ABLE Project - Rehabilitation Game for Seniors

THE ABLE PROJECT

The ABLE project focuses on creating an art-based rehabilitation experience suitable for seniors undergoing at-home physiotherapy.

ABLE is currently developing movement-tracking experiences that use sensor data to make calculations and present the visual content. Some of the ongoing difficulties surround elderly are their comfortability and understanding of technology[1] as well as fragility. The ABLE Project is made possible by McMaster Humanities Department (Pulse Lab), Dr. Paula Gardner as well as Dr. Rong Zheng.

BACKGROUND

With the 'Baby Boomers' approaching the age for extended care, the problems and concerns of the elderly are quite substantial to the Canadian economy and job markets.

• It costs the government a hefty 2 billion dollars every year [2]

• 1 in 3 Canadian seniors above the age of 65 will likely fall at least once [2].

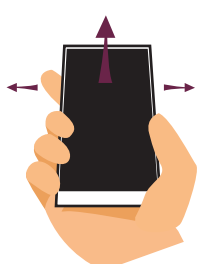
$2Billion
in healthcare costs per year

• The fear of falling alone can cause seniors to reduce their activities further increasing the risks of a fall [2].

• The elderly population needs to be able to exercise and stay active regularly in order to maintain their mobility.

IMPLEMENTATION

[redacted]



HARDWARE: Chromecast v2, Phone (OS independent), TV + Router (wifi setup)

TSOFTWARE: HTML, CSS, JS (Three.js, Google Poly).

THE ABLE ALLEY SOLUTION

The foundations of the ABLE Project expose the success of gamified experiences with seniors and its extension to improving health. The ABLE Alley solution proposed is designed to compliment the project by creating a platform that also promotes health by preventing loss of mobility, dexterity and stability.

ABLE Project has invested interest from AMICA (senior residence) for creating a platform that encourages social interaction as well as physical wellbeing.

Previous feedback from ABLE Project's sensor-driven experience shows seniors do not particularly enjoy engaging in activities with absolutely no goal or storyline (e.g. skipping a rock).

ABLE Alley strives to create a motivating gamified experience that is familiar to the users and contributes to an active lifestyle with the following considerations in mind:

• Research proves that person affected with memory loss retain the habit to do a learned action. The benefits of a familiar setting (or habitual action) is that the Brain has less of a workload and the user can get all the physical benefits [3].

• Considerations for physical ability when the users differ vastly in physical and mental ability, it is important to consider creating a experience that can be understood and used by the majority.

• The elderly are often aided with peripherals such as wheelchairs, walkers etc. In order to be able to reach the most users, ABLE Alley is going to create a gamified experience that captures motion data without lower body mobility.

• Sensor experiences are not considered for this project because the ABLE Project is in progress developing with sensors and curating sensor data to get insights. The intention is to mirror their project goals and contribute research and a proof of concept.

CHOOS ING AN EXPERIENCE

ABLE Alley considered the options of tennis, golfing and bowling. They are all suitable for maintaining good health among seniors [4] and possible with upper body movements.

Tennis lacks the ability to have a team mode or less competitive mode. Golfing and bowling can allow for a more realistic amount of players (for AMICA type environment) and multiple modes (cumulative team score or melee). However, research found that seniors playing golf experience negative feelings as a side effect [4]. Bowling, however, has leagues of 'teams' to try to create a team atmosphere rather than competitive one.

INVESTIGATING TECHNOLOGY

ANALYSIS

Wii

The Wii is an excellent tool for receiving complex movement data since it involves communication between the controller and the sensor (and is therefore mostly unaffected by environmental factor). Nintendo's addition of their physical cases (see wheel and racket controller casings) could be good inspiration for ABLE Alley (seniors would be interacting in a way they are familiar, with a controller that really resembles a tennis 'racket' or other peripheral). The downfall is that Wii is an expensive choice (Wii Console: $80. Wii Controller: $32).

Computer Vision

Working with Computer Vision can be extremely effective for applications that involve full body movement because it can handle precise changes.. Another benefit is that there would be the potential to remove the physical technology from the user (once game is in progress). Unfortunately, with physical ability in mind, training a model to recognize all types of assisted walking devices/peripherals might introduce a problem.

Chromecast (& Mobile Device)

Chromecast is Google's brand of casting technology which offers a way to create a connection between two applications (referred to as sender and receiver). Usually a casting session mirrors content from sender to the receiver while offering controls on the sender (similar to a remote and a television). Chromecast is considered for the project specifically using a phone for the sender application. While this is also an expensive option (requires phone, Chromecast, Wi-Fi, TV), it is by far the most practical option for a few reasons. Firstly, it does not need to be a phone, simply a handheld device with access to Chrome browser and wifi will do (iPod Touch, etc). Secondly, the Chromecast itself is not very expensive (and comes built into some televisions currently) at approximately 40 dollars. It is safe to assume that wifi is an acceptable prerequisite due to its availability in most other shared spaces.