Frank XING

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Research Interests

Information Systems Design
Financial Forecasting and Optimization
Natural Language Processing
Knowledge Engineering

Professional Appointments

Assistant Professor, National University of Singapore — 2021 - now
Created the "Financial Information & Knowledge Engineering" research group
Developed a new course at the Department of Information Systems and Analytics

Presidential Postdoctoral Fellow, Nanyang Technological University — 2019 - 2021
Amongst 12 awardees selected from 894 cross-disciplinary applicants worldwide

Machine Learning Specialist, Continental AG — 2018 - 2019
Acted as a tech lead and mentored innovation projects in NLP and machine learning

Academic Qualifications

PhD in Computer Science and Engineering, Nanyang Technological University — 2016 - 2019
Thesis: Textual knowledge integration for financial asset management

BSc in Information Systems / BA in Economics, Peking University — 2011 - 2015
Thesis: Weakly supervised image semantic segmentation with conditional random field

Awards and Honors

Presidential Postdoctoral Fellowship, Nanyang Technological University — 2019

Temasek Research Scholarship, Nanyang Technological University — 2016

May Fourth Scholarship, Peking University — 2013

Wang Jin-Yun Scholarship, Wuhan No.2 Middle School — 2011

Research Grants

Advancing Information-intensive Financial Modeling with NLP Solutions, Role: **PI** — 2021 - 2024
Singapore Ministry of Education AcRF Tier 1, SGD 180,000

Innovative Approaches to Portfolio Optimization, Role: **PI** — 2019 - 2021
NTU Presidential Postdoctoral Fellowship Research Grant, SGD 200,000

Conti+ Service Chatbot, Role: Staff — 2018
Continental Internal R&D Project, EUR 30,070

Irony Detection on the Internet, Role: **PI** — 2013
PKU President's Undergraduate Research Fellowship, CNY 2,000

Publications

Citations

Web of Science	count: 1013	h-index: 11
Scopus	count: 1345	h-index: 13
Google Scholar	count: 2014	h-index: 14

Books and Chapters

1. **Xing, F.**; Cambria, E.; Welsch, R. E. (2019). Intelligent Asset Management. **Springer International Publishing**. In Series "Socio-Affective Computing", ISBN: 978-3-030-30262-7.

Journal Papers

10. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). Financial sentiment analysis: Techniques and applications. *ACM Computing Surveys*. forthcoming.
9. **Xing, F.** (2024). Financial risk tolerance profiling from text. *Information Processing & Management*. 61(4), 103704.
8. Du, K.; **Xing, F.**; and Cambria, E. (2023). Incorporating multiple knowledge sources for targeted aspect-based financial sentiment analysis. *ACM Transactions on Management Information Systems*. 14(3), art 23, pp 1-24.
7. Ma, Y.; Nguyen, K. L.; **Xing, F.**; and Cambria, E. (2020). A survey on empathetic dialogue systems. *Information Fusion*. 64, pp 50-70.
6. **Xing, F.**; Cambria, E.; and Zhang, Y. (2019). Sentiment-aware volatility forecasting. *Knowledge-Based Systems*. 176, pp 68-76.
5. **Xing, F.**; Cambria, E.; and Welsch, R. E. (2019). Growing semantic vines for robust asset allocation. *Knowledge-Based Systems*. 165, pp 297-305.
4. **Xing, F.**; Pallucchini, F.; and Cambria, E. (2019). Cognitive-inspired domain adaptation of sentiment lexicons. *Information Processing & Management*. 56(3), pp 554-564. [Honorable Mention for 2019 Best Paper Award]
3. Malandri, L.; **Xing, F.**; Orsenigo, C.; Vercellis, C.; and Cambria, E. (2018). Public mood-driven asset allocation: The importance of financial sentiment in portfolio management. *Cognitive Computation*. 10(6), pp 1167-1176.
2. **Xing, F. Z.**; Cambria, E.; and Welsch, R.E. (2018). Intelligent asset allocation via market sentiment views. *IEEE Computational Intelligence Magazine*. 13(4), pp 25-34.
1. **Xing, F. Z.**; Cambria, E.; and Welsch, R.E. (2018). Natural language based financial forecasting: A survey. *Artificial Intelligence Review*. 50(1), pp 49-73.

Conference Papers

13. Qi, Q. and **Xing, F.** (2023). Leveraging interactions for stationary and dynamic financial distress prediction: A spatio-temporal financial graph attention network. *ICIS*. Hyderabad, India.
12. Chen, S. and **Xing, F.** (2023). Understanding emojis for financial sentiment analysis. *ICIS*. Hyderabad, India.
11. Du K.; **Xing, F.**; Mao, R.; and Cambria, E. (2023). FinSenticNet: A Concept-Level Lexicon for Financial Sentiment Analysis. *SSCI*. Mexico City, Mexico.
10. Saha, J.; Patel, S.; **Xing, F.**; and Cambria, E. (2022). Does social media sentiment predict Bitcoin trading volume? *ICIS*. Copenhagen, Denmark.

