



**Année Universitaire : 2024/2025**  
**Formulaire de dépôt de sujet de Mémoire**  
**Mastère de recherche en Système d'Information et Web**

Nom et prénom : Hamdi Houda

Numéro CIN : \_\_\_\_\_

Date et lieu de naissance : \_\_\_\_\_

E-mail : \_\_\_\_\_

N° Tel : \_\_\_\_\_

**Sujet de mémoire : Financial Time Series Analysis and Forecasting**

**Objectifs de la recherche, délimitation du sujet de mémoire et méthode de travail :**

“Financial time series analysis and forecasting” is crucial for enhancing economic decision-making, improving financial stability, and advancing the application of machine learning techniques in real-world economic and financial contexts. Also, “Financial time series analysis and forecasting” remains a vital and evolving research field, driven by advancements in machine learning and the increasing complexity of financial data. Recent studies highlight the effectiveness of deep learning techniques, such as LSTMs and GANs, for capturing non-linear and temporal dependencies in stock markets and cryptocurrency data [1, 2,5,6,7]. Researchers are also leveraging alternative data sources, like social media sentiment, to enhance predictive models [3]. Additionally, methods like multivariate GARCH models are improving risk management strategies in finance [4]. These trends underscore the interdisciplinary opportunities and practical relevance of the field.

This M.Sc. graduation project has introductory goals to the field of “Financial time series analysis and forecasting”. The study is intended to integrate the following components:

- Explore and synthesize the recent state of the art for “Financial time series analysis and forecasting”.
- Identify the best-performing forecasting models and rank them according to pertinent performance criteria.
- Implement a pertinent selection of these models and evaluate their performances in selected contexts.
- Eventually build a visible contribution to the current literature of anomaly detection in time series data.

Here, some references are given:

[1] Hu, Z., Yu, R., Zhang, Z., Zheng, H., Liu, Q., & Zhou, Y. (2024, December 24). *Developing cryptocurrency trading strategy based on AutoEncoder-CNN-GANS algorithms*. arXiv.org. <https://arxiv.org/abs/2412.18202>



- [2] Omer Berat Sezer, Mehmet Ugur Gudelek, Ahmet Murat Ozbayoglu. 2020. Financial time series forecasting with deep learning : A systematic literature review: 2005–2019. *Applied Soft Computing, Volume 90*.
- [3] Teixeira, D. M., & Barbosa, R. S. (2025). Stock Price Prediction in the Financial Market Using Machine Learning Models. *Computation, 13*(1), 3.
- [4] Jahangirnia, H. , Hoseinzadeh Bizaki, M. , & Zomorodian, G. (2024). Providing a comprehensive risk prediction model using the method (MGARCH). *Defensive Future Studies*.
- [5] Carl Remlinger, Clémence Alasseur, Marie Brière, Joseph Mikael. (2023). “Expert aggregation for financial forecasting”. *The Journal of Finance and Data Science, Volume 9*.
- [6] Chao Liang a, Qin Luo a, Yan Li b, Luu Duc Toan Huynh c. 2023. “Global financial stress index and long-term volatility forecast for international stock markets”. *Journal of International Financial Markets, Institutions and Money, Volume 88*.
- [7] Chen, Weisi & Hussain, Walayat & Cauteruccio, Francesco & Zhang, Xu. (2023). Deep Learning for Financial Time Series Prediction: A State-of-the-Art Review of Standalone and Hybrid Models. *Computer Modeling in Engineering and Sciences*. 139. 187-224.

### Encadrant

Nom, prénom et signature  
**Dr. Hassenet Slimani**

### Co-encadrant

Nom, prénom et signature  
**None**

<b>Avis du président de la commission :</b>	<b>El Kef, le...../...../2024</b>  <b>La Directrice</b> <b>Ibtissem Cherni</b>
---	---

2/2