

Final FeedBack Sight-Sense

Milestone 5: Testing Execution Feedback

- **Object Detection Accuracy:**

- The testing involved 50 trials using a set of 200 objects in both indoor and outdoor environments.
- The system correctly identified 191 objects, resulting in a 4.5% error rate.
- Testers commented, "The object detection was very reliable in the grocery store and even in busy streets. Only a couple of objects were misidentified."
- Recommendation: Fine-tune sensor calibration in highly cluttered areas to minimize occasional misreads.

- **Battery Efficiency:**

- Battery performance was measured on an iPhone at varying brightness levels.
- At full brightness (100%), the device lasted 3 hours and 14 minutes; as brightness decreased, the operation time improved significantly (up to 8 hours and 16 minutes at 25% brightness).
- One tester noted, "The battery life is acceptable when not at full brightness; however, a longer life at higher brightness would be ideal."
- Recommendation: Implement auto-dimming features to optimize power usage under high ambient light.

- **Latency and Audio Feedback:**

- The response time from object detection to audio feedback was measured across 30 trials under different Bluetooth conditions.

- The average response time recorded was 0.85 seconds, which meets the target of under 1 second.
- Feedback included, “The audio cues were almost instantaneous, which made it very reassuring during navigation in crowded areas.”
- Note: Although performance is consistent, occasional delays were observed in high-interference areas.

- **User Experience and Usability:**

- Over 10 sensory-impaired users participated in real-world scenarios (e.g., navigating a dim obstacle course, cooking).
- The device received an average ease-of-use rating of 8.5/10, with testers praising its straightforward, hands-free operation.
- Specific feedback: “I found the interface straightforward, and the single-button operation made it very easy to use.” Another tester suggested adding a brief tutorial video to assist new users.
- Suggestion: Enhance the onboarding process with a tutorial to further reduce the learning curve.
- Specific Feedback: “The chest strap is tooo tooo tooo finicky, there are a lot of components to it and for the client you explained this is intended for, I think you should change what mechanism you use just so that it is easier for your client to use and it somewhat looks more, i guess “normal””.
- Implementation: Instead of a chest strap we decided on using a strap that goes around that neck (not heavy at all so it is comfortable for)

- **Environmental Adaptability:**

- Testing was conducted in various settings, including indoor malls, homes, and outdoor areas with differing lighting and weather conditions.
- The system maintained consistent performance overall, though a slight performance drop was noted in extremely bright sunlight.

- Tester feedback included, “The device worked well indoors and in moderate outdoor light, but I noticed occasional lag in very bright sunlight.”
- Recommendation: Refine sensor calibration for extreme brightness to improve reliability.

- **Wearability and Comfort:**

- Ten users wore the device continuously for over an hour during various activities (walking, jogging, sitting).
- The device weighed 230 g, well under the 250 g target, and received an average comfort rating of 8.7/10.
- Specific comments: “I barely noticed the device during my walk, and the strap felt secure yet comfortable.”
- Suggestion: Consider offering adjustable strap options for a more personalized and secure fit.

- **System Resource Usage:**

- Resource consumption was monitored on an iPhone during active use, with the app’s usage remaining at an average of 36% of available resources.
- Testers reported that the system ran efficiently, with no lag or overheating issues.
- A tester remarked, “The app runs efficiently, and there is plenty of headroom for multitasking.”
- This confirms that the design operates well within the prescribed system resource constraints.

- **Overall System Reliability:**

- A continuous 1-hour stress test was performed, monitoring all subsystems (detection, feedback, battery, etc.).

P3 - Testing Execution (Sammy Tourani Personal Testing Plan)