9. Cambria, E.; Liu, Q.; Decherchi, S.; **Xing, F.**; and Kwok, K. (2022). SenticNet 7: A commonsense-based neuro-symbolic AI framework for explainable sentiment analysis. *LREC*. Marseille, France.
8. Young, T.; **Xing, F.**; Pandelea, V.; Ni, J.; and Cambria, E. (2022). Fusing task-oriented and open-domain dialogues in conversational agents. *AAAI*. Vancouver, Canada.
7. **Xing, F.**; Hoang, D.-H.; and Vo, D.-V. (2021). High-frequency news sentiment and its application to forex market prediction. *HICSS*. Online.
6. **Xing, F.**; Malandri, L.; Zhang, Y.; and Cambria, E. (2020). Financial sentiment analysis: An investigation into common mistakes and silver bullets. *COLING*. Online.
5. Cambria, E.; Li, Y.; **Xing, F.**; Poria, S.; and Kwok, K. (2020). SenticNet 6: Ensemble application of symbolic and subsymbolic AI for sentiment analysis. *CIKM*. Online.
4. Bai, H.; **Xing, F.**; Cambria, E.; and Huang, W.-B. (2019). Business taxonomy construction using concept-level hierarchical clustering. *FinNLP@IJCAI*. Macao, China.
3. **Xing, F. Z.**; Cambria, E.; Malandri, L.; and Vercellis, C. (2018). Discovering Bayesian market views for intelligent asset allocation. *ECML-PKDD*. Dublin, Ireland.
2. **Xing, F. Z.**; Cambria, E.; and Zou, X. (2017). Predicting evolving chaotic time series with fuzzy neural networks. *IJCNN*. Anchorage, USA.
1. **Xing, F. Z.** and Xu, Y. (2015). A logistic regression model of irony detection in Chinese internet texts. *CICLing*. Cairo, Egypt.

Guest Editorials

4. **Xing, F.**; Schuller, B.; Chaturvedi, I.; Cambria, E.; and Hussain, A. (2023). Neurosymbolic AI for sentiment analysis. *IEEE Transactions on Affective Computing*. 14(3), pp 1711-1715.
3. Cambria, E.; **Xing, F.**; Thelwall, M.; and Welsch, R. (2022). Sentiment analysis as a multidisciplinary research area. *IEEE Transactions on Artificial Intelligence*. 3(5), pp 638-641.
2. Malandri, L.; Porcel, C.; **Xing, F.**; Serrano-Guerrero, J.; and Cambria, E. (2022). Soft computing for recommender systems and sentiment analysis. *Applied Soft Computing*. 118, 108246.
1. **Xing, F.**; Poria, S.; Cambria, E.; and Welsch, R. (2020). Social media marketing and financial forecasting. *Information Processing & Management*. 57(5), 102314.

Preprints

6. Qi, Q. and **Xing, F.** (2024). Leveraging relational data for financial risk prediction: A spatiotemporal graph attention network with meta-learning. *Under review*.
5. **Xing, F.** and Wang, C. (2024). Managing Sentiment Analysis: A Method Selection Framework. *Under review*.
4. **Xing, F.** (2024). Designing Heterogeneous LLM Agents for Financial Sentiment Analysis. *Under review*.
3. Cesarini, M.; Malandri, L.; Pallucchini, F.; Seveso, A.; and **Xing, F.** (2024). Explainable AI for Text Classification: Lessons from A Comprehensive Evaluation. *Under review*.
2. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). Explainable Stock Price Movement Prediction using Contrastive Learning. *Under review*.
1. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). An Evaluation of Reasoning Capabilities of Large Language Models in Financial Sentiment Analysis. *Under review*.

