Machine learning methods applied to sea level predictions in Taiwan

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Content

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Introduction

Location_Keelung Port

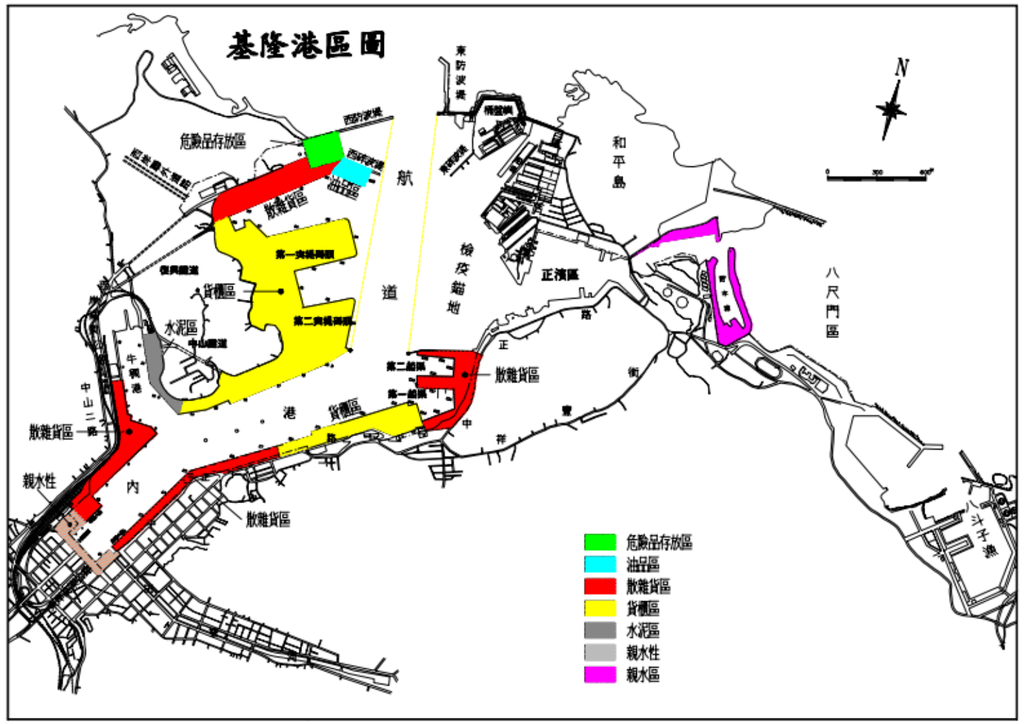
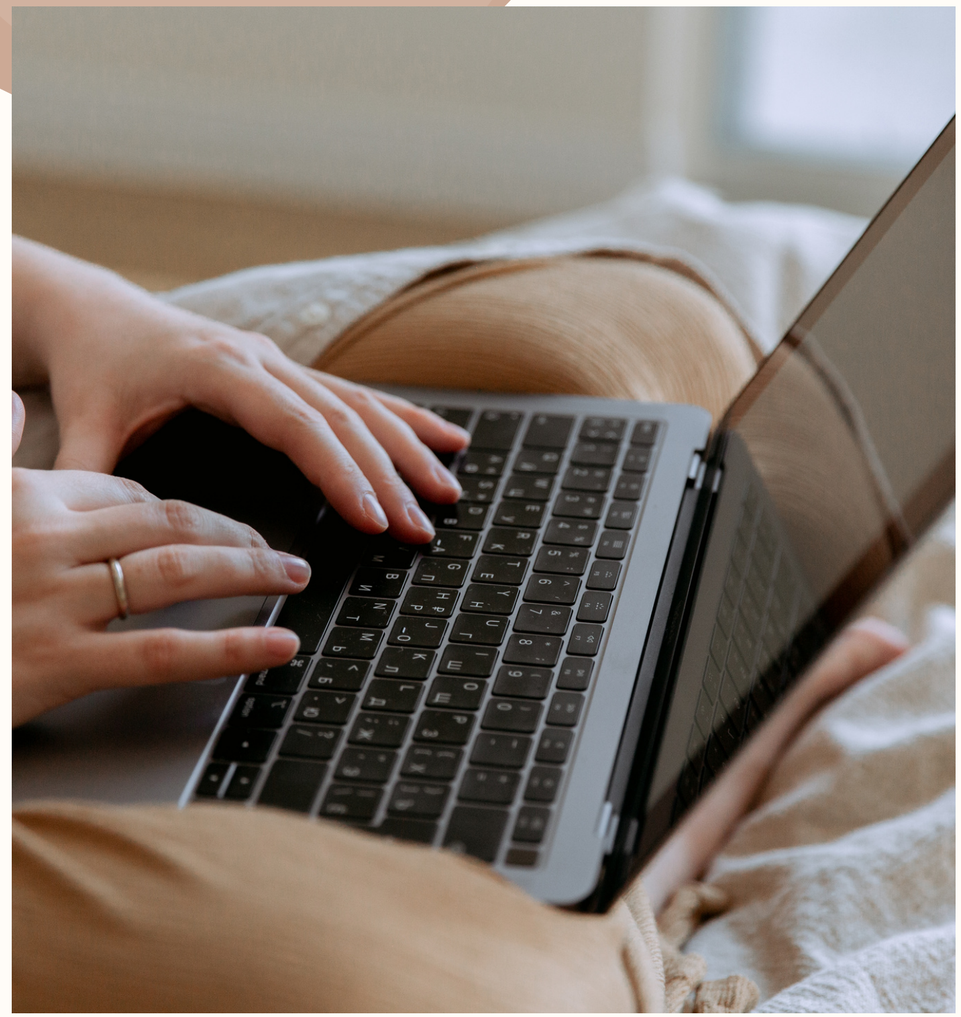


