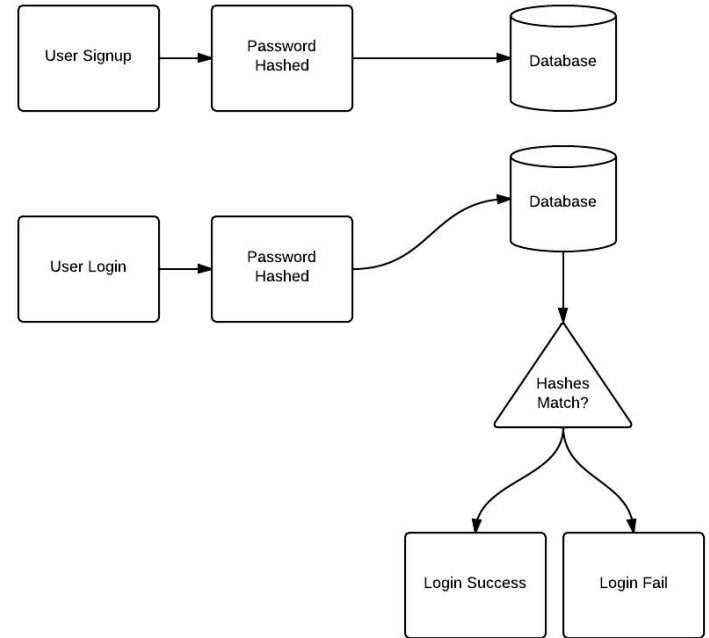


Deliverables

- ◆ Secure database that stores account information and vocal recordings
- ◆ Different types of user accounts
 - ◆ Therapist
 - ◆ Developer
 - ◆ Researcher
 - ◆ Caregiver
- ◆ Ability to sort and display certain sets of data.
- ◆ Ability for researchers to submit speech data to the database.
- ◆ Ability to port database to different servers.

Security

- ◆ Backups
 - ◆ “Regular backups protect against the risk of damage or loss due to hardware failure, software or media faults, viruses or hacking, power failure, or even human errors.”
[-https://www.library.cmu.edu/datapub/dms/data/secure](https://www.library.cmu.edu/datapub/dms/data/secure)
- ◆ Password hashing
 - ◆ Encryption is two way, so less safe
 - ◆ Hashing is a one way function and therefore more secure
- ◆ Privacy level accesses
 - ◆ Certain facilitator types can only access a subset of information.



Constraints

- ◆ Speed
- ◆ Cloud data size/Memory
- ◆ Storage performance due to the cloud
- ◆ COPPA/HIPAA Laws



<https://cloud.google.com/>

Budget

Section	Item	Price Allotted
<u>Software</u>	Development	\$0.00
	Cloud Service	\$0.00 for 1st year
<u>Travel</u>	Hotels/food	\$700
	Rental cars	\$200
<u>Expo Presentation</u>	Poster	\$70

Total Funding	\$3000
Current using	\$0
Funds left over	\$2,030

Schedule

Database	Purchase Cloud Service	10/31/2018	11/2/2018
	Get familiar with MySQL	10/31/2018	11/12/2018
	Create Caregiver account	11/5/2018	12/12/2018
	Add more data needed (such as age, sex, therapist name)	1/12/2019	1/23/2019
	Create Therapist account	1/23/2019	2/8/2019
	Create Researcher account	1/23/2019	2/8/2019
	Create Student account	1/23/2019	2/8/2019
	Set privacy levels	2/11/2019	3/1/2019
	Encrypt passwords	2/11/2019	3/1/2019
	Import vocal recordings	3/1/2019	3/29/2019
	Search capabilities for researchers and therapists	3/1/2019	3/29/2019
	Fully delete account with its information	3/15/2019	4/3/2019
	Develop database wrapper	3/15/2019	4/3/2019
	Update information capabilities	4/1/2019	4/15/2019
	Upload Audio files that users didn't create with information needed	4/15/2019	5/1/2019

Schedule Continued

Testing	Test creation of caregiver account	12/3/2018	12/12/2018
	Test creation of Therapist account	2/1/2019	2/8/2019
	Test creation of researcher account	2/1/2019	2/8/2019
	Test creation of student account	2/1/2019	2/8/2019
	Test privacy levels	2/20/2019	3/1/2019
	Test search capabilities	3/15/2019	3/29/2019
	Test account deletion	3/25/2019	4/3/2019
	Test information update	4/8/2019	4/15/2019
	Port database to another server	4/15/2019	5/1/2019
	Upload other audio files and delete them	4/22/2018	5/1/2019
School Schedule	Thanksgiving break	11/19/2018	11/23/2018
	Winter break	12/17/2018	1/9/2019
	Spring break	3/11/2019	3/15/2019
	Graduation	5/11/2018	5/11/2018

Any Questions?

E. Booth. (2017). *Automatic Speech Recognition for Speech Therapy Applications*. Boise State University.

M. Shahin *et al.*, “Tabby Talks: An automated tool for the assessment of childhood apraxia of speech,” *Speech Commun.*, vol. 70, pp. 49–64, 2015.

O. Cheng, W. Abdulla, and Z. Salcic, “Hardware-software codesign of automatic speech recognition system for embedded real-time applications,” *IEEE Trans. Ind. Electron.*, 2011.