Factors Influencing Users' Attitudes Towards Using Brain Computer Interface (BCI) for Non Medical Uses: An Application of the Technology Acceptance Model (TAM)

Yichin Wu
wuy8@my.erau.edu

Leila Halawi
Embry-Riddle Aeronautical University, leila.halawi@erau.edu

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Yichin Wu
Dr. Leila Halawi
College of Aviation
Graduate Studies
Worldwide Campus

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Agenda

- Problem and purpose statement
- What is Brain Computer Interface and its Origin
- Bring Brain Computer Interface out of the Laboratory
- Literature Research Gap
- Importance of Early User Study
- The Original Technology Acceptance Model (TAM)
- Proposed Technology Acceptance Model
- Methodology

Problem Statement

With the advancement of brain computer interface in areas outside of medical applications, there is little understanding of how potential users feel about this technology.

Purpose

The purpose of this study is to understand users' attitudes towards using brain computer interface for non-medical uses through examining the external factors that could affect user attitudes using the technology acceptance model.

What is Brain Computer Interface and its Origin

- The Human Brain
  - Controls everything, including thoughts and movements
  - Signals transmit through neurons, or brain cells
- Brain Computer Interface (BCI)
  - An interface for brain and computer to interact and communicate
  - Relies on electric signals in the scalp
- Medical needs
  - Virtual motor controller
    - Patients with motor deficits

Bring Brain Computer Interface out of the Laboratory

- Applications - still in early research phase
  - Gaming
  - Virtual Reality
  - Smart homes
- Form
  - Electroencephalogram (EEG)
    - Brain signal sensors
  - Wireless wearable device

Literature Research Gap

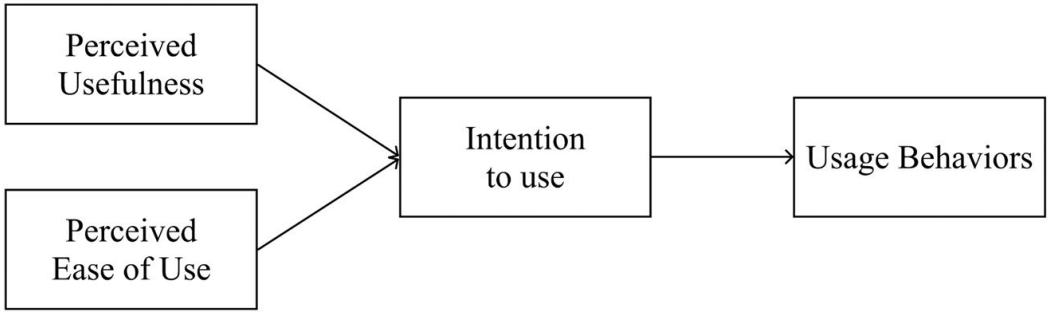
- A lack of psychosocial studies on BCI
  - Most focus on technical research
- A lack of user attitude
  - Even if there is user attitude related studies, most focus on medical application
- Next closest technology: voice-based digital assistance (VBDA) and virtual reality (VR) technology
  - Possible concerns:
    - Privacy
    - Practicality
    - Safety

