Milestone 6

Title:

SmartStride: Toe-Walking Rehab

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Progress of Milestone 6:

Task	Progress	To Do
User and/or Developer Manual	100%	N/A
Demo Video	100%	N/A
SmartStride Poster	100%	N/A
Update User Guide	100%	N/A
Update About Us Page & Home Page Description	100%	N/A
System Testing & Evaluation	100%	N/A
Severity Bar Functionalities	100%	N/A
Angle & EMG Graph	100%	N/A

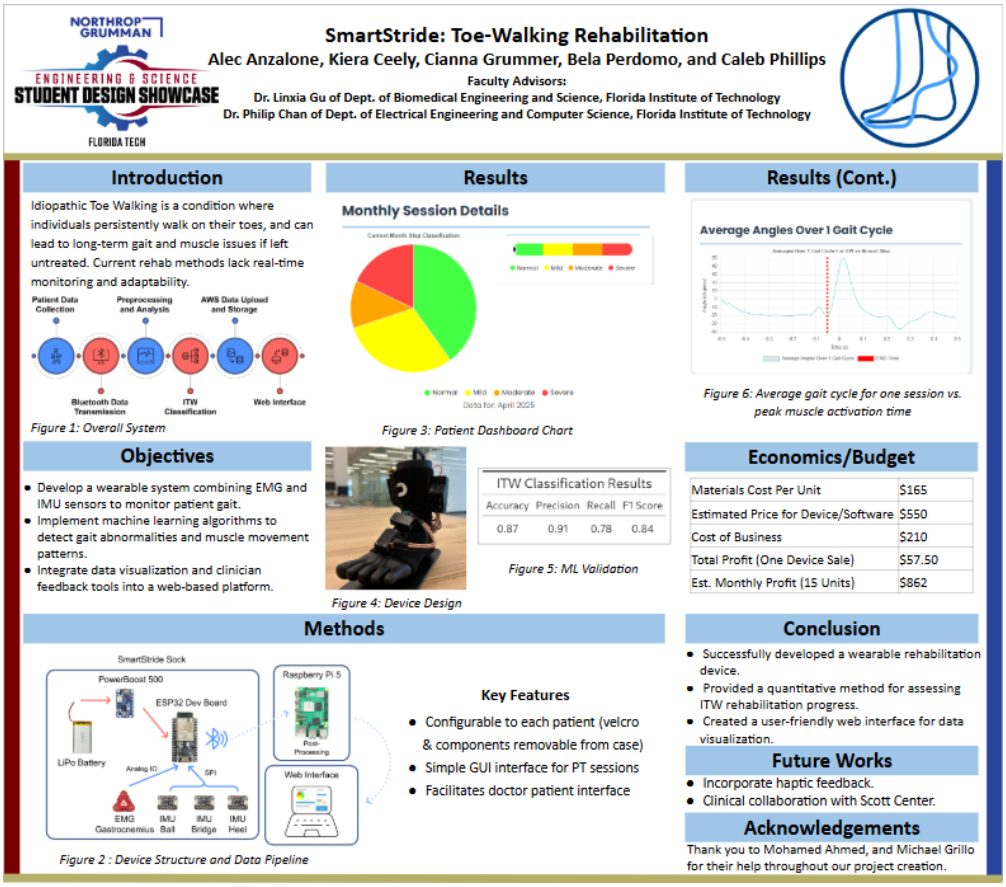
Discussion (Milestone 6):

- User and/or Developer Manual
    - I have created a developer manual that explains the structure of the website, database and the interactions between the APIs, HTML files, and Lambda functions. I also detailed how to access the database and explained the roles of

VCPs, security groups, and IAM Roles and how these are vital to the security of the database and website interactions. I also explained all the JavaScript within the HTML files and how different elements on a webpage are created.

- I have also made a user manual that provides step by step guides to how to do various things on the website. Some of these things are meant only for the practitioners and some are for just patients and have been labeled accordingly. The things that are covered in this manual are features like how to sign up, log in, find past results, filter those results, etc.

- Demo Video
  - I have created a demo video that displays the functionality of the website through a new patients view. First, they sign up and then log into their new account. On the dashboard there is no data to be viewed so we use the drag and drop webpage to add the new patient's data and upon returning to the dashboard their data is displayed. We then move to the perspective of the doctor and see how they would access the new patients account by viewing the clinician only items of that patient's page.
- SmartStride Poster
  - I have helped my BME group with creating a poster that encompasses not just the SmartStride device but the website as well. The poster is the image below and you can see portions of the website can be seen in figure 3 and figure 6.



