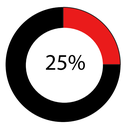
Adaptive Break Threshold Algorithm for Electronic Grip Gauge

Jerry Zheng[1], Michael Adkins[2], Shriya Nedamuran[3],
Marta Iversen[2], Jacob A. George[2,4,5,6]

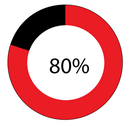
[1]West High School, [2]Department of Physical Medicine and Rehabilitation, [3]Leigh High School, [4]Department of Biomedical Engineering,
[5]Department of Electrical and Computer Engineering, [6]Department of Mechanical Engineering, University of Utah, Salt Lake City, UT

jwz.rio@gmail.com
u1389927@utah.edu

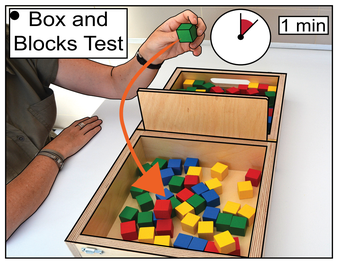
Stroke Rehabilitation Neglects Individual Needs



1 in 4 people have a stroke in their lifetime

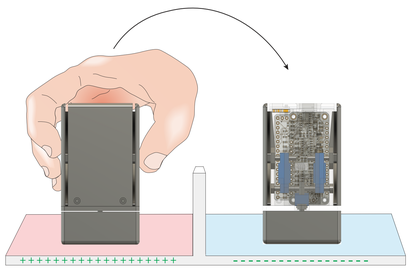


80% of stroke patients have upper limb hemiparesis

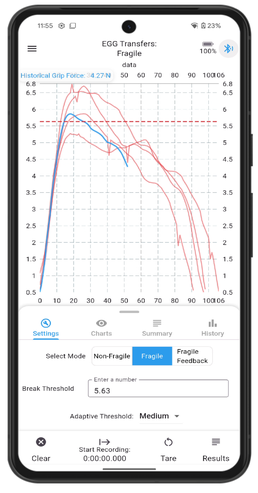


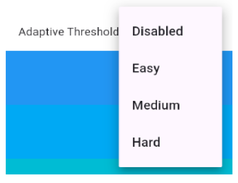
- Current hand dexterity tests mainly target gross motor skill while neglecting sensory's contribution to hand dexterity
- These tests are not personalized and may not adequately challenge the patient

The EGG and its App



- Electronic Grip Gauge is able to assess both sensory and motor function via fragile and non-fragile object transfers
- Mobile app streamlines client interface and provides seamless, accessible features
- Fragile object transfers still lacked personalization; implented a static breaking threshold

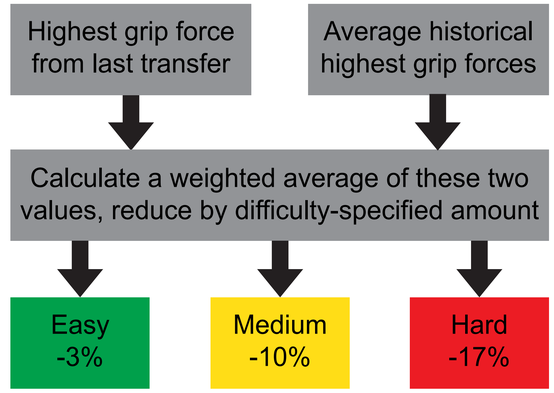


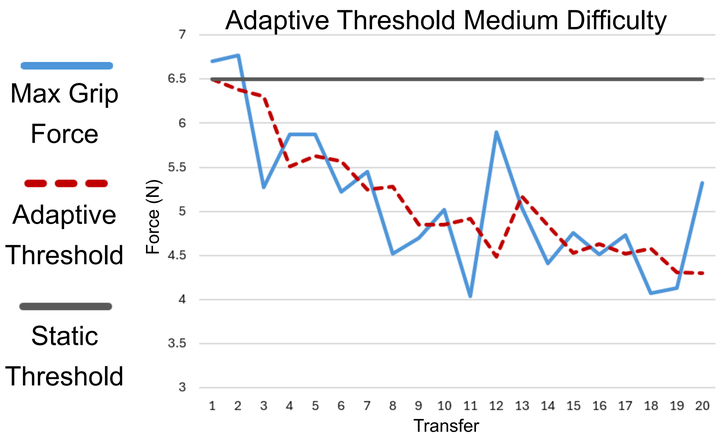


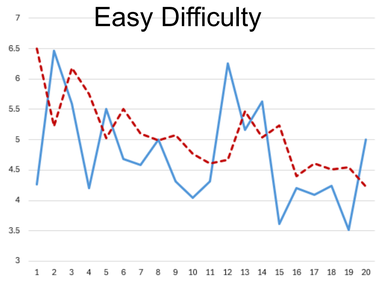
Creating an Adaptive Breaking Threshold

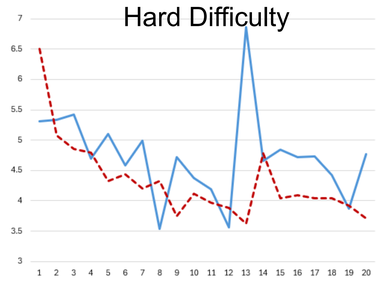
This project aims to solve this lack of personalization via the implementation of an adaptive breaking threshold, which detects the force at which the patient is gripping the EGG and adapts it to their unique strength, targeting a 50-50 success-break ratio.

Adaptive Algorithm Flowchart

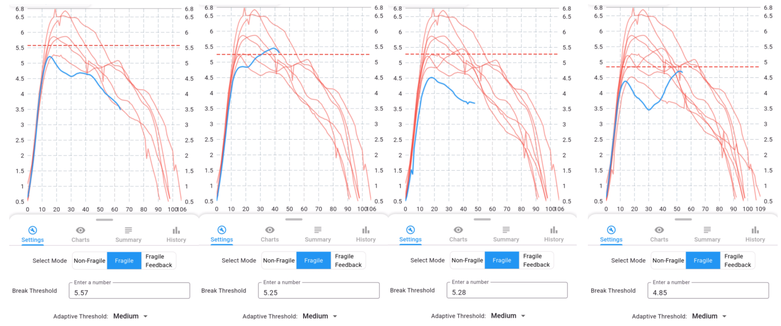








Adaptive Breaking Threshold In Action



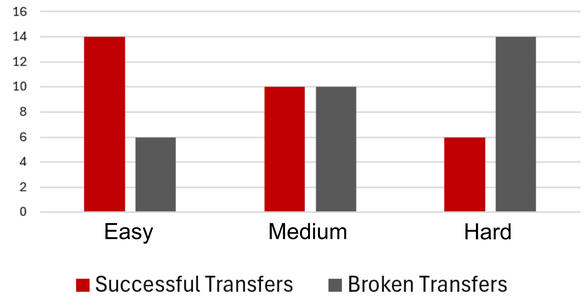
Max grip force of this transfer is 5.22, which is under the threshold

Threshold decreases to 5.25, closer to user's true skill level

Previous max grip force is over threshold, which increases to 5.28

Extremely low max grip force decreases threshold to 4.85

Successful to Broken Ratio for Transfers



Twenty transfers were recorded for each difficulty mode. EGG was in fragile mode (no feedback) and the break sound was muted to ensure random samples.

In the future, a gradual increase to weighing historical average higher than previous max force and lessening reduction amount will be implemented. This allows for adaptive threshold to level off after a certain amount of transfers, eliminating the "chasing" nature of the adaptive breaking threshold.

Acknowledgements

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