圖 2-2 基隆港域環境及港區配置
（資料來源：港研中心）

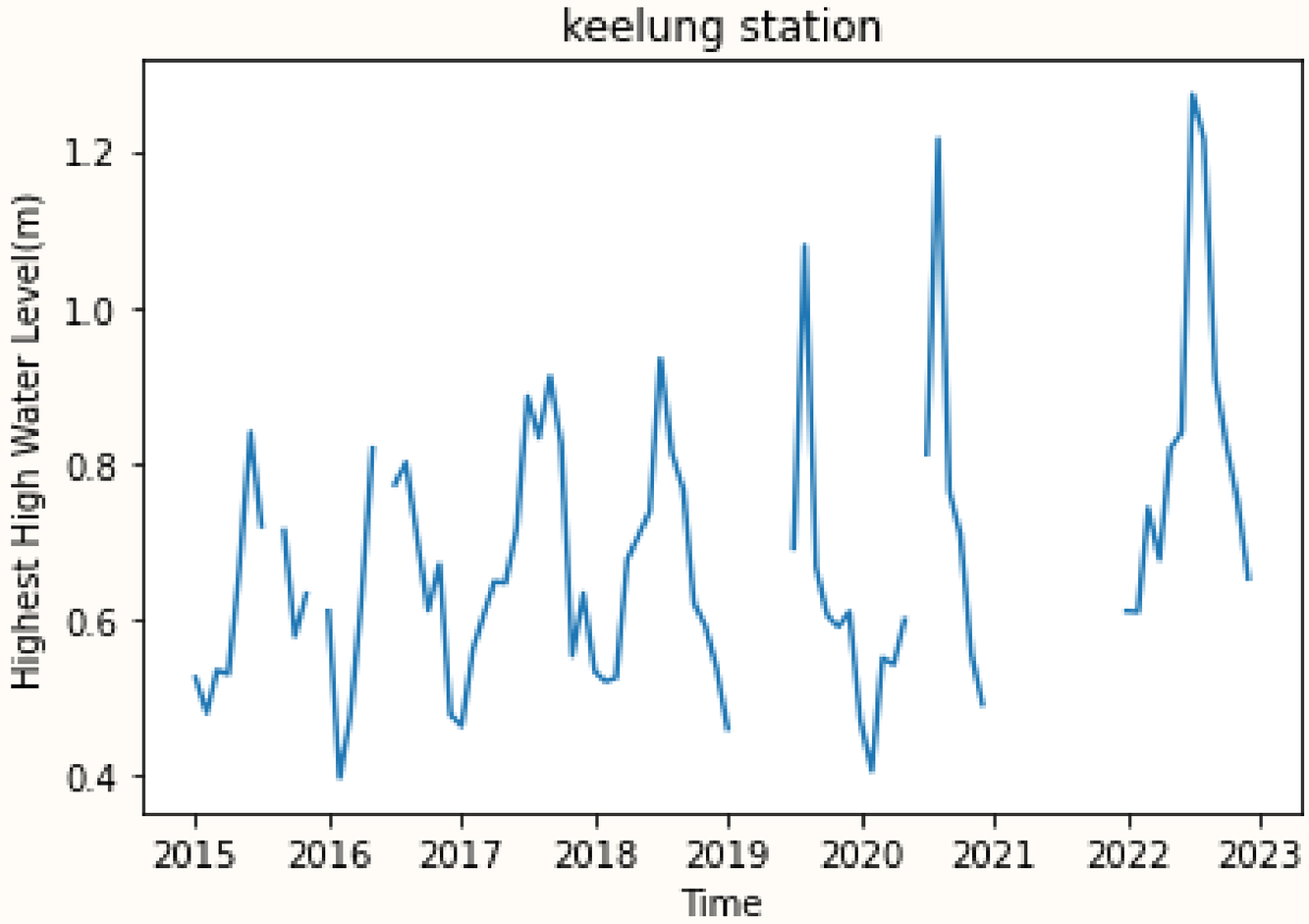
- important port
- geographical location
- near Taipei metropolitan area
- time:2015~2022

Data Analysis



Data Analysis

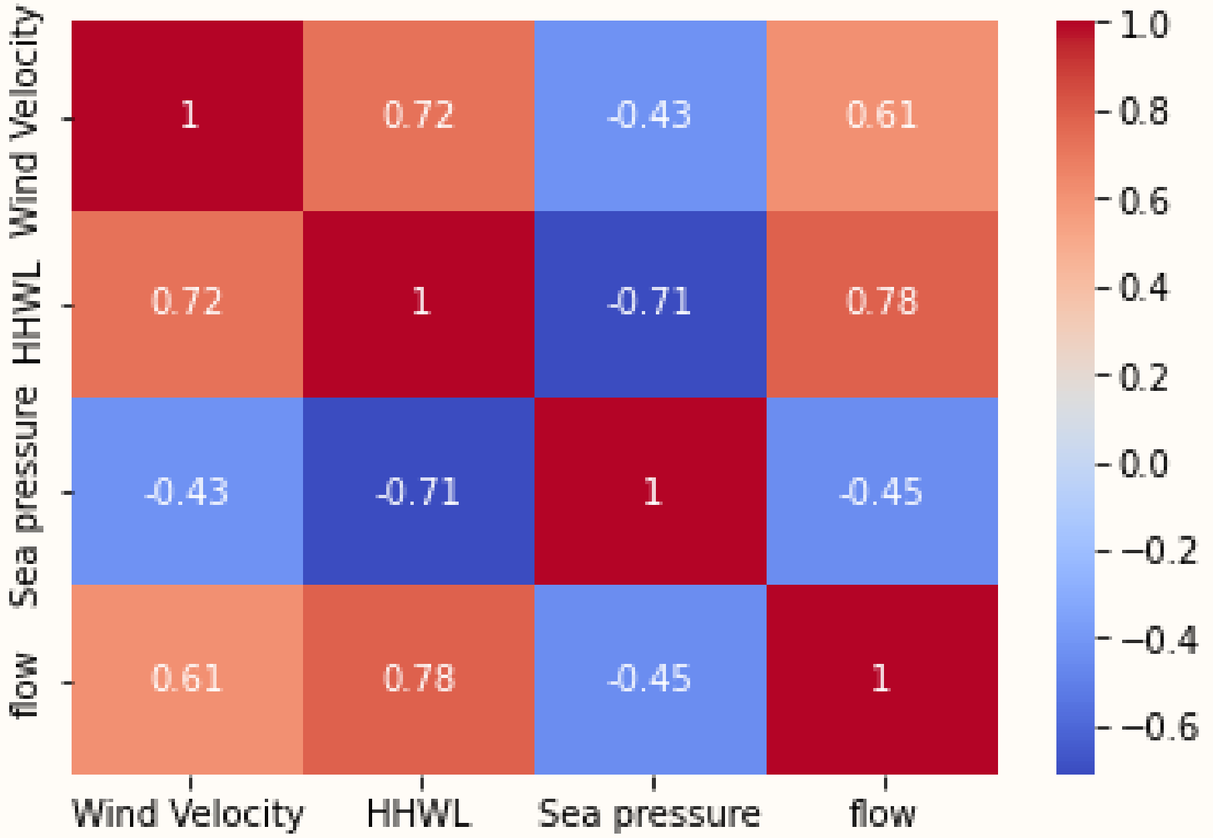
2015~2022 Highest High water level in Keelung station



Data Analysis

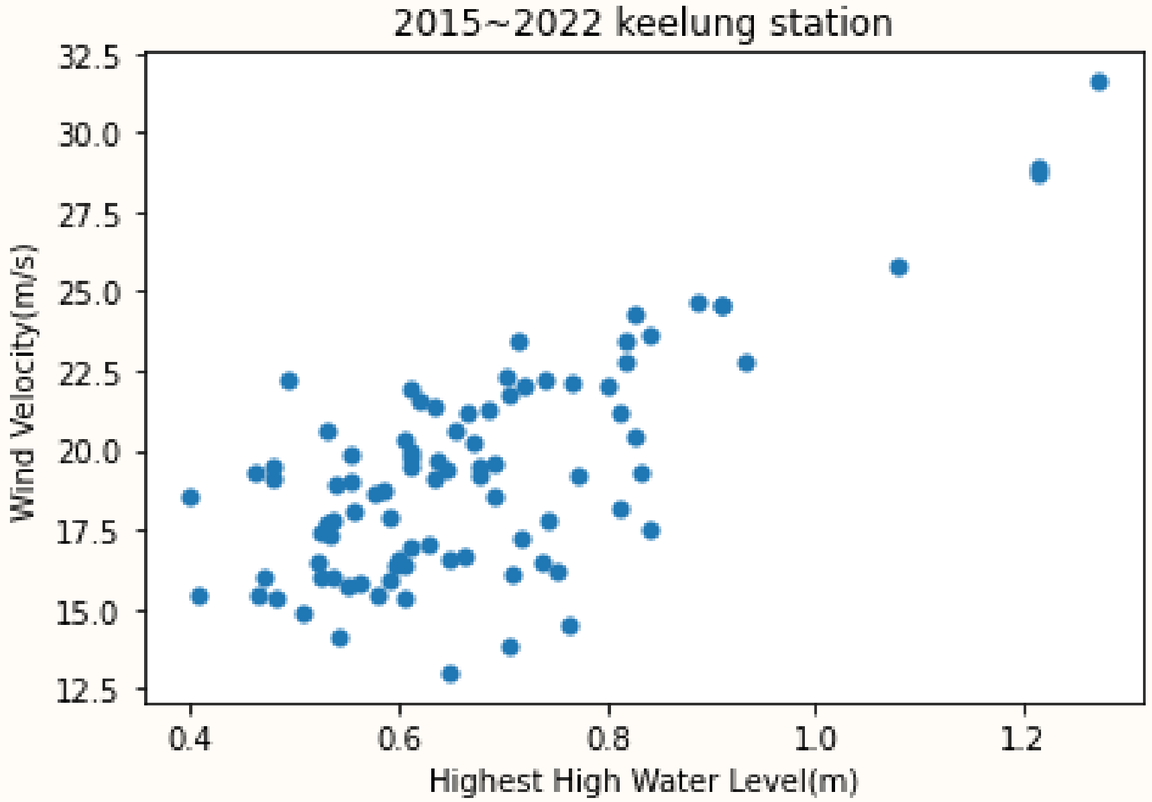
Heat map of variables

- Wind velocity
- Sea level pressure
- River flow



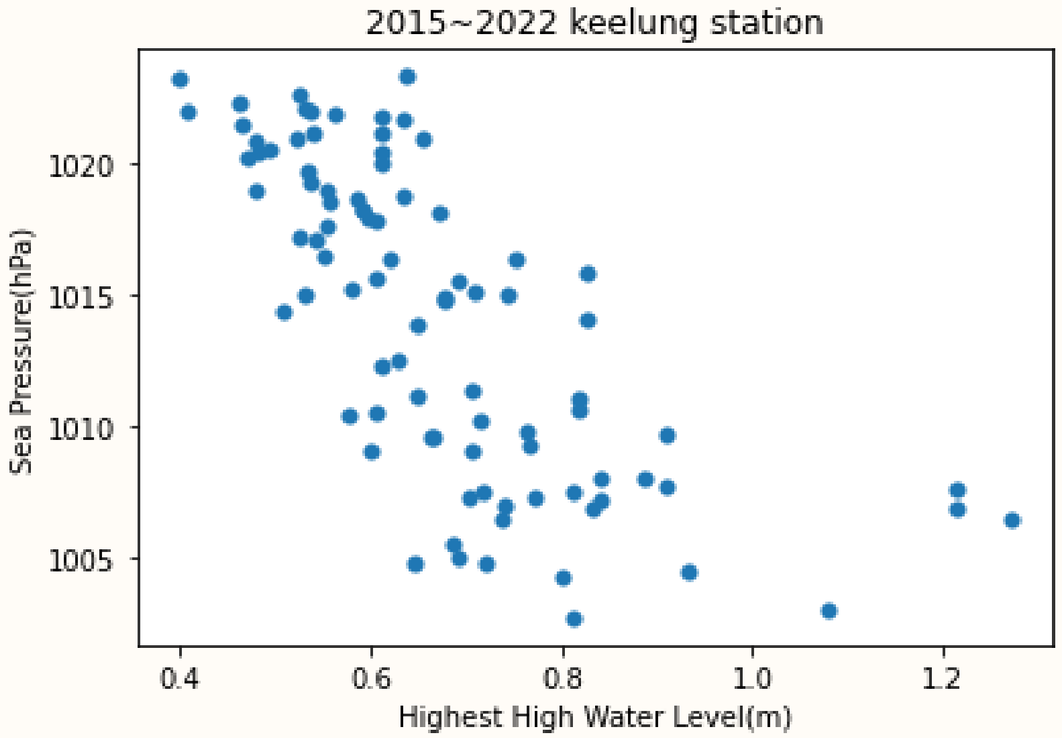
Data Analysis

relationship between
HHWL and wind velocity



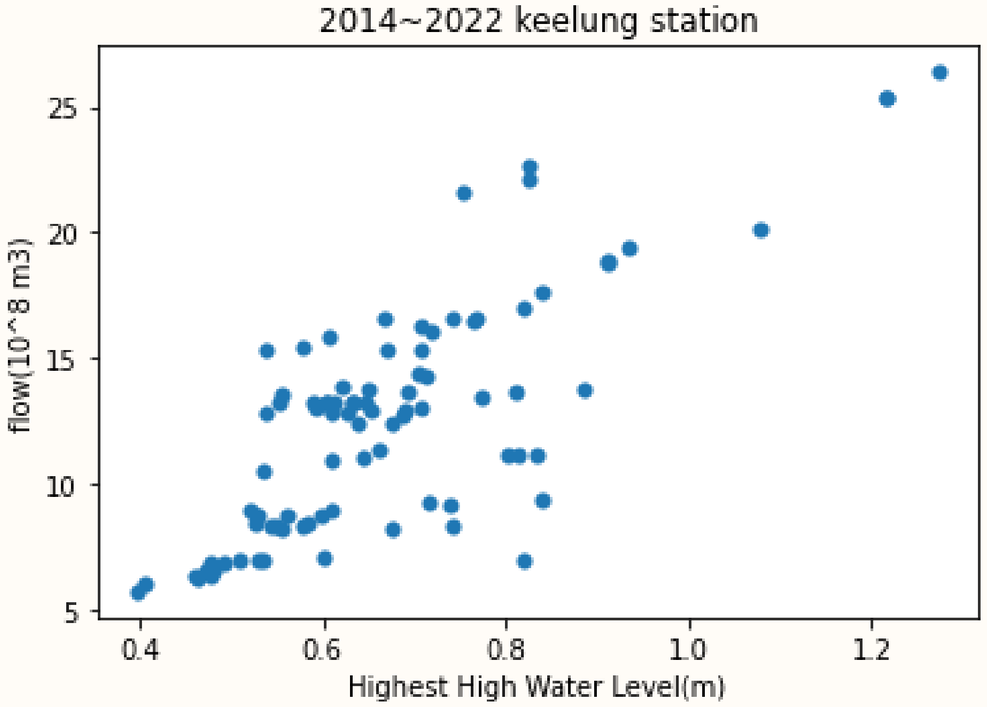
Data Analysis

