SPRING 2023

UNDERGRADUATE RESEARCH SYMPOSIUM

AWARDEES

Most Popular Project

Brownian Motion and Stochastic Calculus in Finance

Presenters: Jiale Zheng, Chijie An, Yuxin Ji, Zhou Liu

Project Subject: Mathematics

Faculty Mentor: Wei Wu

This project focuses on studying the notion of Brownian Motion, stochastic calculus, and its applications in quantitative trading and other financial fields. The unpredictability of the financial markets contributes to the difficulty of building a mathematical model to describe financial trends. Compared to ordinary mathematical modeling approaches, we focus on building a model using stochastic process theories and corresponding stochastic calculus for the calculation. Among the models in the stochastic process, we find out that the Brownian motion might be the best to fit this application scenario, for it has martingale properties and Markov properties, etc., which are suitable for describing some interesting features of the phenomenon in this field.

LIBERAL ARTS & BUSINESS

Best Research Project

Transit Proximity and Property Values in New York City

Presenter: Leo Shirky

Project Subject: Social Science
Faculty Mentor: Tyler Haupert

This study will fill in a gap within the existing research on the transit access-property value relationship, specifically with respect to existing, large, high-frequency, high-capacity rapid transit heavy rail systems in large American metro areas. If a residual positive effect on property values can be found, then this study will help fill in a gap in the existing literature. This study will use GIS and a large pre-existing database, and easy and understandable figures to communicate the findings of this study. This research has implications for the broader debate surrounding the role of rapid transit in urban areas, and the specific debate around Value Capture as a mechanism for transportation funding.

LIBERAL ARTS & BUSINESS

Best Presentation

Why Do Young Chinese Females Perform Male Identity on a Text-based Subcultural Video Game?

Presenter: Fenglin Ju

Project Subject: Global China Studies
Faculty Mentor: Zhiqiu Zhou

This paper examines why young females impersonate males in the video game Celebrity Moments. Based on digital ethnography and interviews with experienced users, my findings unpack two primary motivations for digital impersonation:
(1)The figures of males in cinematic productions are usually created with perfect values that intensify females' ideal intimate partner and self ;
(2) impersonating males provide females with more possibilities that are usually inaccessible to them, participation in writing BL fan fiction closely, and open self-expression. This paper contributes to understanding how young female users reconfigure their digital identities and negotiate with patriarchy in Chinese digital spaces.

STEM

Best Research Project

Customer Segmentation in Retail Banking: Modeling the HSBC Dataset

Presenters: Summer Xiao, Shan Lu

Project Subject: Interdisciplinary
Faculty Mentor: Hongyi Wen

We use a dataset with transaction and demographic information provided by HSBC to carry out customer segmentation with a recommendation-based approach. We utilize Neural Collaborative Filtering (NCF) to create a comprehensive recommendation system based on credit card transaction data. Our model achieves a hit ratio of 0.756. Through correlation analysis and association rule mining, we test our model and explain our recommendation results with customer characteristics. Compared with previous work, our model provides a categorization specific to users' purchase preferences, which can empower the marketing team to better tailor perks and promotions to the designated customers.

STEM

Best Presentation

Low-Frequency Cortical Activity Tracking Speech in Hidden Hearing Loss

Presenter: Shucheng Li

Project Subject: Neural Science
Faculty Mentor: Xing Tian

Hidden hearing loss refers to the weakened ability to perceive loud sound due to long-term exposure to a loud noise environment. But the diagnosis of hidden hearing loss is hard because the volume range of the patient is not obviously influenced, and the encoding ability of loud sound is hard to detect. In this research, we used EEG to measure the neural response during passive listening and evaluate the effects of the temporal response function trained from the data. We then found out that the TRFs of high-risk group have worse encoding performance than the lower-risk group, which supports the effect of this new diagnosis method.