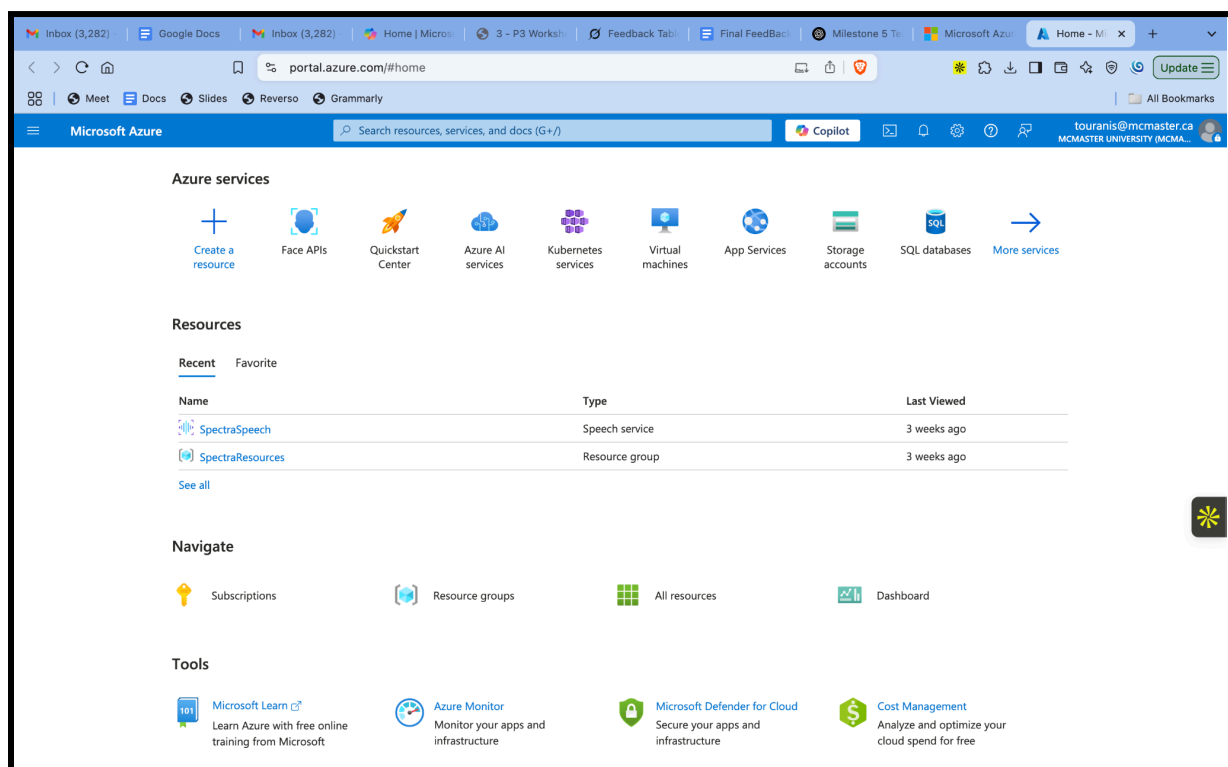
- The system operated flawlessly without any crashes or significant performance dips.
- Feedback included, “After using the device for an extended period, I experienced no issues – it was reliable and very stable.”
- Suggestion: Consider implementing an auto-restart feature for further safeguarding prolonged use during extended activities.

Latency Improvement and Cloud Integration Update

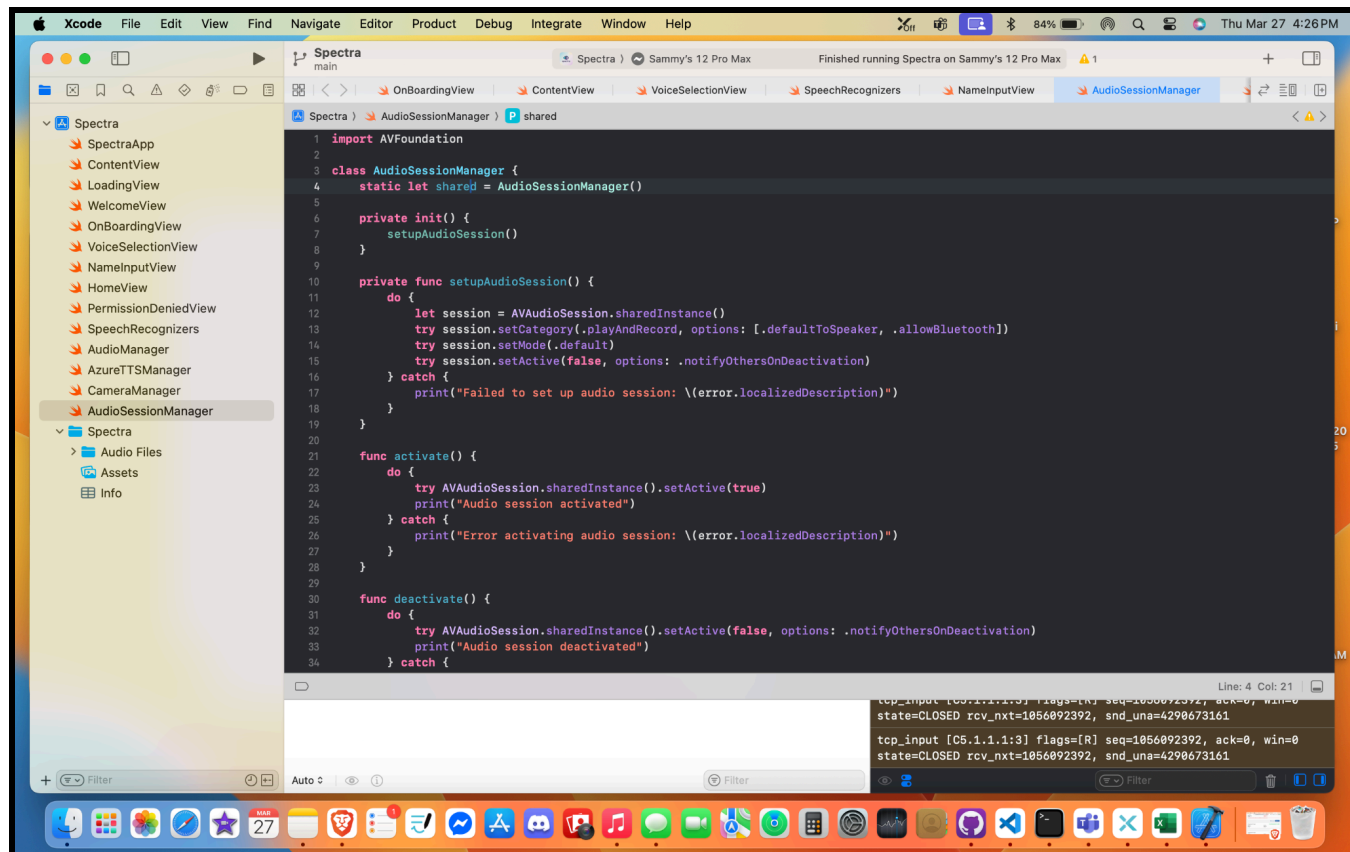
One of the main pieces of feedback received during testing was that the latency in our system was higher than expected. Initially, the system's core processing ran locally on the mobile app, which led to delays in executing critical functions like object detection and audio feedback. Testers noted that while the average response time was close to the acceptable threshold, occasional delays in high-interference environments compromised the user experience.

