MI S TEAM

- Graduate Students at Binghamton University - MBA '20 with concentrations in Supply Chain Analytics and Healthcare Administration

- Brenden received his Bachelor of Science in Biomedical Engineering and Shirli received her Bachelor of Science in Biochemistry. Both are deeply committed to contribute as much as they can to exceed expectations and make a lasting impact on the medical care industry.

- For his Senior Design Project in Biomedical Engineering, Brenden helped lead a team of five individuals to develop a therapeutic device that aided children suffering from Sensory Processing. His team worked alongside children, their therapists, and different processing labs throughout Upstate New York, and created a functional device that is currently being implemented in therapeutic settings.

- Shirli has used her business knowledge to develop a strategy for an IT-related phone and earpiece application that revolutionized the way individuals with auditory disorders sense the world around them using innovations in AI technology. She created a marketing plan, designed a business outline, and researched competitors and the market in order to determine the potential of product success. Shirli's team placed 1st out of 11 teams of graduate students.

Brenden Faherty | Shirli Samara

What is a Stroke?

Statistics

- In the US alone, over 700,000 patients a year suffer from strokes

- Over ⅔ of these patients survive and require rehabilitation

- Strokes occur when blood flow is blocked to the brain, or there is bleeding of the brain

Symptoms

Stroke victims may have difficulty with muscle control due to weakened or paralyzed limbs aka paresthesias

Chronic pain due to damage to nervous system

Aphasia concerning the understanding of language

Rehabilitation

The goals of rehab is to help survivors become as independent as possible

Ensure the best possible quality of life with their limitations

There is no cure since there is no way to reverse brain damage

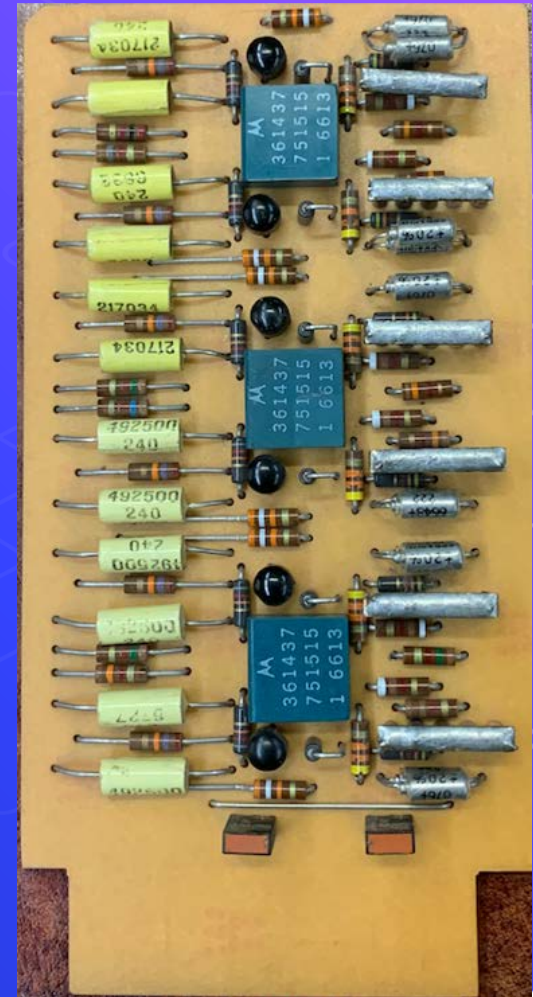Skills can be relearned through repetitive movements circumventing damaged areas through neuroplasticity

Why ReWire?

Where's the connection between circuitry and strokes?

It's simple: Players are rewiring their brain like rewiring a circuit

Project Mission:

The goal of the MIS Team project is to finalize the development and create a business strategy for the implementation of a therapeutic video game system in the treatment of stroke patients.

Project Objectives:

Bridge the communication gap between Physical Therapists and Computer Science students in creating a game that provides a novel outlet for independent rehabilitation and build a business strategy for the product

Add new game features and constantly update system

Involve the Chicago Team to help beta test the product

Create a business strategy & marketing plan for introduction of the product to Shirley Ryan Ability Lab in hopes of a partnership

Multidisciplinary Team

MIS Team: Brenden Faherty & Shirli Samara are responsible for managing the Project and serving as the intermediary between all other teams

Computer Science Students: Ensure functionality on all operating systems adding bug fixes and additional features