relationship between HHWL and sea level pressure



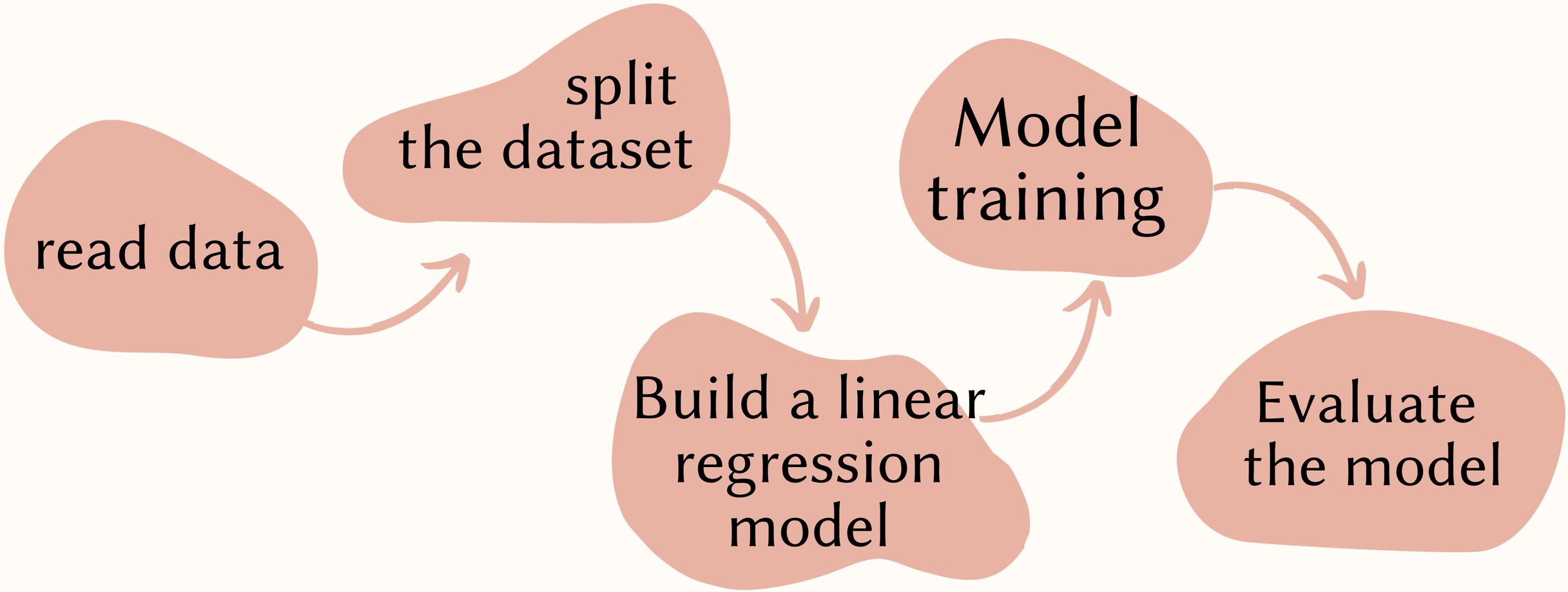
Data Analysis

relationship between
