Tactile Vision

1 CONCEPT

Tactile vision for blind curling is a device that represents the stones' instantaneous location on the curling house using adjustable height and texture input. This provides visually impaired curlers with an ability to practice curling without a guide.

2 BACKGROUND

In blind curling, visually impaired players commonly receive assistance from a guide on where to throw the stone and how their turn went. However, many players aspire to increase their independence while curling.

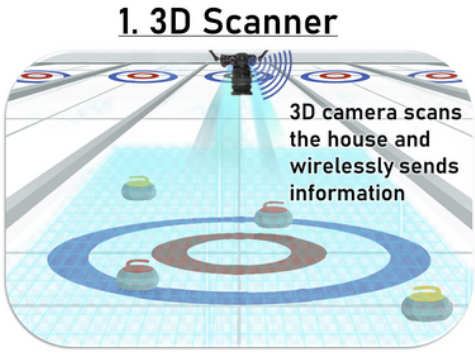
3 OPPORTUNITY

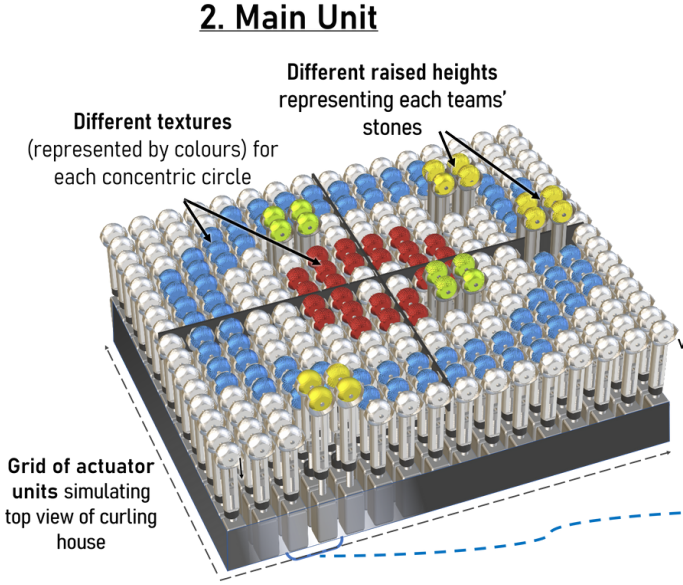
Improve the independence of the training process for visually impaired curlers at Leaside Curling Club

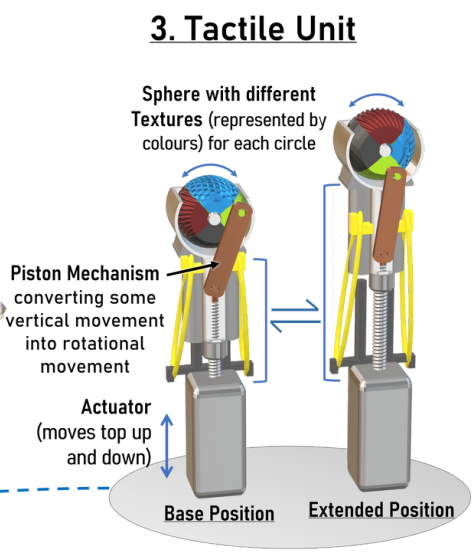
4 DESIGN

1. Scans the curling house using a 3D camera
2. Wirelessly relays this information to the main unit, which has pins move up to represent the stones' location
3. Different textures on pins represent each concentric circle of the house

User feels the main unit with their hand to understand the exact location of each curling stone, and using a portable sliding stand, they can practice with it







Portable stand – slides on curling rink and can be set to any height

5 OBJECTIVES

Critical requirements include Independency, Accessibility, Usability, and Accuracy

Independency
Decrease the need for a guide during practice

Accessibility
Usable for all levels of visual impairment

Usability
Ease of use for visually impaired curlers

Accuracy
Improve the precision of the stone locations

Safety
Minimize health risks

Ergonomics
Increase physical comfort

Affordability
Decrease the cost of the product

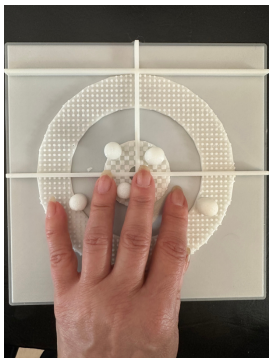
Durability
Withstand standard use for a prolonged period

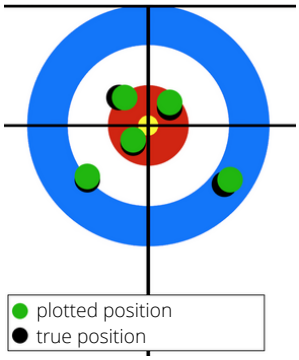
6 TESTING

Testing was done for the accuracy and usability of the prototype

Accuracy

Purpose: Measure the ability of the user to accurately determine the position of the stones.
Procedure: The user is given unlimited time to understand the position of the stones on a still-state prototype before drawing the position of the stones on a blank curling rink. The accuracy is measured by comparing the distance between true stones' positions and plotted positions. The subject is blindfolded to simulate the lack of eyesight. The results from 3 trials of testing are averaged.
Result: Tactile Vision prototype yielded the lowest average error of **2.4%**



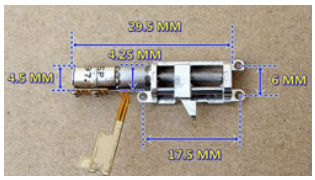


Usability

Purpose: Measure the time and complexity for the user to reasonably understand the position of the stones.
Procedure: The subject is given 6 minutes to use the design and understand the position of the stones. The average accuracy is measured from 3 trials and if it has less than 5% accuracy error, the design is considered trustworthy and the average time spent is calculated. The subject is blindfolded to prevent the use of eyesight.
Result: Tactile Vision prototype yielded an average of **4.2%** accuracy error with an average time of **1 minute 2 seconds**

7 NEXT STEPS

1) Improve the accuracy and quality of the display by increasing the number of pins.



2) Increase the number of pins with smaller actuators.

3) Add the ability to zoom in on parts of the house to increase fidelity.

4) Engage in stakeholder validation.

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