Frank XING | 邢竹天

Curriculum Vitae

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Highlights

- 9 years of research experience in AI, information systems, and natural language processing.
- Authored the Springer book *Intelligent Asset Management* and 30+ peer-reviewed articles.
- Google Scholar Citations 2500+, h-index 17.
- Research fundings secured for 280K+ USD.
- Taught 8 semesters of undergraduate/postgraduate courses.

Professional Appointments

Assistant Professor, School of Computing, National University of Singapore 2021 - now
Spearheaded the Financial Information & Knowledge Engineering research group and developed a new course

Presidential Postdoctoral Fellow, Nanyang Technological University 2019 - 2021
Honored with a competitive award and developed grant management skills and research independence

Machine Learning Specialist, Continental Automotive Singapore 2018 - 2019
Acted as a tech lead and mentored innovation projects in natural language processing and machine learning

Academic Qualifications

PhD in Computing and Data Science, 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 Interests and Grants

AI in Finance, Forecasting and Optimization, Knowledge Engineering, Natural Language Processing

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

Books and Chapters

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

Journal Papers

14. **Xing, F.** (2025). Designing heterogeneous LLM agents for financial sentiment analysis. *ACM Transactions on Management Information Systems*. forthcoming.
13. Wu, X.; Li, L.; Tao, X.; **Xing, F.**; and Yuan, J. (2025). Happiness prediction with domain knowledge integration and explanation consistency. *IEEE Transactions on Computational Social Systems*. forthcoming.
12. Du, K.; Zhao, Y.; Mao, R.; **Xing, F.**; and Cambria, E. (2025). Natural language processing in finance: A survey. *Information Fusion*. 115, 102755.
11. Cesarini, M.; Malandri, L.; Pallucchini, F.; Seveso, A.; and **Xing, F.** (2024). Explainable AI for text classification: Lessons from a comprehensive evaluation of post hoc methods. *Cognitive Computation*. 16(6), pp 3077-3095.
10. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). Financial sentiment analysis: Techniques and applications. *ACM Computing Surveys*. 56(9), art 220, pp 1-42.
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 IP&M 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

17. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). Explainable stock price movement prediction using contrastive learning. *CIKM*. Boise, USA.
16. Du, K.; Mao, R.; **Xing, F.**; and Cambria, E. (2024). A dynamic dual-graph neural network for stock price movement prediction. *IJCNN*. Yokohama, Japan.

15. Du, K.; **Xing, F.**; Mao, R.; and Cambria, E. (2024). An evaluation of reasoning capabilities of large language models in financial sentiment analysis. *IEEE CAI*. Singapore, Singapore.
14. 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.
13. Chen, S. and **Xing, F.** (2023). Understanding emojis for financial sentiment analysis. *ICIS*. Hyderabad, India.
12. Du K.; **Xing, F.**; Mao, R.; and Cambria, E. (2023). FinSenticNet: A Concept-Level Lexicon for Financial Sentiment Analysis. *SSCI*. Mexico City, Mexico.
11. Saha, J.; Patel, S.; **Xing, F.**; and Cambria, E. (2022). Does social media sentiment predict Bitcoin trading volume? *ICIS*. Copenhagen, Denmark.
10. 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.
9. 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.
8. **Xing, F.**; Hoang, D.-H.; and Vo, D.-V. (2021). High-frequency news sentiment and its application to forex market prediction. *HICSS*. Online.
7. **Xing, F.**; Malandri, L.; Zhang, Y.; and Cambria, E. (2020). Financial sentiment analysis: An investigation into common mistakes and silver bullets. *COLING*. Online.
6. 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.
5. Bai, H.; **Xing, F.**; Cambria, E.; and Huang, W.-B. (2019). Business taxonomy construction using concept-level hierarchical clustering. *FinNLP@IJCAI*. Macao, China.
4. **Xing, F. Z.**; Cambria, E.; Malandri, L.; and Vercellis, C. (2018). Discovering Bayesian market views for intelligent asset allocation. *ECML-PKDD*. Dublin, Ireland.
3. **Xing, F. Z.**; Cambria, E.; and Zou, X. (2017). Predicting evolving chaotic time series with fuzzy neural networks. *IJCNN*. Anchorage, USA.
2. **Xing, F. Z.**; Cambria, E.; Huang, W.-B.; and Xu, Y. (2016). Weakly supervised semantic segmentation with superpixel embedding. *ICIP*. Phoenix, 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.

