SPRING 2024 UNDERGRADUATE RESEARCH SYMPOSIUM AWARDEES

Most Popular Project

LLMBiasWatch: A Framework for Prompt-Based Bias Detection in Language Model Outputs

Presenters: Ameer Qureshi & Ramish Jalil

Project Subject: CS/DS/Engineering

Faculty Mentor: Rachid Rebiha

The use of generative artificial intelligence has become increasingly popular as technology progresses and experts are showing that 92% of the data found on the internet will be from generative A.I in 10 years from now. Starting from a prompt Generative A.I. is able to generate automatically new contents. Unfortunately, it tends to reinforce the bias that was first available on its data sets. We propose an automated prompting framework allowing us to quantify the biases found in the end-users output. Our framework allows us to compare the bias between LLM popular tools and methods to quantify bias on polarized topics (e.g., profession, gender, race, religion, and political ideology).

HUMANITIES & SOCIAL SCIENCE A

Best Research Project

Shifting Dynamics of Northbound Capital: Predictive Power and Trading Strategies in the Chinese Stock Market

Presenters: Jingru Luo & Siteng Wu & Yilu Pan

Project Subject: Economics

Faculty Mentor: Xin Zhou

This paper investigates the predictive power and trading logic of Northbound Capital in China's Stock Connect program. Employing data from November 2014 to October 2023, we analyze the influence of Northbound Capital on the Shanghai stock markets. Our study reveals a decline in predictive power post-2020, with Northbound Capital shifting preferences for companies with specific financial characteristics. We delve into short-term and long-term trading strategies of northbound capital, uncovering a dynamic approach that adapts to market conditions. The paper also highlights the impact of recent regulatory changes, showing how they reshape investment strategies and market dynamics.

HUMANITIES & SOCIAL SCIENCE A

Best Presentation

The Relationship Between Social Media & Political Polarization in the United States

Presenters: Helen Zhu

Project Subject: Social Science

Faculty Mentor: Tyler Haupert

Political polarization is a key topic that has been and is still being studied within United States politics. In recent years, there has been a rise in political polarization, and social media usage has steadily increased. This paper will examine data collected from a survey of 609 respondents in the United States, where respondents answered questions regarding their social media usage, media trust, and attitudes towards the other political party. The project utilizes the survey results, looking at statistical significance to determine to what extent social media affects polarization.

HUMANITIES & SOCIAL SCIENCE B

Best Research Project

The Impact of AI-generated Photos in Advertisements on Consumer Decision Making

Presenters: Ruoming (Hattey) Sun

Project Subject: Social Science

Faculty Mentor: Brian Hall

As AI (Artificial Intelligence) has been a popular tool among the marketing industry for generating attractive photos in advertisements to capture consumers' attention, this research wants to understand how AI-generated photos in advertisements influence consumer psychology from the aspect of emotion-based decision making. With ChatGPT to create photos, the results from an online experiment showed that, compared to real photos, AI-generated photos didn't significantly impact people's perceived quality, emotion, attitude. The effects of perceived quality, attitude and emotion on purchase intention for two product types were confirmed with the existence of AI-generated photo serving as a moderating variable.

HUMANITIES & SOCIAL SCIENCE B

Best Presentation

Post-Sex Behaviors and Their Correlates in Straight Chinese Couples

Presenters: Julie Yang

Project Subject: Social Science

Faculty Mentor: Pekka Santtila

The present study aimed to fill a gap in research by investigating how after-sex behaviors impact couples in China. As part of a randomized controlled trial for sensate focus intervention, forty-two Chinese heterosexual couples completed survey questions before and after the intervention, reporting on after-sex behavior, relationship satisfaction, sexual satisfaction, intimacy level, and sexual dysfunction. The results showed that less negative after-sex behaviors were associated with increased levels of relationship satisfaction and sexual functioning in women, while more negative after-sex behaviors were associated with increased levels of relationship satisfaction and sexual functioning in men. For both genders, less negative after-sex behaviors were associated with higher intimacy. The results also showed that the group who partook in the sensate focus intervention reported fewer negative after-sex behaviors compared to the control.

STEM

Best Research Project

Advancing Quantum Dynamics Simulations: A Comparative Study of Dynamical Methods for the Spin-Boson Model

Presenters: Brian Liu

Project Subject: Chemistry

Faculty Mentor: Xiang Sun

This thesis investigates various computational methods for simulating population dynamics within the spin-boson model, focusing on numerically exact and approximate methods. Through an extensive literature review and simulations, the study aims to evaluate the accuracy, efficiency, and reliability of these methods. Findings suggest that numerically exact methods give more precise results, but they are more computationally demanding. Approximate methods reduce the computational load, but give less accurate results. This study is important as it allows for a better understanding of quantum dynamics in the spin-boson model and lays the foundation for future research to optimize such computational strategies.

STEM

Best Presentation

Exploring the Impact of Brief Naps on Emotional Reactivity to Emotionally Valenced Words

Presenters: Annie Lu

Project Subject: Neural Science

Faculty Mentor: Xing Tian

This pilot study investigates the influence of short naps, particularly focusing on sleep spindles during non-rapid-eye-movement stage 2 (N2) sleep, on emotional reactivity during emotion association and imagination tasks. Current research primarily explores the role of sleep spindles in memory forming, intelligence, and learning, less talking about its impact on emotions. Hypothesizing that sleep spindles during N2 sleep play a crucial role in emotional regulation, we aim to analyze emotional reactivity using EEG measures and emotionally-valenced word stimuli. This study holds significance in understanding emotional regulation, potentially contributing to enhancing cognitive functioning and emotional well-being across various domains.