

Contributing to the Development of Hong Kong into a Global Fintech Hub

About the Project



Project Period 1 Jan 2019 – 31 Dec 2022 (4 years)

Project Lead The Hong Kong University of Science and Technology

Participating Institutions City University of Hong Kong
The Chinese University of Hong Kong
The University of Hong Kong
The Education University of Hong Kong

Objectives

- To assess the **impacts of emerging Fintech technologies** on the delivery of financial services and the landscape of Hong Kong's finance industry;
- To study the **ecosystem of Fintech innovations** in Hong Kong and offer **policy recommendations** to maintain and strengthen the creation of financial innovations that leverage technological advances

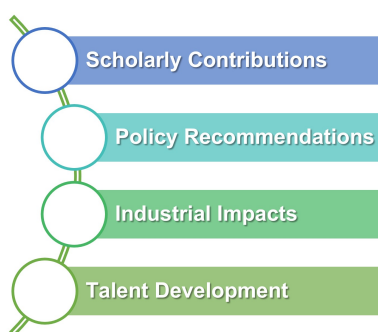
Abstract

The project aims to establish a strategic foundation for fintech in Hong Kong, addressing key issues at the intersection of technology and finance. It covers diverse topics like digital payments, financial product design and distribution, public disclosures and distributed ledger applications. Research findings led to practical applications and policy insights crucial for enhancing fintech development in Hong Kong, focusing on **regulatory environment, innovation, collaboration between industry players, and talent development.**

8 Majors Tasks Covering these Research Topics:



Impact Areas



Project Impacts

Our research has generated impacts to enhance Hong Kong's fintech capabilities on multiple fronts. Access the QR code for more information:



Industrial Impacts

- FinBERT** – The project team developed a model pre-trained on financial communication text with a total corpora size of 4.9B tokens that can be utilized to analyze financial texts to predict outcomes including stock returns, stock volatilities, corporate fraud, etc.
- FinSent** - An interactive financial sentiment analysis web portal that automatically tracks sentiment expressed in financial reports and earnings calls of listed companies.
- "Public Perception of e-HKD" Survey Research (2022)** – A survey conducted in August 2022, which found that over half of the Hong Kongers were willing to adopt e-HKD, but there was a need to increase their knowledge of digital currency.



Knowledge Dissemination and Cross-Sector Dialogues

The project team published **14 fintech-related publications for the industry, policymakers and the public** that are freely accessible online. The team also actively organized **industry seminars** gathering stakeholders from the fintech community and regulators to discuss crucial topics in the fintech industry, establishing a platform that drives cross-sector communication and collaboration within the fintech ecosystem. Some examples of events include:



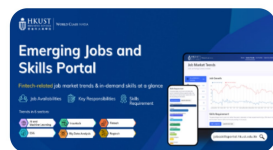
Hong Kong's Way Forward to Becoming a Leading Global Fintech Hub: An Industry Dialogue (June 2022)



Regtech Industry Dialogue: Talent as the Fuel for Growth (February 2023)

Talent Development

The project team developed the **Emerging Jobs and Skills Portal** using AI/ML technologies to analyze job trends and requirements in 6 fintech-related fields: AI & ML, Big Data Analysis, Fintech, Regtech, Insurtech and ESG. More sectors may be covered later.

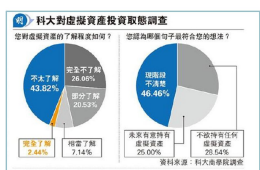


To enhance fintech education for industry professionals, we collaborated with industry partners to develop initiatives such as the **ECF-Fintech (Professional Level) Program** and the **Cyberport Financial Practitioners FinTech Training Programme**.



We also organized various educational events to promote fintech knowledge among students and the wider public in Hong Kong, which include **HKUST Fintechstic (2020–2023)**, with **over 6,800 participants** across all editions, the **HKUST-WBB x MIT Node Fintech Academy (2023)**; and **Bizkathon@HKUST (2019)**.

- "Public Awareness and Perception of Virtual Assets" (2023)** – A two-phase survey study conducted between April and October 2023, which found that despite a high level of awareness about virtual assets (VA), the understanding of VA investment were generally low.



- Hypothetical e-HKD Central Bank Digital Currency (CBDC) Research Study (2023)** – A two-phase study and a week-long on-campus pilot test conducted by HKUST and HSBC to explore the potential adoption of a retail CBDC in Hong Kong.



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Highlights of Published Research

The project has yielded 41 research papers, with 31 already published in academic journals. Below are some of the featured research papers.

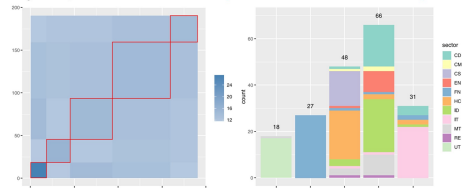
Stock Co-jump Networks

Yi Ding, Yingying Li, Guoli Liu, Xinghua Zheng; published at *Journal of Econometrics*, 2024

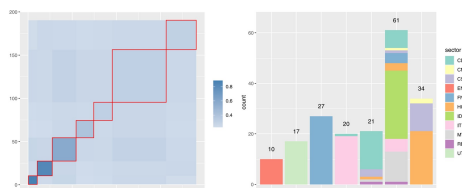
Based on co-jumps among stock prices, we developed a method to cluster stocks to capture their dependency in terms of jump risk. We proposed a **Degree-Corrected Block Model with Dependent Multivariate Poisson edges (DCBM-DMP)** to study stock co-jump dependence.

Our findings reveal important community information that cannot be explained by industrial classifications. We proved that our method enjoys **strong consistency in community detection**.

Empirically, using high-frequency data of S&P 500 constituents, we constructed **two co-jump networks** according to whether the market jumps and found that they exhibit different community features than GICS. We showed that the co-jump networks **help in stock return prediction**.



Clustering results when the market jumps



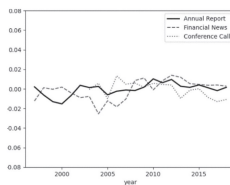
Clustering results when the market does not jump

The Effects of Sentiment Evolution in Financial Texts: A Word Embedding Approach

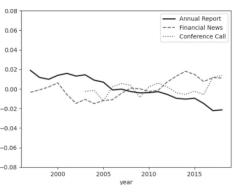
Jiexin Zheng, Ka Chung Ng, Rong Zheng, Kar Yan Tam; published at *Journal of Management Information Systems*, 2024

This paper explores how language changes affect the analysis of sentiment in financial texts, such as annual reports, conference calls, and financial news. This type of analysis, called **sentiment analysis**, is often used to predict market trends. We propose a new algorithm, **WOrd List VECtor for Sentiment (WOLVES)**, which uses **machine learning** to understand how the meanings and sentiment strength of words evolve over time. When the algorithm was tested on different types of financial texts, it revealed that sentiment intensity was relatively stable over time, except for a decrease in negative sentiment in annual reports. This decrease suggests a strategic choice of language by managers to control perceived sentiment.

Positive Word Trend



Negative Word Trend



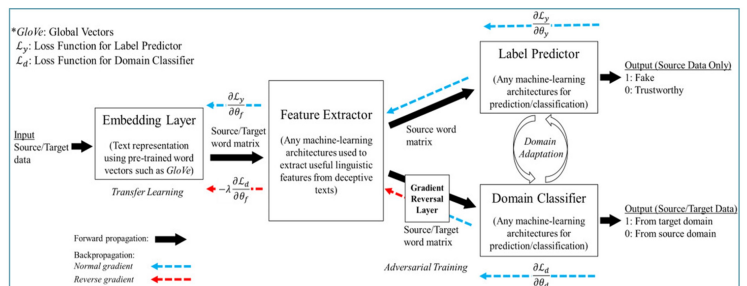
We found that the improved sentiment measures provided by WOLVES were **effective predictors of market reaction, earnings performance, and accounting fraud**. This study offers new insights into strategic language adjustment in corporate communications.

Augmenting Fake Content Detection in Online Platforms: A Domain Adaptive Transfer Learning via Adversarial Training Approach

Ka Chung Ng, Ping Fan Ke, Mike K. P. So, Kar Yan Tam; published at *Production and Operations Management*, 2023

Online platforms are testing various methods like content screening to moderate the effects of fake, biased, and inflammatory content. However, they face a challenge in using machine learning algorithms to manage online content due to the labelling problem. This means that labelled data used to train the model are limited and expensive to obtain.

To address this, we propose a **domain-adaptive approach that leverages human judgment to improve fake content detection**. We start with a source domain dataset that includes both deceptive and trustworthy general news compiled from a large collection of labelled sources based on human judgments and opinions. We then use **advanced deep learning models** to extract distinguishing linguistic features commonly found in the source domain news. We transfer these features associated with the source domain to improve fake content detection in three target domains: political news, financial news, and online reviews.



A model framework for fake content detection

We show that **domain-invariant linguistic features learned from a source domain** with abundant labelled examples can **significantly improve fake content detection** in a target domain with very few or highly unbalanced labelled data. We further show that these linguistic features are most useful when there is a high level of transferability between source and target domains. Our study provides insights into **managing online content and resources when applying machine learning for fake content detection**. We also outline a **modular architecture that can be used to develop content screening tools** in a wide range of fields.