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 data uncertainty and high-dimensionality**
   Westlake University Research Seminar, Hangzhou, China, Oct 2019

Teaching

2. **National University of Singapore**
   BT4103 Business Analytics Capstone Project: 2025 Spring
   IS3107 Data Engineering [New]: 2024 Fall, 2023 Fall, 2022 Fall, 2022 Spring
   BT4016 Risk Analytics for Financial Services: 2024 Spring, 2023 Spring
   IS6000 Topics in Information Systems and Analytics Research: 2021 Fall

1. **Nanyang Technological University**
   CZ 4034 Introduction to Information Retrieval (TA): 2021 Spring, 2016 Spring
   CZ 2002 Object Oriented Design & Programming in Java (TA): 2016 Spring

Supervision

Student, Research title, Placement
K. Ong (2023- , PhD TAC), Explainable NLP for finance, -
K. Du (2022-2025, PhD co-advised), Financial sentiment analysis, DBS Bank
F. Pallucchini (2018-2019, MA), Domain adaptation of sentiment lexicons, Uni Milano-Bicocca
I. Koh (2023-2024, BComp), Predictive text analytics on Innofund grant applications, MS Precision
J. Sun (2023-2024, BComp), Modeling dependence structure of cryptocurrency returns, NUS
S. Chen (2022-2023, BComp), Effects of emojis in sentiment analysis, Bybit Crypto Exchange
T. Wee (2022-2023, BComp), Mapping ESG trends to identify investment opportunities, S'pore Air Force

Research Assitant, Placement
C. Wang (2023-2024), University of Connecticut
X. Chen (2020-2021), University of Hong Kong

Academic and Professional Services

Journal Editorial Board

Financial Innovation, Youth Editorial Board Member	2024 - 2026
IEEE Transactions on Affective Computing, Special Issue Guest Editor	2023

IEEE Transactions on Artificial Intelligence, Special Issue Guest Editor	2022
Applied Soft Computing, Special Issue Guest Editor	2022
Information Processing & Management, Special Issue Guest Editor	2020

Conference Chair / Associate Editor

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
European Journal of Finance (EJOF)	2021
Financial Innovation (FIN)	2020 - 2024
IEEE Computational Intelligence Magazine (CIM)	2019
IEEE Transactions on Affective Computing (TAFFC)	2019 - 2023
IEEE Transactions on Engineering Management (TEM)	2020
Information Processing & Management (IPM)	2018 - 2023
Information Systems Frontiers (ISFI)	2022
International Journal of Forecasting (IJF)	2020
Journal of Banking and Finance (JBF)	2025

AAAI Conference on Artificial Intelligence (AAAI)	2021 - 2022
Annual Meeting of the Association for Computational Linguistics (ACL)	2021 - 2022
Economics and Natural Language Processing Workshop (ECONLP)	2021, 2024
Hawaii International Conference on System Sciences (HICSS)	2021 - 2022
International Joint Conference on Artificial Intelligence (IJCAI)	2021 - 2022
International Conference on Information Systems (ICIS)	2022, 2024

Grant Proposal Reviewer

The Czech Science Foundation: Standard & Lead Projects	2021 - 2024

Professional Society Membership

ACM (Association for Computing Machinery)	2023 - 2024
ACL (Association for Computational Linguistics)	2024 - 2025
AIS (Association for Information Systems)	2021 - 2025
INFORMS (Institute for Operations Research and Management Sciences)	2020 - 2023
IEEE (Institute of Electrical and Electronics Engineers)	2016 - 2017

Administrative Services

Interviewer, Undergraduate 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 - 2024
Final Year Project Evaluator, NUS School of Computing	2021 - 2024

Internal/External PhD Thesis Examiner

National University of Singapore	2022 - 2024
Imperial College London	2024