Curriculum Vitae

PERSONAL INFORMATION

Name	Jiayu Hu	**M/F**	Male
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EDUCATION BACKGROUD

Sun Yat-sen University (SYSU) Aug. 2017-Jun. 2019
- Master of Hydraulic Engineering Guangzhou, China
- GPA: **87.4**/100

South China University of Technology (SCUT) Sep. 2013-Jun. 2017
- Bachelor of Water Resources and Hydropower Engineering Guangzhou, China
- GPA: **3.68**/4.0 or **86.09**/100 Rank: **3**[th]/53

HONOR AND AWARD

- Outstanding Students Awards of SCUT in 2014, 2017
- Undergraduate Fellowship of SCUT in 2014, 2016, 2017
- Postgraduate Fellowship of SYSU in 2018 (***Top 3 in a class of 30***)

RESEARCH EXPERIENCE

Project 1: *Dynamic prediction and regulation of water resources carrying capacity in the Pearl River Delta (2016YFC0401305)*, **National Key Research and Development Program of China**, 2016-2020
Experience: Engage in modeling the response of river network to land use changes in the context of urbanization of Foshan city. *(**Bachelor Thesis Theme**)*
- The goal was to quantitatively characterize the evolution of urban river, and analyze the spatial response of urban river reduction and its causes.
- Use stepwise regression analysis to get driving fators of river network changes, and then develope both spatial auto-regression and geographic weighted regression models to quantify contributions of driving fators.
- Results showed that the expansion of industrial land was the primary cause, while the impact of land use changes has obvious spatial differences.

Project 2: *Study of estuarine saltwater intrusion and salinity time series prediction (51879289)*, **General Program of National Natural Science Foundation of China**, 2019-2022
Experience: Engage in developing data-driven prediction models for salinity time series to serve estuarine water resources management. *(Participate in the preparation of fund application; **Master Thesis Theme**)*
- The goal was to construct an effective daily-scale prediction scheme for the water quality of the estuary under the complex interaction of sea and land factors.
- Input variables selection, data transformation, uncertainty analysis and machine learning were involved and coupled to construct hybrid machine learning models.
- The nonlinearity and nonstationarity of salinity time series were handled by hybrid models, and the developed time-invariant wavelet-based model was pratical for estuarine salinity prediction.

PUBLICATION AND SOFTWARE

Research paper：
- **Hu, J.**, Liu, B. (2019). Analysis of River Network Changes Based on Spatial Auto-regression and Geographic Weighted Regression Model. *Hydrology, 039(002), 7-13. (**Chinese Core Journal**)*
- **Hu, J.**, Liu, B., & Peng, S. (2019). Forecasting salinity time series using RF and ELM approaches coupled with decomposition techniques. *Stochastic Environmental Research and Risk Assessment, 33(4-6), 1117-1135. (https://www.researchgate.net/profile/Jiayu-Hu-9)*
- Zhou. F., Liu, B., **Hu, J.**, et al. (2020). Study of Estuarine Salinity Prediction Based on Wavelet Artificial Neural Network. *Hydrology, 240(06):57-64. (**Chinese Core Journal**)*

Software copyright：
- Liu, B., **Hu, J.**. Software for iterative predictors selection for hydrological and water environment prediction based on HP-OPELM model (V1.0), *2019SR0470866*.

SKILL AND EXPERTISE

Application of data-driven forecast/prediction models for water resources system
1. *Machine Learning*
- Artificial neural network; Extreme learning machine; Random forests
2. *Data Preprocessing and Feature Engineering*
- Data transformation: Time-invariant wavelet; Empirical mode decomposition
- Input determination: (Partial) mutual information; Forward iterative selection
3. *Uncertainty Measurement*
- Sample with bootstrap technique; Sample with bayesian method and markov chain monte carlo

Spatial econometric analysis
- Spatial autocorrelation analysis; Spatial regression analysis

Tools for data analysis, statistical modeling and data visualization
- Python/ Matlab/ Arcgis (skilled); R/ SQL (average)

WORK EXPERIENCE

Guangdong Provincial Design Institute of Water Conservancy and Electric Power — Jul. 2019-
- *Assistant engineer*, engage in water resources and flood prevention planning — Guangzhou, China

Relevant experience:
1. *West Guangdong Water Diversion Optimization Based on Genetic Algorithm*
(https://github.com/Napolepburn/Water-Diversion-Optimization-Based-on-Genetic-Algorithm)
- Make a daily-scale water resources allocation system with Python (involving the joint dispatch of 4 reservoirs).
- The combinations of 57 decision variables (e.g., design diversion, reservoir operation) were optimized to reach Pareto-fronts for irrigation water supply guarantee rates of multiple reservoirs.
2. *Monthly Probabilistic Streamflow Improvement for East River with Machine Learning Method*
(https://github.com/Napolepburn/Probabilistic-Streamflow-Improvement-with-Machine-Learning-Method)
- Wavelet transformation was used to improve runoff point and interval forecasts with a forecast period of one month.
3. *Emergency Plan for Exceeding Standard Floods (1%) in Liuxi River, Guangzhou*
- Technical support for flood control consultation and decision-making (e.g., flood risk map making based on DEM).