Human-Robot Interaction in E-Commerce: The Role of Personality Traits and Chatbot Mechanisms – A Neuromarketing Research

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- **This research attempts to explore the impact of personality traits across different chatbot mechanisms (rule-Based vs generative AI) and platforms (virtual chatbots vs humanoid robots) on user satisfaction, purchase intention, and brainwave patterns.**
- **The results may reveal which medium more effectively assists users in decision-making and completing the purchase process and whether certain personality types prefer a particular interaction mode.**
- **The findings are expected to provide practical insights for future human-computer interaction design and contribute to the evolving field of neuromarketing.**

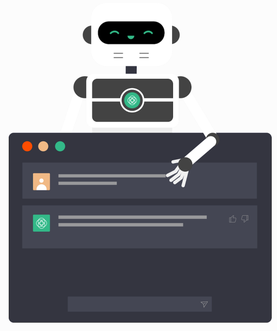
Research Questions

RQ1. Will different chatbot mechanisms impact interpersonal impressions?
RQ2. Will social presence impact interpersonal impressions?
RQ3. Will different personality traits impact interpersonal impressions?

Research Design

Chatbot Mechanisms

VS



Rule-Based Chatbot

Rule-Based chatbot rely on predetermined rules and questions, offering users predefined options that lead to desired answers.

Generative AI Chatbot

GAI chatbot will utilize machine learning models, employing natural language processing (NLP) to understand the real meaning of user input and provide personalized responses.

Platforms

VS

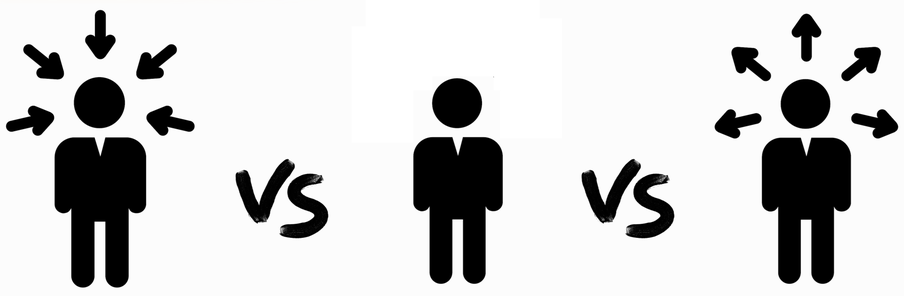
Virtual Chatbot

Rule-Based Chatbot
Generative AI Chatbot

Humanoid Robot

Pepper

Personality Traits



Introvert **Ambivert** **Extrovert**

Textual (adjusting word count, information structure, and visual effects) + Gestural (altering movement frequency, speed, and size)

Experimental Design

Online Session

- **The objective is to choose the most appropriate birthday gift based on a provided scenario.**
- **The chatbot will offer product recommendations based on the participants'stated product preferences.**
- **Different chatbot mechanisms and personality traits will be randomly presented to the participants.**

Offline Session

- **Interact with a humanoid robot while maintaining consistent experimental conditions as the online session.**

Data Collection

EEG Measurement

- **Use EMOTIV EPOC X (wireless 14 channels EEG headwear device) to collect participants' brainwave patterns during the experiment**
- **This study will measure the alpha (α) and beta (β) brainwaves in the frontal cortex (AF3, F7, AF4, F8, F3, FC5, FC6, and F4) significantly associated with human preferences, consciousness, and cognitive processes**

System logs

- **Document users' interactions on the e-commerce website**

Surveys

Perceptions of Robot:
- **NARS: Negative attitudes toward robots**
- **RoSAS: Identify participants' judgements of the social attributes of robots**

Human-Robot Interactions:
- **NASA-TLX: Access participants' perceived workload during experimental tasks**
- **Purchase intention: Participants' tendency toward making purchases from the chatbots/ robot**
- **Serving Rating: Preference among different mechanisms or platforms with different personalities**

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Video Presentation: