



UMBC

An Autoethnographic Study of Using Peripheral Interaction to Enhance Research Dexterity



Brandon Ables - HCC Independent Study with Dr. Foad Hamidi - Spring 2024

Introduction

In my autoethnographic research I experiment with improving critical reading and recall of weekly assigned papers in my Human-Centered Computing PhD program using peripheral interaction during routine activities. Peripheral interaction is engaging with interactive systems in the periphery of our attention that are embedded into our routines and environment.

Background Information

- During MFA research I became a certified hypnotist specializing in inventing my own active-alert self-hypnosis techniques.
- Active-alert hypnosis uses physical movement instead of relaxation to get your mind to a suggestible state.
- This sparked my interest in pairing computer interaction opportunities with reading, writing, or learning specific information related to the interaction.
- Contributes to research in ubiquitous computing, slow technology, quantified self.

Research Question

How does interacting peripherally with highlighted research text, summary notes, and responding to questions consistently while engaging in routine activities affect content recall, discussion participation, and comprehension level?

Reading Questions

1. What was it about?
2. What did they do?
3. What did they find?
4. What was particularly interesting or surprising to you?
5. What is the contribution to HCI?

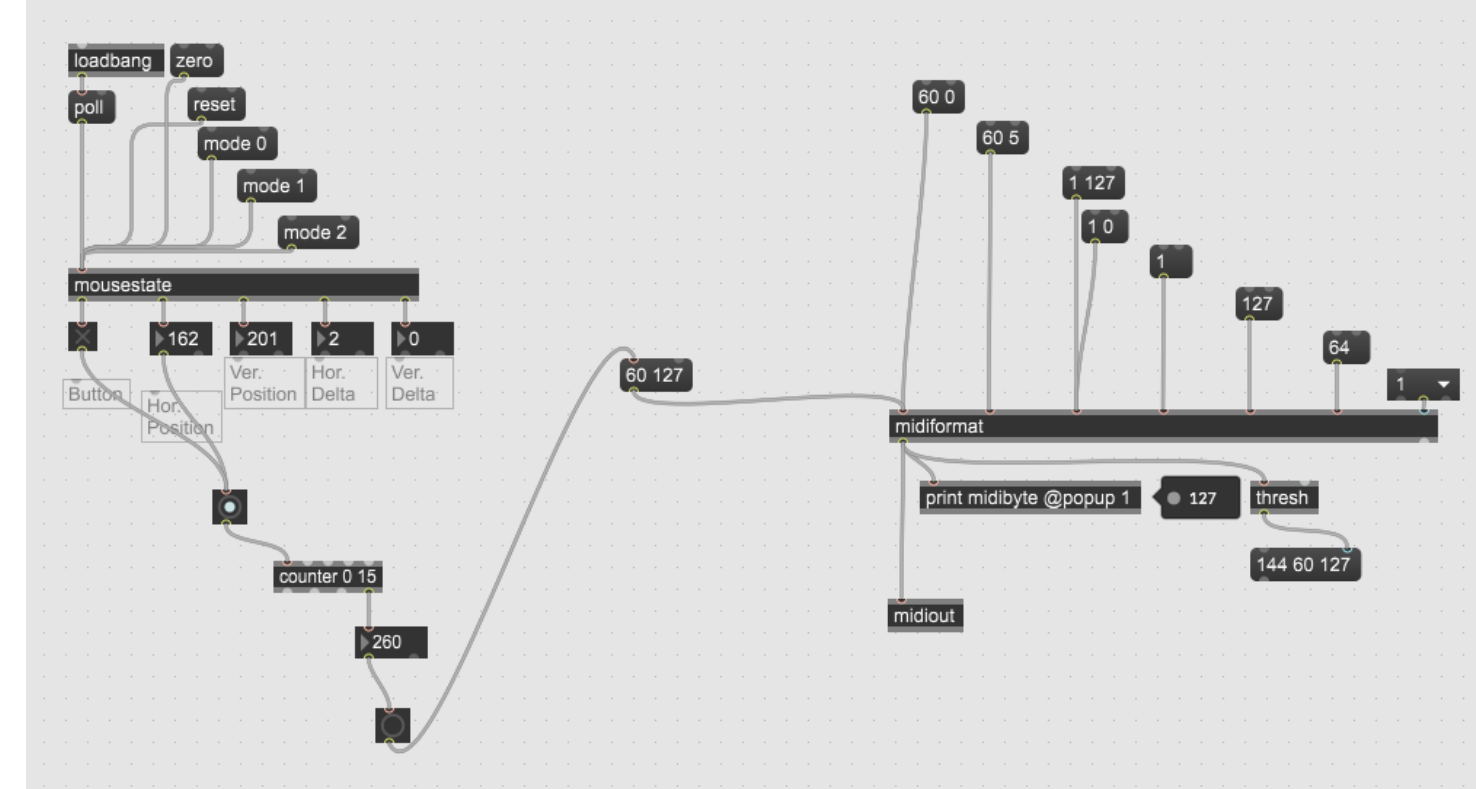
References

Bakker, S., Hausen, D., & Selker, T. (Eds.). (2016). *Peripheral Interaction*. Springer International Publishing. <https://doi.org/10.1007/978-3-319-29523-7>

Hällnäs, L., & Redström, J. (2001). Slow Technology – Designing for Reflection. *Personal and Ubiquitous Computing*, 5(3), 201–212. <https://doi.org/10.1007/PL00000019>

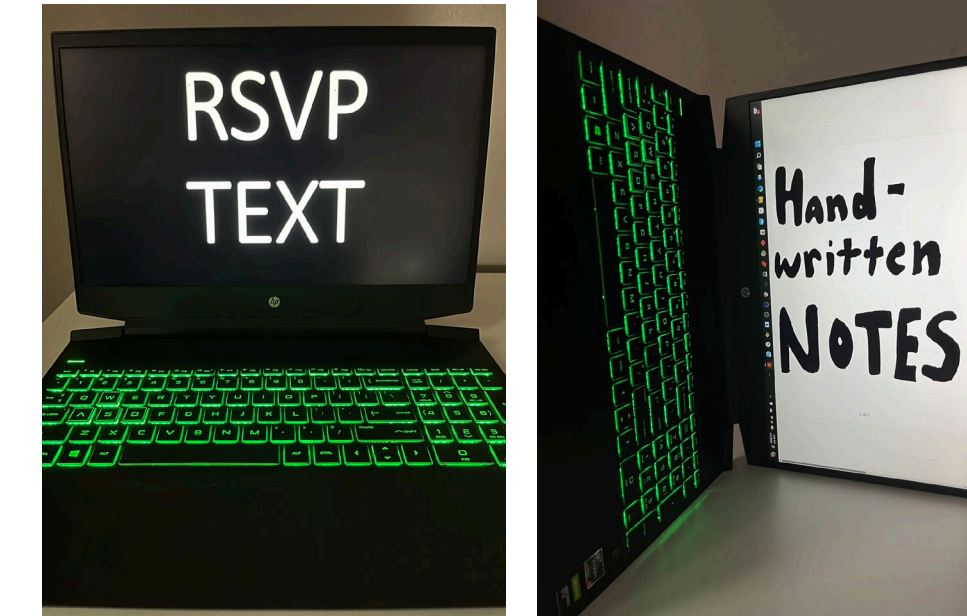
Setup

Each activity uses sensors, hardware, and software to allow my movements to interact with content on peripheral screens.



Working on my Desktop Computer - Max 8

Mouse movement is tracked and triggers a signal to change a peripheral screen every time the horizontal position changes 15 points.



Laptop as Portable Peripheral Monitor

My Laptop functions as a peripheral monitor in the horizontal position for text presented in Rapid Serial Visual Presentation and vertical for handwritten notes from my Kindle Scribe.



