# Zuokun OUYANG Ph.D. Candidate

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zuokun-ouyang


## Research Interests

I am interested in Machine Learning and Data Mining for Time Series Analysis and Forecasting. My current researches include the following aspects:

- Multivariate time series forecasting.
- Sequential & temporal learning.
- Statistical time series analysis.

## Education

**University of Orléans** — Orléans, France
**Ph.D. Candidate, Computer Science** — *Oct. 2019 – Present*
Dissertation: *Prediction of multivariate time series to accompany the activity of a franchise network positioned on the repair and maintenance of roofs*
Advisors: Prof. Philippe Ravier, Assoc. Prof. Meryem Jabloun
Funding: This research was funded by ANRT (Association Nationale de la Recherche et de la Technologie) CIFRE $N^{\circ}$ 2019/0551 contracted with ATTILA Gestion

**University of Orléans** — Orléans, France
**Diplôme d'Ingénieur, Computer Engineering,** *Polytech Orléans* — *Sept. 2015 – June 2018*
**M.Sc., Computer Science** — *Sept. 2017 – June 2018*
Dissertation: *A Fundamental Study on Time Series Prediction*
Advisors: Prof. Christel Vrain, Prof. Marcilio C. P. de Souto, Assoc. Prof. Sylvie Treuillet

**Beijing Institute of Technology** — Beijing, China
**B.Eng., Electrical Engineering** — *Sept. 2012 – June 2016*
Dissertation: *Sound Source localization with Microphone Array*
Advisors: Assoc. Prof. Shiyong Li, Assoc. Prof. Rodolphe Weber

## Professional Experience

**University of Orléans** — Orléans, France
**Temporary Research Assistant & Assistant Lecturer (ATER)** — *Jan. 2023 – Present*

- *Introduction to Signal Processing* (EPL4CI04).
- *Signals and Linear Systems* (EPL3CI13).
- *Techniques and Realization Projects* (EPL2CI03).
- *Mathematics and Computer Science* (EPL2CI02).
- *Acquisition systems and signal processing* (EPL2IA01).

**ATTILA Gestion** — Lyon & Montargis, France
**Machine Learning Engineer and Data Analyst** — *Oct. 2019 – Dec. 2022*

- Pinpointed and evaluated various internal indicators of numerous franchise agencies.
- Developed multi-step forecasting models for multivariate time series.
- Conducted customer segmentation exploiting traditional and time series clustering techniques.
- Developed pipelines for assessing the effectiveness of various time series forecasting models.

**Data Analyst Intern** — *Apr. 2018 – Sept. 2018*

- Analyzed indicators of multiple franchise agencies.
- Conducted a literature review on statistical and ML models for time series analysis.
- Analyzed and assessed different statistical and ML/DL models for time series forecasting.

**eContent Store Sàrl** — Luxembourg
**Software Development Engineer Intern** — *June 2017 – Aug. 2017*

- Acted as one of the core developers of the Android development team.
- Implemented key enhancements and upgrades for AR functionalities, encompassing improved technique selection, natural feature training pipeline, and numerous bug fixes.
- Led the development of a user-end WebGL tool for natural features training to improve rendering performance.

## Scientific Knowledge

**Programming** Python, R, C#, Java, C/C++, Swift, MATLAB
**Frameworks & Tools** PyTorch, scikit-learn, Unity3D, OpenCV, PowerBI, Linux, Git
**Skills & Expertise** Deep Learning, Machine Learning, Time Series Analysis, Signal Processing, Calculus, Linear Algebra, Probabilities and Statistics, Optimization Theory
**Languages** English (TOEIC/855, proficient), French (TCF/B2, upper-intermediate), Mandarin (native language)

## Selected Publications

1. **Z. Ouyang**, M. Jabloun, and P. Ravier, "STLformer: Exploit STL decomposition and Rank Correlation for Time Series Forecasting," in *Proc. EUSIPCO*, 2023, (submitted).
2. **Z. Ouyang**, M. Jabloun, and P. Ravier, "Rankformer: Leverage Rank Correlation for Transformer-based Time Series Forecasting," in *Proc. IEEE SSP*, 2023, (submitted).
3. G. Ouyang, K. Abed-Meraim, and **Z. Ouyang**, "Magnetic-Field-Based Indoor Positioning Using Temporal Convolutional Networks," *Sensors*, vol. 23, no. 3, p. 1514, 2023. DOI: 10.3390/s23031514.
4. **Z. Ouyang**, P. Ravier, and M. Jabloun, "Are Deep Learning Models Practically Good as Promised? A Strategic Comparison of Deep Learning Models for Time Series Forecasting," in *Proc. EUSIPCO*, 2022, pp. 1477–1481.
5. **Z. Ouyang**, P. Ravier, and M. Jabloun, "STL Decomposition of Time Series Can Benefit Forecasting Done by Statistical Methods but Not by Machine Learning Ones," *Eng. Proc.*, vol. 5, no. 1, p. 42, 2021. DOI: 10.3390/engproc2021005042.

## Selected Projects

**iOS application *RestauRank*** Orléans, France, Mar. 2018 – Apr. 2018

- Created a map application to find top-rated restaurants nearby and the quickest route.
- Used Google Maps SDK and Google Geolocation API for map display, navigation, and reviews.
- Pure Swift implementation.

**Archaeological ceramic decoration segmentation** Orléans, France, Jan. 2018 – Mar. 2018

- Built 2D FCN to segment decorated areas of ancient ceramic shards from depth maps.
- Clustered segmented areas and preprocessed depth maps into distinct categories.
- Compared the clustering results with other algorithms, including $K$-means and DBSCAN.

**Interactive real-time earthquake map** Orléans, France, Apr. 2017 – May 2017

- Developed an interactive map application in Java to display global earthquake information.
- Used Processing for UI and icons, Unfolding for interaction.
- Distinguish locations, depth, levels, and time with different shapes, colors, sizes, and icons.

**Sound source localization with microphone array** Orléans, France, Mar. 2016 – May 2016

- Developed a microphone array system with MATLAB and Python to localize a sound source.
- Used Raspberry Pi 3B, Arduino UNO Rev3, stepper motor, and an eight-microphone array.
- Implemented DOA-TDOA & GCC algorithms.

## Talks

- Use Time Series Prediction Methods to Forecast Customers Number, *1st Collaborative Workshop on Artificial Intelligence Applications for Small Medium Enterprises*, Orléans, France, June 2018.

## Awards

- College Student Academic Scholarship, Beijing Institute of Technology *2012 – 2015*
- National 3rd Prize, Chinese Exhibition of Calligraphy and Painting for Undergraduates *2013*
- National 3rd Prize, The 25th Chinese Chemistry Olympiad *2011*
- Provincial 1st Prize, The 28th Chinese Physics Olympiad *2011*
- Provincial 1st Prize, The 20th China High School Biology Olympiad *2011*

## Other Experience

- Volunteer, Chinese New Year Festivity, *Orléans and Yangzhou Government* *Feb. 2017*
- Vice President, *Association of Calligraphy of Beijing Institute of Technology* *2013 – 2015*

## Hobbies

Basketball, Reading, Chinese Calligraphy, Singing, Fitness.