Importance of Early User Study/ Purpose

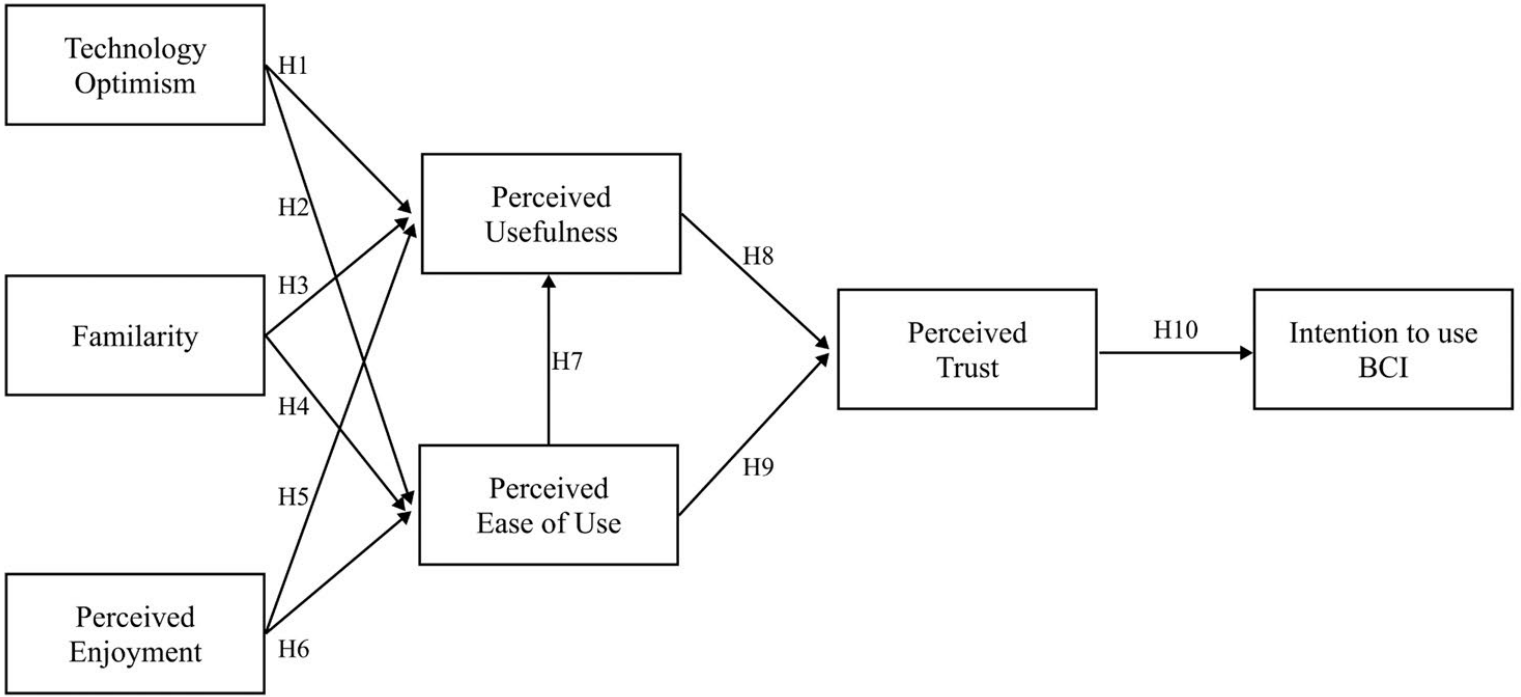
- User testing is crucial for any new product development
  - Define
  - Shape
  - Understand
- Provide insights into intangible requirements
  - User satisfaction
  - Acceptability
  - Aesthetics

The Original Technology Acceptance Model (TAM)

- Defines usage behavior by perceived ease of use and perceived usefulness
- Extension to Theory of Reasoned Action (TRA)
  - Attitudes & Subjective norms
- Comparable to theory of planned behavior (TPB)
  - Attitudes, behavioral intention, subjective norms, social norms, perceived power, perceived behavioral control
  - Does not account for variables on motivation and economic or environmental factors



Proposed Technology Acceptance Model



Methodology

- Creating Survey
- Each construct has 4-5 questions
  - TO1: Brain-computer interface will be a dominating tool in the future in everyone’s daily life.
- IRB
- Launched survey
  - Collecting data
  - Once collecting, at min 100, ideally 200
- Aware of constraints
  - Skipped questions
  - Not enough responses
- Address variability and reliability
- Test Model

Summary

- Brain computer interface originated as a medical device
- It is moving towards commercial products
- There is a need for user feedback early in the design
- This study focuses on determining potential users' attitudes towards this technology using a modified technology acceptance model
- Result can help researchers determine the weaknesses of brain computer interface from the users' perspective

Thank you
Questions?