Exercise Bike – Magnetic switches, Roland-TM1, Max 8

Magnetic reed switches are placed on the pedals and body of the exercise bike to send a signal to the computer with each pedal.



Treadmill –Contact microphones, Roland TM-1, Max 8

Contact microphones are placed on the base of the treadmill to detect steps and convert them to signals to control playback of reading notes.



Practicing my Guitar - Hofner Guitar, Mad Doctor Stutter Pedal, Roland TM-1

When practicing my guitar, I feed the audio signal through a stutter pedal to break up the signal into distinct segments. I then pass these segments through a virtual drum trigger and into a midi translation program to control playback of notes.



Playing with Cats - Wave Ring by Genki, Max 8, Cat Toys

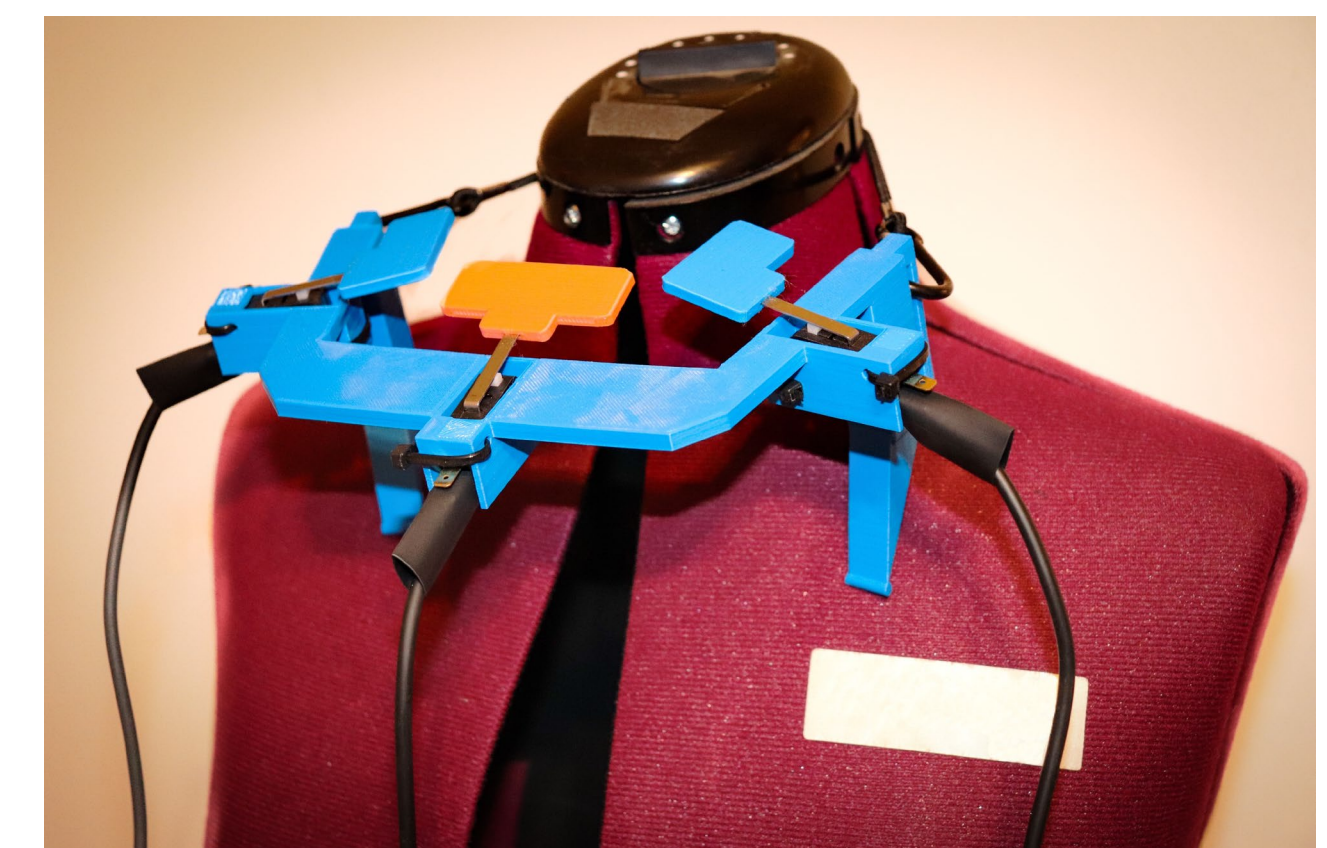
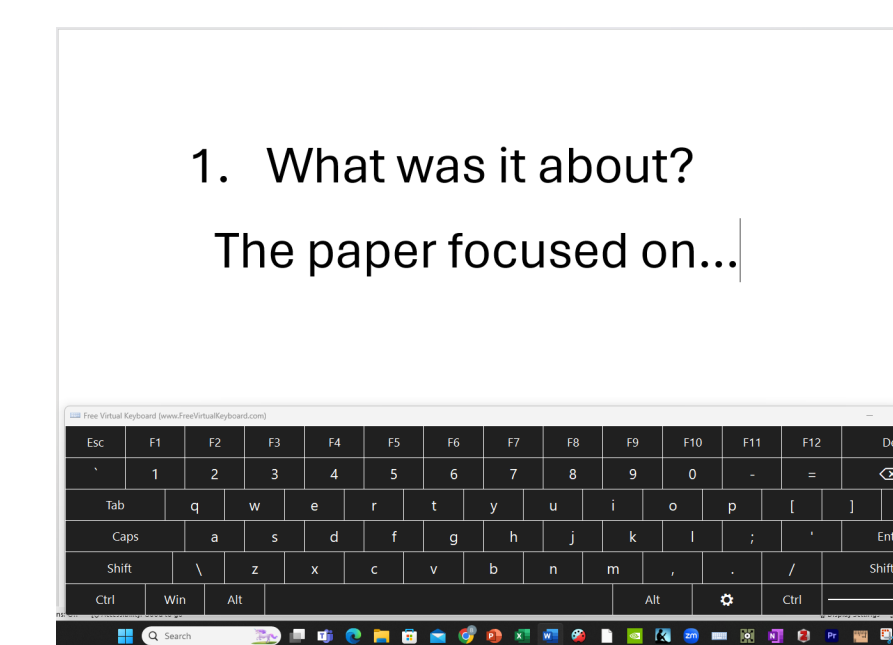
Gesture tracking wearable ring provides data from finger, hand, and arm movement that is used to trigger playback of text while I am playing with my cats.

Routine Activities

1. Working on a computer
2. Riding an exercise bike
3. Using a treadmill
4. Practicing guitar
5. Playing with cats

Methods

1. **Read** each paper on a computer monitor while peripherally viewing reading questions on an adjacent monitor.
2. **Use** computer mouse as a visual pacer, highlight passages from each paper, type notes, and answer reading questions.
3. **Cause** the peripheral monitor to play back slides of the reading questions from mouse movements and keystrokes.
4. **Transfer** highlighted passages from paper to one-word slides to play back in Rapid Serial Visual Presentation style peripherally.
5. **Transcribe** typed notes by hand on a Kindle Scribe to be played back peripherally.
6. **Assign** each paper to a specific activity based on loose metaphorical connections.
7. **Replay** the highlighted text from the papers, notes about the papers, and answers to the reading questions throughout the rest of the week peripherally.
8. **Type** answers to the reading questions while performing the routine activity assigned to each specific paper using custom chin interfaces for text input.



Final Typing of Answers - Wearable Chin Interface, Roland TM-1, Max 8

This interface allows key selection from an onscreen keyboard while performing a routine activity to type answers to weekly reading questions.