

A METHOD TO EVALUATE IMPROVEMENT OF HAND MOVEMENTS IN PATIENTS WITH HAND DYSFUNCTION DUE TO STROKE

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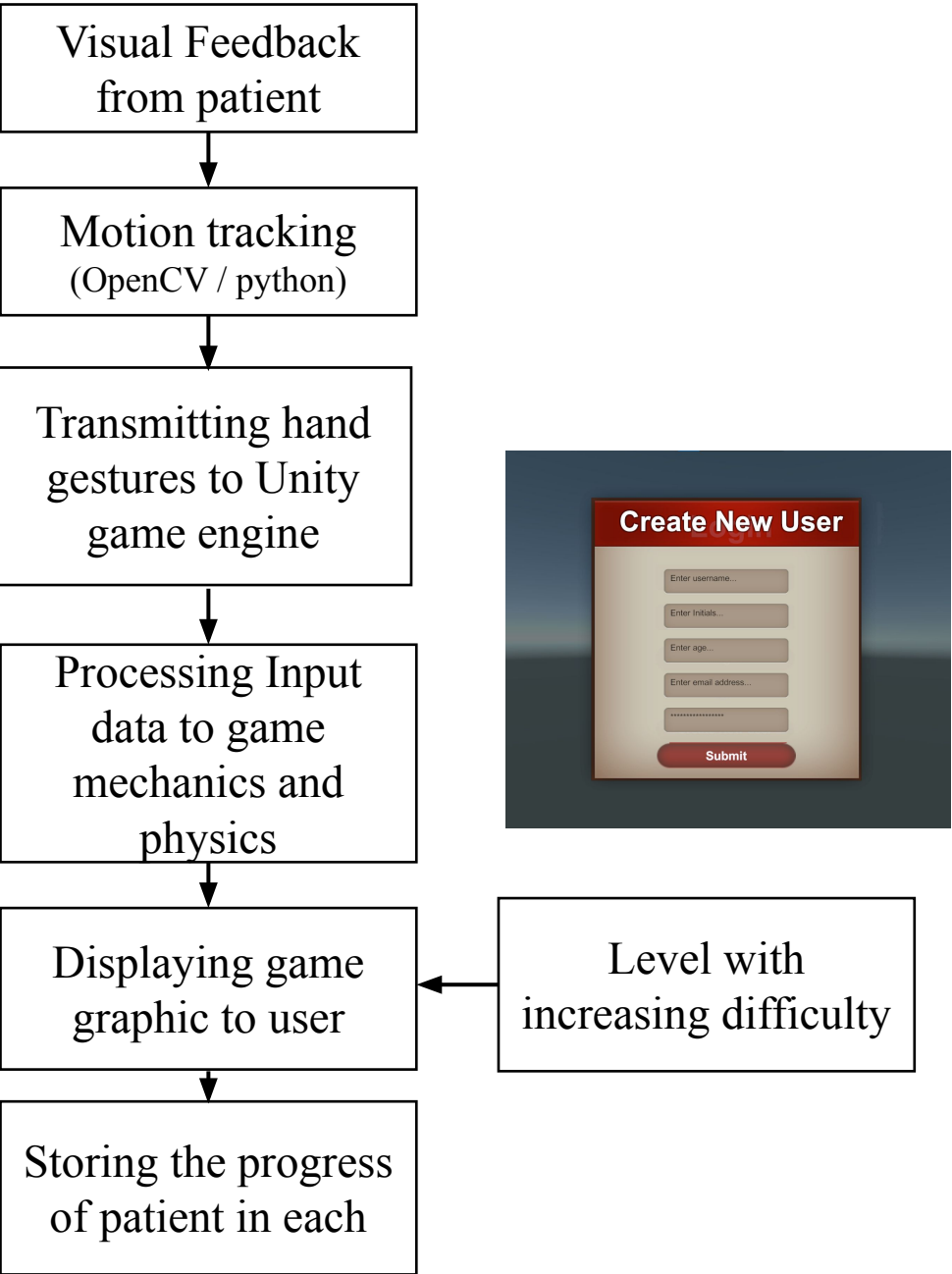
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Objectives

- 1) Create 3 games to aid physiotherapy in patients with impaired hand function.
- 2) Tailor make the difficulty of the games to individual patient progress.
- 3) Improvise a method for therapists to monitor progress and outcome.