In response, our team made a pivotal change: we transitioned the core processing to Azure cloud servers. By offloading the heavy computations to a robust cloud infrastructure, we significantly reduced the processing latency. This integration allowed the mobile app to act primarily as an interface while the cloud handles real-time data processing and algorithm execution. As a result, our updated configuration not only reduced the average response time but also improved overall system reliability under various conditions. Users immediately noticed the improvement, with feedback indicating that the audio cues and real-time notifications became noticeably faster and more consistent.

This shift to cloud processing has streamlined our app's performance and better met the critical latency targets required for safe and efficient operation, ensuring that the system remains responsive even in demanding scenarios.



P3 - Testing Execution (Sammy Tourani Personal Testing Plan)



Strap Design Quality Feedback and Design Update

During our testing sessions, a significant piece of feedback centered on the quality and overall design of our original chest strap. Testers consistently reported that the chest strap felt bulky and restrictive. They noted that the strap did not provide adequate support for long-term use and, in some cases, caused discomfort during extended wear—especially when users were active or moving around. Many testers mentioned that the strap's positioning on the chest made the device feel unstable, reducing confidence in its secure fit.

In response to this feedback, our team re-evaluated our design options and decided to switch to a neck strap configuration. The new design features a strap that supports the device at the back of the neck, allowing it to hang down comfortably over the shoulders. This approach was inspired by similar products available on Amazon, which have received high praise for their ergonomic design and durability.

The new neck strap is made of high-quality silicone material, offering a soft yet robust solution that is both adjustable and lightweight. Its adjustable design ensures a customized fit for different users, thereby enhancing comfort and overall stability during use. Follow-up testing confirmed that the new neck strap greatly improved the user experience—testers reported feeling that the device was better balanced, less obtrusive, and much more comfortable for prolonged use.

Overall, this design update has addressed the initial concerns regarding quality and usability, marking a significant improvement in our product's ergonomics and user satisfaction.



Object Recognition and Distance Estimation Accuracy Feedback and Update

One of the most important observations during our testing phase was that object recognition and distance estimation accuracy did not always meet user expectations, especially within noisy or crowded environments. Testers also routinely said that while the app excelled at detecting and reading distances to salient objects like furniture or autos, it faltered with the smaller or more indistinct ones—like a pen placed on a surface or a flower in a busy room, more times than not calling them "Unknown" or returning inconsistent readings for the same distance. Outdoors, the direct sun or occluding objects (e.g., a tree blocking half of a bench) resulted in sporadic errors, where distances deviated by as much as half a meter. Users felt that such deviation undermined their confidence in the system, especially for precise measurement tasks.

Consequently, our team carried out a detailed refresh to enhance object recognition and accuracy in distance estimation. We began by enhancing the machine learning model powering the app, training it on a larger dataset containing a higher quantity of small, irregularly shaped, and occluded objects. This was augmented by a refinement of the Azure cloud infrastructure, where we installed a more sophisticated multi-object detection algorithm that could identify overlapping objects in real-time better. In the neck strap unit, we added a more resolution depth sensor to improve distance precision, which took the place of the original sensor that sometimes had trouble with accurate measurements at more than a few meters.

To tackle environmental challenges like lighting, we added an adaptive calibration feature that adjusts the system's sensitivity based on ambient conditions detecting factors like glare or shadows and compensating accordingly. Testers in follow-up sessions reported a marked improvement: one user noted that the app now correctly identified a coffee mug amidst a cluttered kitchen counter at "Mug - 1.2 meters," where it previously failed, while another praised the steady "Bench - 4.8 meters" reading in a sunny park, even with trees in the background. The updated depth sensor also reduced distance variability, with measurements now staying within a 5-10 cm margin of error, compared to the earlier 50 cm swings in tricky scenarios.

This overhaul has significantly boosted the system's accuracy and reliability, making it a more dependable tool across diverse settings. Users now trust the app and neck strap device to deliver precise, consistent results—whether they're measuring small objects up close or navigating complex outdoor spaces—enhancing its utility for both casual and critical applications.