Invited Talks and Presentations

6. Sustainability reporting: behaviors, textual clues, and financial effects
   A*STAR CI Research Seminar, Singapore, Sep 2023
   NUS-DISA Summer Research Workshop, Singapore, Jul 2022
   University of Milano-Bicocca Research Seminar, Milan, Italy, Jun 2022
5. Financial sentiment analysis: a neurosymbolic approach
   University of Essex Research Seminar, Colchester, UK, Nov 2021
4. Financial sentiment analysis and sentiment time series
   Singapore Symposium on Sentiment Analysis, Singapore, Mar 2021
   Wuhan University of Technology Research Forum, Wuhan, China, Mar 2019
3. Three interfaces between NLP and asset allocation
   International Conference on Computational and Methodological Statistics, Virtual, Dec 2020
   Knut Wicksell Centre for Financial Studies Workshop, Lund, Sweden, Jan 2020
2. Managing your finances with AI
   NTU Institute of Advanced Studies Webinar, Virtual, May 2020
1. Stock market prediction meets uncertainty and high-dimension
   Westlake University Research Seminar, Hangzhou, China, Oct 2019

Teaching

2. National University of Singapore
   BT4016: Risk Analytics for Financial Services (Spring 2023, Spring 2024)
   IS3107: Data Engineering [New] (Spring 2022, Fall 2022, Fall 2023)
   IS6000: Topics in Information Systems and Analytics Research (Fall 2021)
1. Nanyang Technological University
   CZ 4034: Introduction to Information Retrieval (Spring 2021, Spring 2016)
   CZ 2002: Object Oriented Design & Programming in Java (Spring 2016))

Supervision and Placement

Doctoral Students
K. Du (2022-), co-advising, Topic: financial sentiment analysis
Q. Qi (2021-), Topic: Risk analytics and human-AI collaboration in finance

Notable Master/BComp Dissertation Students
I. Koh (2023-), Title: Predictive text analytics on company innovation outcomes
J. Sun (2023-), Title: Copula model for high-freq cryptocurrency returns, Placement: NUS
S. Chen (2022-2023), Title: Effects of emojis in sentiment analysis, Placement: BYBIT
T. Wee (2022-2023), Title: Mapping ESG trends across equity markets, Placement: RSAF
F. Pallucchini (2018-2019), Title: Domain adaptation of sentiment lexicons, Placement: UNIMIB

Research Assitants
C. Wang (2023-2024), Placement: UConn
X. Chen (2020-2021), Placement: HKU

Academic and Departmental Services

Journal Guest Editor
IEEE Transactions on Affective Computing, special issue 14(4) 2023
IEEE Transactions on Artificial Intelligence, special issue 3(5) 2022

Applied Soft Computing, special issue 118	2022
Information Processing & Management, special issue 57(5)	2020

Conference Chair / AE

Associate Editor, Pacific Asia Conference on Information Systems	2024
Session Chair, International Conference on Computational Linguistics	2020

Journal and Conference Reviewer

Information Fusion (InfFus) -*Outstanding Contribution Award*	2019
Knowledge-Based Systems (KBS) -*Outstanding Contribution Award*	2018

ACM Transactions on Management Information Systems (TMIS)	2024
Decision Support Systems (DSS)	2023
IEEE Transactions on Affective Computing (TAC)	2019 - 2023
IEEE Transactions on Engineering Management (TEM)	2020
IEEE Computational Intelligence Magazine (CIM)	2019
Information Systems Frontiers (ISFI)	2022

AAAI Conference on Artificial Intelligence (AAAI)	2021 - 2022
International Joint Conference on Artificial Intelligence (IJCAI)	2021 - 2022
International Conference on Artificial Intelligence and Statistics (AISTATS)	2021
Annual Meeting of the Association for Computational Linguistics (ACL)	2021 - 2022
International Conference on Information Systems (ICIS)	2022
Hawaii International Conference on System Sciences (HICSS)	2021 - 2022
Pacific Asia Conference on Information Systems (PACIS)	2023

Grant Proposal Reviewer

The Czech Science Foundation: Standard Project 24-****5S	2023
The Czech Science Foundation: Standard Project 23-****7S	2022
The Czech Science Foundation: Standard Project 22-****6S	2021

Professional Society Membership

AIS (Association for Information Systems)	2021 - 2024
INFORMS (Institute for Operations Research and Management Sciences)	2020 - 2023
IEEE (Institute of Electrical and Electronics Engineers)	2016 - 2017

Administrative Services

Interviewer, UG Aptitude Based Admissions, NUS School of Computing	2022
Interviewer, Faculty Candidate Evaluation, NUS School of Computing	2021 - 2023
Interviewer, Discretionary Admission and Scholarship Selection, NUS School of Computing	2021 - 2022
Member, Publication Ranking Committee, NUS School of Computing	2021 - 2023
Final Year Project Evaluator, NUS School of Computing	2021 - 2023
PhD Thesis Proposal Examiner, NUS School of Computing	2022 - 2023

Media Coverage

2. Using News Sentiments in the High-Frequency Forex Market
   Dow Jones Newswires (by Simon Rodda), Dec 2020

1. Machine Learning Applied to Quantitative Investment
   QIML (no.62, in Chinese), Jul 2018

Referees

Available upon request.