

Background

- Wheelchair users have a strong need to monitor activity
 - Manual wheelchair users are highly susceptible to repetitive stress injuries [2]
 - Propulsion forces over 80% of maximum capacity result in damage [1]
- Typical existing activity monitors don’t work with manual wheelchair users
- SmartWheels are the gold standard, but are an expensive clinical tool
 - There is a need for an affordable consumer-grade tool for activity monitoring

Objective

The objective of this work was to create an inexpensive activity monitor for manual wheelchair users capable of measuring the following data:

- Number of propulsion strokes
- Average travel velocity
- Amount of time spent active
- Estimated distance travelled
- Number of “redline events”¹

¹ *redline events* are instances of when the user’s propulsion force exceeds 80% of the maximal propulsion force they can generate

Method

Results

As you can see in Figure 1, derp.

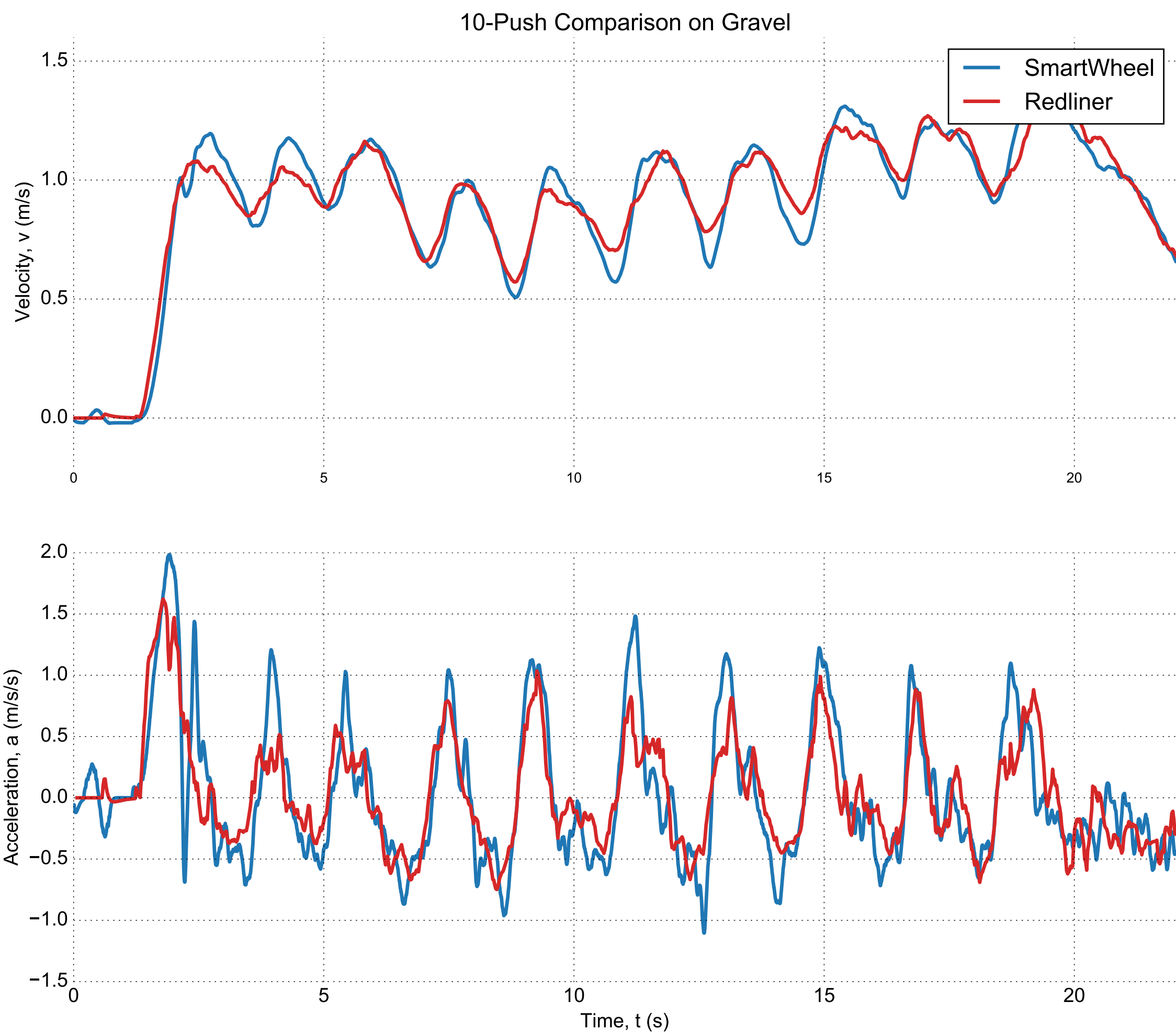


Figure 1: Velocity and acceleration traces for both Redliner and SmartWheel for 10 pushes on rough gravel. The traces are in close enough agreement to accurately count pushes and reasonably estimate exertion and distance travelled with Redliner—despite the excess noise caused by the rough terrain.

Conclusions

- Redliner is a new activity monitor for manual wheelchair users
- Redliner has been validated against expensive SmartWheel devices
- Redliner is moving forward as a commercial entity to produce and sell the devices

References

[1] I.P. Freely. A small paper. *The journal of small papers*, -1, 1997. to appear.
[2] Hugh Jass. A big paper. *The journal of big papers*, MCMXCVII, 7991.

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