- Update User Guide
    - The user guide page on the website now holds the user manual, developer manual and device guide. This page is now buttons labeled according to what manual it is and when clicking the buttons the manuals will be downloaded as a pdf and pulled up on a separate webpage where they can be viewed.
- Update About Us Page & Home Page Description
    - The about us page has been updated to hold more relevant information regarding the SmartStride team, why we are creating the device, key features of the device, and collaborators. I worked with the BME side to help create more accurate statements regarding the device features and reasons for creating the device. I also have updated the homepage description, so it reflects the SmartStride goals more accurately.
- System Testing and Evaluation
    - The testing was conducted by three JavaScript files that tested the reliability and accuracy of the website. More specifically I tested both the logins and the CSV uploader. These two functionalities were chosen because they make up the majority of the website and would be the most used functions if put into production. The CSV uploader handles the drag and drop page and the upload from the raspberry pi. A new user of the patient type was created for the tests to provide a clean slate and not mess with existing users' data. First the logins were tested with the patient tester login and the clinician user login. I sent the login information to the API using the JavaScript file and had it read the response code that was sent back from the API. If the response code was passing the successful attempts variable was ticked up by one and if unsuccessful the unsuccessful attempts variable was ticked up by one. These variables are used to calculate the success rate of the logins. I ended up with a 100% success rate for 200 total attempts. The next thing that was tested was the Drag and Drop handler functionalities that are used for the upload of the CSV files from both the Pi and the webpage. This was tested in total 300 times between the reliability test and the accuracy test. Both of these tests ran 50 times uploading three different kinds of CSV files per attempt. The reliability test just checked that the data was uploaded through the response code received while the accuracy test connects to the database and checks the values that were uploaded. Both tests resulted in 100% accuracy and reliability success. I attributed this to the fact that it is a small system with few users and to more accurately test the website stress testing should be conducted to get a better understanding of the reliability and accuracy of the system when a large userbase is present.
    - The User Survey was sent out to get an idea about the usability of the system. It had nine questions and one optional free response in case an error occurred, or feedback was needed. The questions and their usability ratings out of five stars are as follows:

Task: Sign up as a patient using the Doctors username: GreenEggs
Question: How easy was it to find the sign-up page?
(1 star being impossible 5 stars being no issues)
Rating: 4.63 stars

Task: Sign up as a patient using the Doctors username: GreenEggs
Question: How easy was it to complete the sign-up form?
Rating: 4.88 stars

Task: Log in using your username and password
Question: How easy was it to login?
Rating: 4.88 stars

Task: Find the User Device Guide webpage
Question: How easy was it to find?
Rating: 4.63 stars

Task: Find the Past Results webpage
Question: How easy was it to find?
Rating: 4.38 stars

Task: Find the Upload CSV File webpage
Question: How easy was it to find?
Rating: 4.75 stars

Task: Find the About Us webpage
Question: How easy was it to find?
Rating: 4.63 stars

Task: Find the About Us webpage
Question: How easy was it to find?
Rating: 4.63 stars

Task: N/A
Question: Overall how easy was it to navigate the website?
Rating: 4.38 stars

This is an optional feedback box for any comments, issues encountered, or suggestions you may have:
Two of the responses:

“after logging in, I’m still able to click the "login" page in the nav header, which sends me back to the login page. The order of the nav items

is also changing depending on the page that is selected. But overall, all of the pages are looking great and professional”

“It was a bit confusing finding where to sign up. I would have assumed instead of clicking getting started that the login page would have a link to direct me to sign up”

Both of the issues described in the free response were addressed and fixed. The results ended up with an average of 4 stars and above.

- Severity Bar Functionalities
    - The severity bar now has functionality that takes the data from the pie chart and finds the largest portion of steps and moves the indicator to that section of the bar chart. This functionality is called while making the pie chart after the data has been collected form the API and the bar will be changed monthly with the monthly change of the pie chart data and it will encompass all that months data.
- Angle & EMG Graph
    - The angle and EMG graph required an overhaul of the database and the patient_session_data table was removed and replaced by two new tables one to hold the angle data and the other to hold the EMG data point. The two tables data is linked by the session number and the most recent session is used to display the graph. The angle data is the average angle over one gait cycle and the EMG is one data point that marks the angle data graph at the point where the muscles are actively used the most. The EMG point is found by the machine learning part that takes place on the raspberry pi. This graph is only visible to the clinician of that patient. Since the database was changed in how it holds the patients data the drag and drop Lambda needed to be edited as well. Logic to detect what kind of CSV data that is being uploaded was implemented by reading the total number of rows and columns in the CSV file. If it contains more than two rows it is the angle data because it is a long list of data elements. If it contains more than three columns then it is the pie chart data because it is always five columns and two rows and if it is two columns and two rows it is the EMG point. Because the CSV file types always have the same set of rows and columns it can be used to differentiate the three types of data. This was tested from the website and from the raspberry pi.

Lessons Learned:

Throughout the past two semesters, I have gained comprehensive knowledge in web development, API integration, and AWS cloud services. My experience has been particularly focused on AWS infrastructure, where I've developed such a strong understanding that I'm now pursuing AWS certification to validate my skills. This certification will significantly enhance my resume qualifications and career prospects. Additionally, I've mastered essential web technologies including CSS, HTML, and JavaScript, building these skills from the ground up with no prior experience. Beyond technical skills, I've learned to effectively apply software development methodologies and requirements engineering principles to collaborate with the SmartStride team,

translating their ideas into actual project specifications and requirements. I have also developed my skills in testing and full stack development.

Meeting Dates:

Every Tuesday and Thursday 11am-12pm

Every Friday 12pm-1pm

Client Feedback:

Advisor Meetings:

Every Tuesday and Thursday 11am-12pm

Evaluation by Faculty Advisor:

Task for Faculty Advisor: detach and return this page to Dr. Chan (HC 209) or email the scores to pkc@cs.fit.edu

Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Cianna Grummer	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: _____ Date: _____