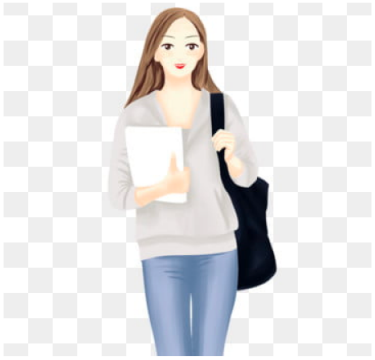
Project Deliverable #3

Project overview:

I am designing a system that will ensure efficient, enjoyable, and healthy typing learning experiences for visually impaired people by considering users' performance (finger and hand movement) and body posture (back, neck, arm position) and sonifying proper instructions. Additionally, the sonification assistance for maintaining good body posture during lessons would be a great assistance for regular people who are learning to touch type.

Persona:

Lisa Lee



"I want to learn typing skill to explore new opportunities ."

Age: 23

Location: Atlanta, GA

Status: Single

BIO

Lisa is a confident individual who has been visually impaired since birth. Lisa loves learning new things. She learned braille when she was a kid and helps other kids learn. She is also health conscious and does light exercise regularly. Recently she learned that learning typing can open some new opportunities for her. While she found some online platform (like typio) that provide audio instructions to start her learning journey, she is facing some issues which demotivating her to continue her journey.

GOALS:

- Learning touch typing with reasonable speed and accuracy
- Structured practice session with clear audio instructions and effective feedback for mistakes
- Maintain good posture during practice to prevent body ache or injury.

FRUSTRATIONS:

- online platforms doesn't provide clear feedback when wrong fingers are used or mistake were made. (just use a beep sound).
- Struggle to track time and gets tired& frustrated.
- neck and back pain due to failure of maintaining the right body posture.

Scenarios:

1.

“Lisa started learning typing recently and enjoying her learning experience so far. She is visually impaired, and she is confident that learning this new skill will open some new opportunities for her. She was sharing her excitement of learning this new skill with her friend John and showed him how she could find the letters from keyboards.

John realized she was using only one hand to type and not following the touch-typing technique with her right fingers. John told her that she should follow the touch-typing instructions from her learning platform, which will help her to become more efficient. Lisa was a little confused, she did get instructions about using a particular finger and hand for different letters, but she ignored it since the platform provided positive feedback as long as she got the letter right.”

2.

“It's been a month since Lisa started learning typing. She has been careful to follow the audio instructions from the platform she used. Initially, she was confident that she was making good progress. However, now that she started the lessons for typing words, she realized she is having a hard time following the instructions. She realizes if her initial hand positioning is right, she can easily figure out the letters. So, she thinks it’s because She fails to maintain her initial hand positioning, therefore she is getting many letters wrong and not being able to make much progress in the lesson. So, Lisa asked one of her friends Ru to help her with this issue. Ru helped her to maintain a constant hand position by telling her when she moves for a few lessons and Lisa thought that was really helpful. However, Ru also has a job, and she is not always there to help Lisa. “

3.

“Alex is visually impaired and started learning typing recently. He enjoys the learning process and spends most of his day practicing this. However, recently he realized he is having neck pain, and he feels exhausted. He shared his discomfort with his family, and they mentioned it because he spends most of his day sitting without a break.

He realized they were right and figured out that setting a timer would be helpful. So, he tries to practice for 30 minutes and take a break of 10 minutes. However, he realized this doesn’t help with his neck pain since he is failing to maintain a healthy posture continuously while sitting.

Sensor Data Description:

- Hand Position

  Angle: Hand position/ wrist angle with keyboard and horizontally

- Keyboard Performance

  Key: [all keyboard characters]

  Finger: [index, middle, ring, little, thumb]

  (Key, Finger)

- Body Posture Accuracy

  Position: [standing, sitting]

  Muscle Type: [Craniovertebral angle, Sagittal head tilt, Sagittal shoulder-C7 angle, Coronal head tilt, Coronal shoulder angle]

  Angle: [position by axis]

  Time:

