Hi everyone. Today, Che, Angel and I will present our prototype called “Sightless Dancer Glover”. As the name implies, it is essentially a glove designed to be accessible for visually impaired people. Our intention was to explore the possibilities in providing a playful gamified experience with tangible media to a group of individuals of all ages, who could benefit through dancing.

According to Mana Hashimoto, a choreographer and performer who lost her eyesight due to an undiagnosed optic nerve atrophy: "Dance is a visual art. It is difficult for visually impaired individuals to enjoy dance as an art form, not only as therapy. We need accessibility and sight assistance through touch to take classes."

We also perceived it as an extension of the body to eventually help compensate the sense of sight. While developing our prototype, we had to take into consideration many aspects including the fact that some interactions are not as intuitive and/or familiar for visually impaired people. Therefore, the solution we came up was to implement responsive clues using the sense of touch and hearing. The artifact will basically provide straightforward instructions to the participant concerning which body parts to move, the speed as well as the time and directions through accelerometers.

Basically, the vibration motor(s) on the hand activates when the Arduino randomizes a movement involving one or two limbs using RNG. It then sends a signal to the user who receives tactile instructions. The user has the option to perform the motion correctly or incorrectly. If the motion is done correctly, the accelerometers detect the motion, send a signal to the Arduino which receives the data, and the speaker plays a positive feedback sound. If done incorrectly, the accelerometers register data, send a signal to the Arduino which receives the data, and the speaker plays a negative feedback sound. At the end, the Arduino waits 1 second before restarting the cycle. However, while developing our product, we’ve faced multiple challenges which we will explain later during our presentation.

Through acoustic feedback, the user can determine and understand their progress. A positive sound effect will also play through a speaker whenever a movement is done correctly, and a negative sound effect when a movement is done incorrectly. This feedback could either encourage the individual to continue or discourage them. Besides, it allows this community to exchange moments and sensations while sharing the same experiences as us. The users will also feel reassured, since the direct touch and sounds are senses visually impaired people rely on the most.

The sensors that we used to build our prototype are accelerometers, specifically a 3-axis magnetometer. We also experimented using a 6-axis magnetometer which outputs a wider range of values, which is more beneficial in a context of identifying the dance movements. Another element we would include are the vibrators which are placed on each finger as well as a speaker for the acoustic feedback. Each finger would essentially be representing a body part and yield the values of its directional movements. We still need to implement a sensor to measure the distance between the user and any obstacles that could potentially harm them in their environment.