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Jhovanny Uribe <jhuribe@ucsc.edu>

interest in design for hand paralysis

8 messages

Dianne Hendricks <dghendri@ucsc.edu> Thu, Jan 23, 2025 at 4:33 PM
To: Jhovanny Uribe <jhuribe@ucsc.edu>, Sage Brill <sagbrill@ucsc.edu>, Eliana Moreno <elshmore@ucsc.edu>

Hi Jhovanny and Sage and Eli,

Jhovanny is a CSE student who is working on a capstone team design project where they will make a device to aid physical therapists in treating patients with hand paralysis.

I thought there may be some overlap with your prosthetic hand project, and your expertise with 3D printing and Slug Works.

Any help would be greatly appreciated! :)

Thanks!

Dianne

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Sage Brill <sagbrill@ucsc.edu> Fri, Jan 24, 2025 at 2:26 PM
To: Dianne Hendricks <dghendri@ucsc.edu>
Cc: Jhovanny Uribe <jhuribe@ucsc.edu>, Eliana Moreno <elshmore@ucsc.edu>

Hello Jhovanny,

Were you an RA at porter? I recognize the name but could be wrong.

Always down to help with anything Hand related, especially if its for rehabilitative tech! Let me know how we can help!

Best,
Sage Brill
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Dianne Hendricks <dghendri@ucsc.edu> Fri, Jan 24, 2025 at 3:25 PM
To: Sage Brill <sagbrill@ucsc.edu>
Cc: Jhovanny Uribe <jhuribe@ucsc.edu>, Eliana Moreno <elshmore@ucsc.edu>

Awesome, thanks Sage! :)
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Jhovanny Uribe <jhuribe@ucsc.edu> Wed, Feb 5, 2025 at 8:00 AM
To: Sage Brill <sagbrill@ucsc.edu>

Hey Sage,

Yes, I was an RA at Porter! It's so great to get in touch with you again! I hope you're doing well! :)

I greatly appreciate your support and consideration of this project! My team and I are looking to get connected to as many resources available to us so we can accomplish our mission statement as closely as possible. My team is currently developing a solution to **aid patients who undergo physical therapy to rehabilitate hand injuries**. For context, here is our **problem statement**:

People with hand disabilities and injuries face challenges in attending physical therapy sessions multiple times a week during their period of recovery due to the demands of their lives. This will slow or reverse recovery progress if sessions are insufficient or missed. We aim to address this by providing a device that allows clients to perform their exercises at home, reducing in-person visits. Our goal is to make rehabilitation more convenient, accessible, and efficient, enabling clients to have more control over their recovery.

Here are some of the **questions** my team and I had when designing this project concerning **rehabilitative tech** for your consideration:

1. Any suggestions on how would you work around moving the joint areas of the finger?
2. What are common challenges patients can face when using medical assistive devices?
3. How can we integrate sensors into the glove to measure hand movement, grip strength, or finger positioning?

If you happen to have any connections or resources that would be helpful for us to refer to or have any questions about the nature of our project scope, please contact me when you are available. I'd love to stay in touch regarding this project as I am passionate about this subject and I'm glad that you are too!

Lastly, I want to apologize for the delayed response due to unforeseen circumstances but I very much look forward to staying in contact during the development of this project!

Best,
Jhovanny Uribe

On Fri, Jan 24, 2025 at 2:26 PM Sage Brill <sagbrill@ucsc.edu> wrote:
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Jhovanny Uribe
University of California, Santa Cruz
Class of 2024

Jhovanny Uribe <jhuribe@ucsc.edu> Wed, Feb 12, 2025 at 8:00 AM
To: Sage Brill <sagbrill@ucsc.edu>

Hey Sage!

I hope you're doing well! I am following up on this topic. I would greatly appreciate any feedback or direction you can provide. Thank you very much for your time and consideration!
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Sage Brill <sagbrill@ucsc.edu> Wed, Feb 12, 2025 at 10:16 AM
To: Jhovanny Uribe <jhuribe@ucsc.edu>

Hey Jhovanny,

Sorry I realized I never sent my initial message, thank you for following up!
Here is some advice for the care glove to your specific questions posed before:

1. For moving singular finger areas I think theres a few approaches you could take. Depending on whether you are trying to increase grip strength or improve flexion my recommendation would be elastic resistance in either direction. If aiming to help patients open their hands beyond a certain point I would say a sort of webbed resistance to prevent proper opening

and vice versa with elastic resistance running around the back of the fingers to provide resistance in the gripping direction. I think this could be interesting for measurement purposes by possibly putting a way to measure tension created over time at each point to show improvement or worsening of grip. I think this could be adjusted to specific joint testers by creating 3 segmented parts for each finger (2 for the thumb) that can be added or removed to test/improve flexion or grip at a specific joint.

2. I think the biggest hurdles faced by patients when using assistive devices are:
- Dilation of care to specific needs. So in designing a sensor glove you want to consider how it can be changed/adjusted to patients that may not fit the mold. Can a lack of nodes be accounted for if a patient is missing fingers or cannot move specific portions of hands. If there's limited motion to specific planes can your modeling be adjusted to set a new center point to measure movement. (would just be to name a few adjustments)
- Cost of materials. Medically assistive devices can be some of the most expensive purchases someone can make. So keeping in mind how to increase accessibility of these helpful tools is always something that should be thought of.

3. This kinda goes with the previous 2 responses but I think for movement and finger positions they could be woven or implemented in the jointed section of the glove and be dialed depending on the limitations of the specific patient. For grip strength measurement I would recommend either pressure sensors in the palm are, possibly a bar or something to grip on, or finding some way to quantify tension of elastic bands that would move as a result of gripping (located in a sort of string housing unit on the wrist or back of hand)

I hope this helps! Let me know if anything needs clarification or if you have any more questions! Always happy to help and again, sorry for the late response!

Thank you for your time,

Sage
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Jhovanny Uribe <jhuribe@ucsc.edu> Wed, Feb 12, 2025 at 4:28 PM
To: Aliyaa Islam <alnislam@ucsc.edu>, Akash Srinivasan <asrini13@ucsc.edu>, Caden Roberts <cawrober@ucsc.edu>, Andy Vo <anngvo@ucsc.edu>, Ethan Cesario <ecesario@ucsc.edu>

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Jhovanny Uribe <jhuribe@ucsc.edu> Wed, Feb 12, 2025 at 9:11 PM
To: Sage Brill <sagbrill@ucsc.edu>

Wow thank you so much for your insightful response, Sage! My team and I greatly appreciate your time and consideration on your feedback! We intend on taking into consideration all of your points to better the quality of our project!

I hope that as the project development progresses that it will be okay to reach out to you again for any follow up questions. I greatly appreciate your time and I hope to talk to you again soon!

With gratitude,
Jhovanny

Jhovanny Uribe
University of California, Santa Cruz
Class of 2024
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