Method



Results



Game 1 targets palm/ wrist improvements across three escalating difficulty levels.



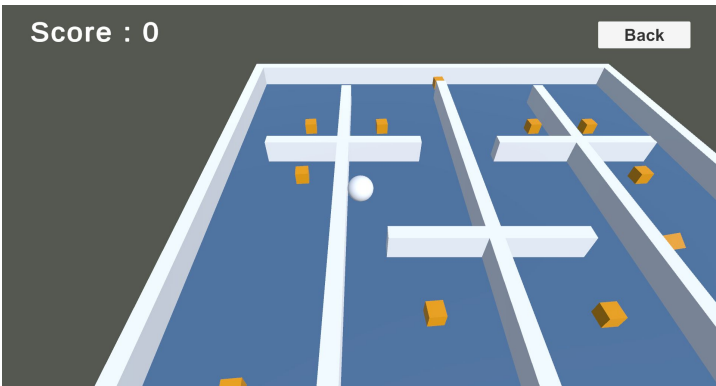
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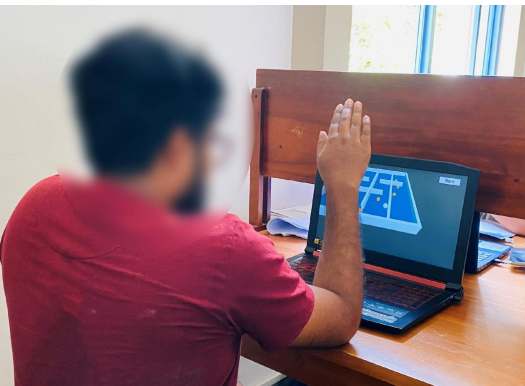
Game 2 focuses on enhancing fingers and wrist movements, uniquely analyzing individual finger improvements while disregarding unintended finger use



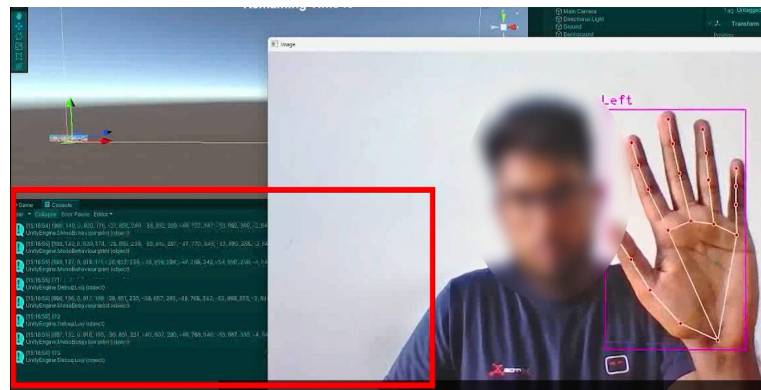
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7111	0	0	0	0	25	25 2024-02-03
7112	0	0	0	25	0	0 2024-02-03
7113	0	25	0	0	0	0 2024-02-03



Game 3 introduces force-based gameplay, strategically designed to follow Game 1 and 2 for incremental patient progress.



Coordinate points of the hand detected by the system



We have tested the suggested system with a 54 year old female Parkinson patient who has a partially paralyzed arm. We asked the patient to play the game before the diagnosis and tested again with patient after one week on medication

Before the medication

- Patient was able to play level 1 of game 1 (scored 4 points)
- Patient didn't understand the game initially

After the medication

- Fully completed all the levels (level 1,2,3) of game 1 with full scores
- Participation with game 2 was not successful due to tremors in the fingers

Conclusion

This stroke rehabilitation game introduces an innovative methodology leveraging motion tracking and personalized game experiences to enhance therapy for stroke patients. While showing promising potential in improving patient outcomes and quality of life, the system requires further clinical guidance for elderly users and could benefit from mobile application development to broaden accessibility and ease of use.

References

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- Bower, K. J., Louie, J., Landesrocha, Y., Seedy, P., Gorelik, A., & Bernhardt, J. (2015). Clinical feasibility of interactive motion-controlled games for stroke rehabilitation. *Journal of neuroengineering and rehabilitation*, 12(1), 1-12.