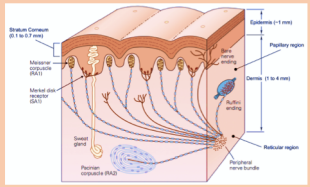
Automated Adaptive Touch Testing

Clinical testing of touch typically involves manual application of test stimuli. The Sensory Motor Neuroscience (SyMoN) Lab and Obi Robotics are developing an **automated approach** based on continuously varying stimulus intensity or frequency for assessing touch discrimination ability. Discrimination difficulty is adjusted adaptively up or down to yield 75% correct performance.

Manual touch tests:
Detect, discriminate
Quick, objective.
- Von Frey
- 2-point
- Grating orientation
- Tuning fork

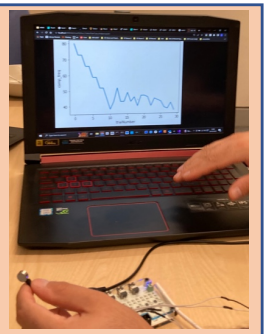
Mechanoreceptors:
Slowly adapting (SAI/II);
-> static touch
Rapidly adapting (RA1/II)
-> Sliding touch



Adaptive touch testing:
Vibration frequency discrimination
2 buzzes on each trial, which was higher?
30hz and 300 Hz standard interleaved

Technical:
Frequency bands target Meissner (RAI) and Pacinian (RAII) mechanoreceptors
Resonant frequency -> amplitude matching vs randomization
Coded in Unity

2 down 1 up:
Harder after 2 correct; Easier after 1 error
Reversals settle at 75% correct (midway between 50% and 100% correct)



Next:
Mountings (suitable for fingers, toes)
Norms: effects of age, peripheral neuropathy
Amplitude discrimination at 30hz and 300hz
Indenter (pressure) to target SAI/II
Phone app

Questions following adaptive touch test:
(1) Do you use manual touch tests (MTT)?
(2) Which MTT do you use most?
(3) Any issues with MTTs you use?
(4) Did you try the adaptive touch test (ATT?)
(5) Any problems with ATT?
(6) What would improve ATT?
(7) Would you like to be updated about ATT?
If so please get in touch via e-mail and we will share news on development in the New Year.

Touch Assessment Workshop

Wed 15 March University of Birmingham

Expert talks covering touch testing methods including:
* adaptive touch * forceful touch * imaging touch
* painful touch * virtual touch * aging touch
* patient experience of neuropathy.

Practical demos, Poster sessions, Lab tours.

Further Information

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https://adaptivetouchtesting.netlify.app/

https://www.obirobotics.com

https://twitter.com/symon_uob