- TotalTime

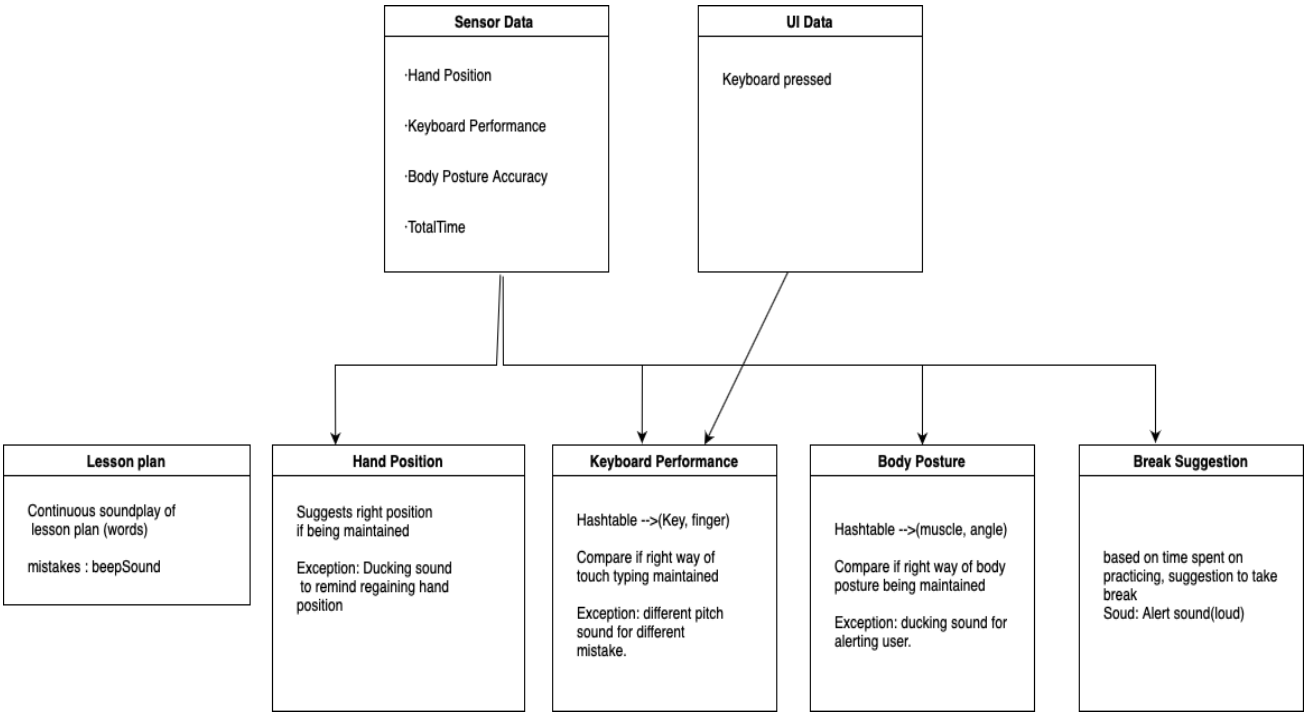
Priority

Reference: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5446097/

User experience of your simulator:

The user will interact with the keyboard for the practice session based on what they hear from the auditory lesson plan. I plan on playing letter-focused lesson plans. Other data(Hand, body, Keyboard performance) will be collected by the sensor from the user and the system will decide to play different sounds for wrong finger positioning, posture, and hand position. Additionally, in order to indicate healthy body posture is being maintained, there would be a continuous sound that will change frequency or pitch based on user's changed posture. I plan on adding a UI, so users can control the volume of this feature. When it reaches a certain threshold (indicating bad body posture), there would be a ducking sound of instructions for alerting users.

Software architecture:



Detailed Timeline:

Time	Goal
Nov 6 -12	Gathering sound sources for each instruction or alert features Designing mockup json data for sensor data
Nov 13 - 19	Work on pd#4 Evaluation plan Start on implementation of project [creating events of sonification from json data] Submission of #PD4 on Nov17
Nov 20-26	Continue working on the implementation of the project. #pd5: Simulator Implementation due 21
Nov 27 – Dec 5	Conduct User test and work on #PD6:Evaluation Result and Analysis Submission of #PD6 due on Dec 5