Physical Therapists: Our team also works with PTs to test and receive feedback for improving the current game
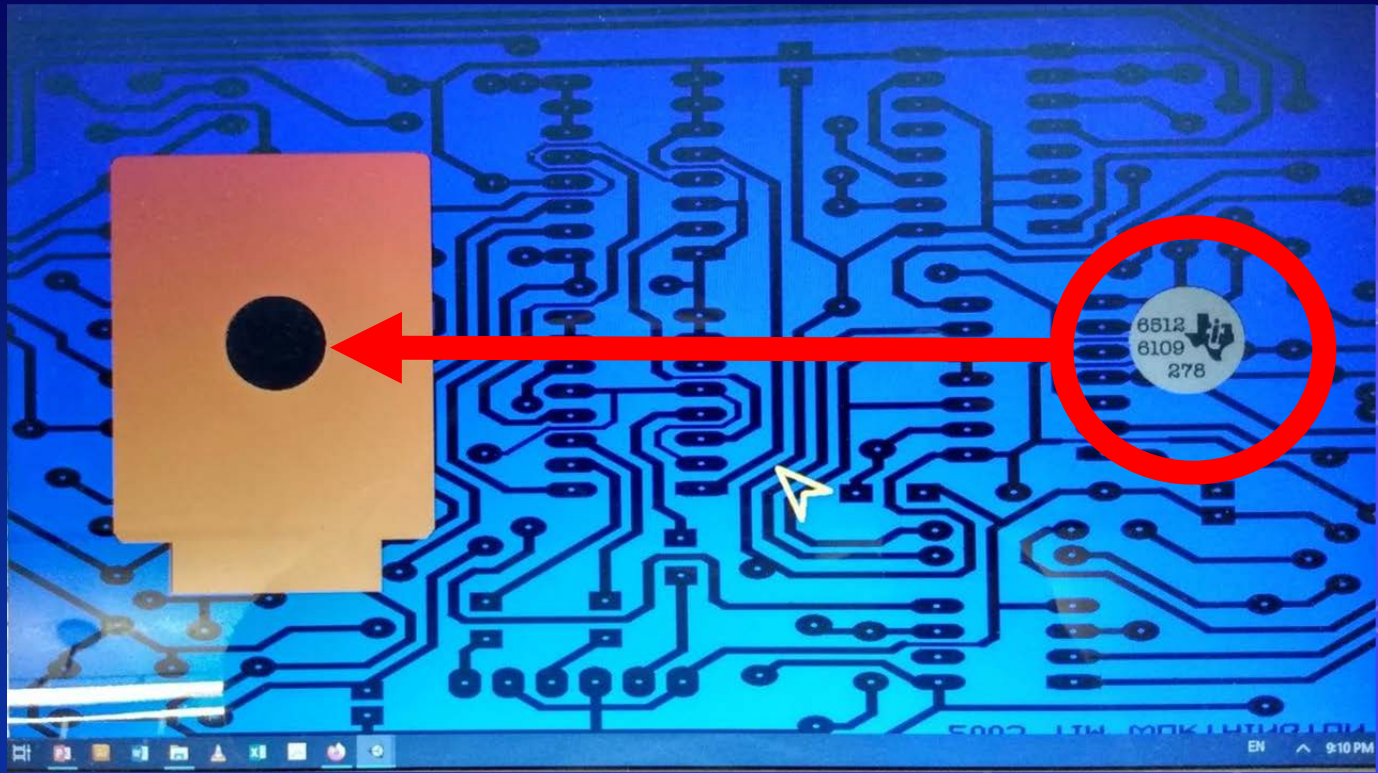
Game: Initial Prototype

The initial model was called Pick & Place and had three components: left, middle and right

The patient uses a mouse to produce large repetitive motions to drag circuit components into the proper positions on the circuit board

However, there were many bugs that needed to be fixed
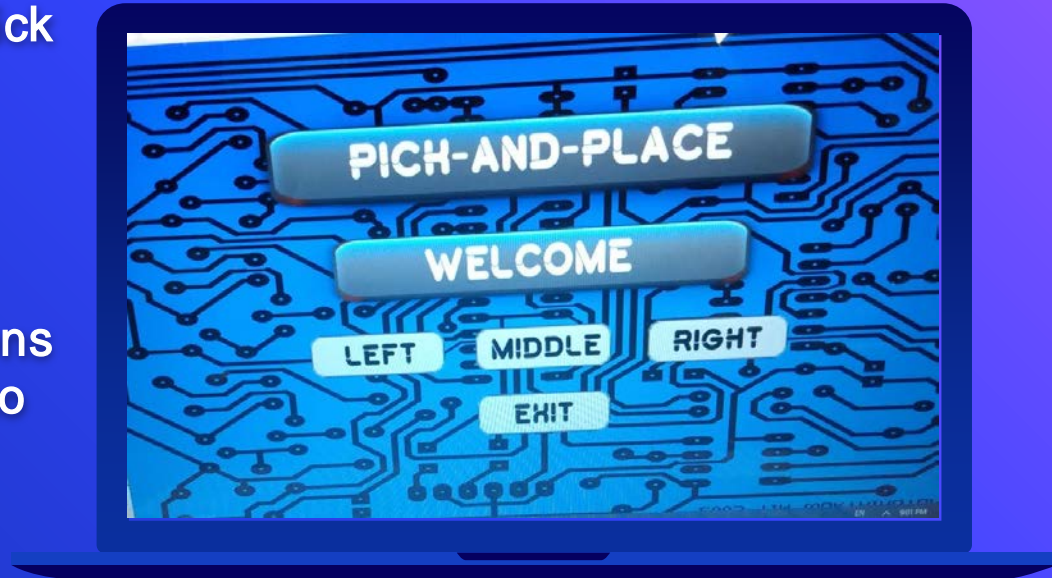
Fixed Game Bugs:

1. Redefined main menu
2. Cursor can't leave Screen
3. Incorporated Pause Feature
4. Clicker Specificity

Future Additions To The Game:

1. Add Timer
2. Add Sensitivity Adjust
3. Level Select

Accomplishments

- Added onto pre-existing code to successfully optimize the system on both PC and MacOS devices

- Facilitated Communication with Northwestern Medical through our connection Dr. Alan Burke

- On track to establish connections with Shirley Ryan Ability Center in the hopes of aid with testing the game in a upscaled PT setting

Shirley Ryan AbilityLab in Chicago

We plan on partnering with SRAL for the upscaling of the device and large scale testing on stroke patients
Our contacts include Dr. Burke who is part of the neurology department at Northwestern University and their IT Team

Where to Next?

- Finalize Business Plan by examining some of the other technology currently being used
  - Our product aims to provide support players affected in the most severe category from strokes
  - Targets players both in the Physical Therapy setting as well as independently at home

- Ensure last few additions are added to the game
  - Addition of timer, sensitivity alert, and level select, etc..

- Continue to keep in contact with the Shirley Ryan AbilityLab and discuss future plans with them

Constraints

Technical

- No previous experience with programming; Must rely on CS students

- Game sometimes does not work appropriately on different operating systems

- Long downloading time

Environmental

- CoronaVirus

Procedural

- Finding stroke patients to test the video game takes time and is unpredictable

- Medical constraints on what we are allowed to observe during PT hours

- Working with a large multidisciplinary team can be difficult in communicating and understanding everything appropriately

Scheduling

Finding a time when all members of the multidisciplinary team are available to meet (director of Techworks, CS students, Physical Therapists, our Team members)

Different time zones between Binghamton and Chicago making scheduling difficult

Schedule of Tasks, Milestones, & Deliverables

Tasks	Start Date	End Date	Duration (Days)
CORONA VIRUS Outbreak	3/01/2020	End of semester	...
Update Rewire Code with new features	3/17/2020	4/20/2020	34
Keep in Contact with SRAL	3/19/2020	4/18/2020	30
Create a marketing plan	3/23/2020	4/20/2020	28

Cost and Restraints

Costs

- Training
- Time commitment to upgrading game system
- System updates and maintenance
- Testing Time

Benefits

- Increase independence of stroke patient
- Ability to adapt to a dynamic environment
- Usability at home
- Decrease strain on physical therapists & family members
- Engages stroke patients
- Innovative

Potential Future Outlets

Use cutting edge technology to combine headset and 3 dimensional features with current body camera technology allowing the patients to express a larger range of motions

Think the Unthinkable!

Instructions for Players
Welcome to the main menu!

The goal of the game is to challenge you to reach the highest score ...have fun while fill in the circuit board with the missing pieces.

Directions
   1.) On the opening screen, you will see three different options: Left, Middle and Right. These choices correspond to the pieces starting point where you will then have to drag them to the opposite side of the screen.
        a.) For the Left option
   2.) Click the desired module and the first level will immediately begin.
   3.) click on a circuit piece ie. (Batteries, resistors and capacitors) and drag it to its corresponding shaded in area on the tan circuit board

The purpose ...Through large repetitive motions, the player are designed to facilitate relearning physical

PT
Download and Executing

   1. Download Stroke Rehab Game Demo folder containing the game files
   2. Click on Rehab game.exe to launch the game
   3. A window should appear with options to change the games resolution (windowed mode recommended)
   4. Once the game starts you will be presented onto the main menu. Click on **Left**, **Middle**, or **Right** to start the game or click on **Quit** to exit the application

How to Play

   1. Levels can be assigned based on the patient's specific circumstances.
   2. **Left** levels have click and drag exercises that go from left to right, **Right** levels have exercises that go from right to left, and **Middle** levels go from down to up.
   3. Levels 1-10 steadily increase the number of objects that the player needs to move from 1 object to 10. Levels 11-17 contain levels that mix shapes, while 18-20 mix colors. The last level has a moving block.
   4. You can exit the game by pressing the main menu button button, or skip through levels with the skip button or space bar.
   5. That's it! After you finish the game, you'll be sent back to main menu.

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How to Play

1. Once the game starts, click and drag the objects from their starting point to their ending point.
2. You can exit the game by pressing the main menu button button, or skip a level with the skip button.
3. That's it! After you finish the game, you'll be sent back to main menu.