HHWL and flow

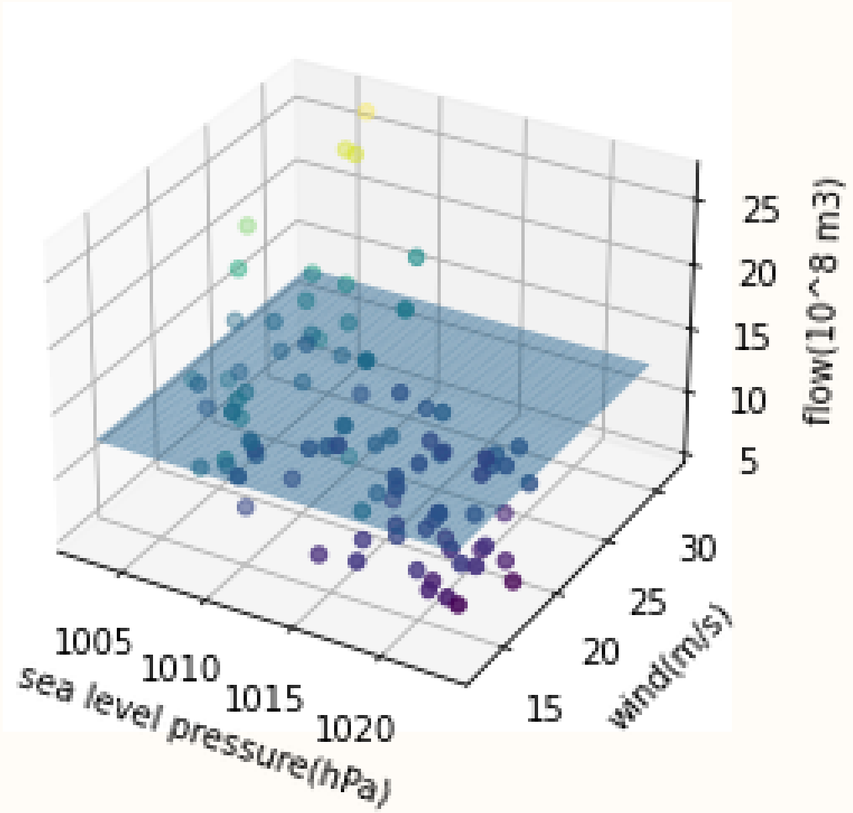


Methods & results

Linear Regression



Linear Regression



- TRAINING:80%
- TESTING:20%

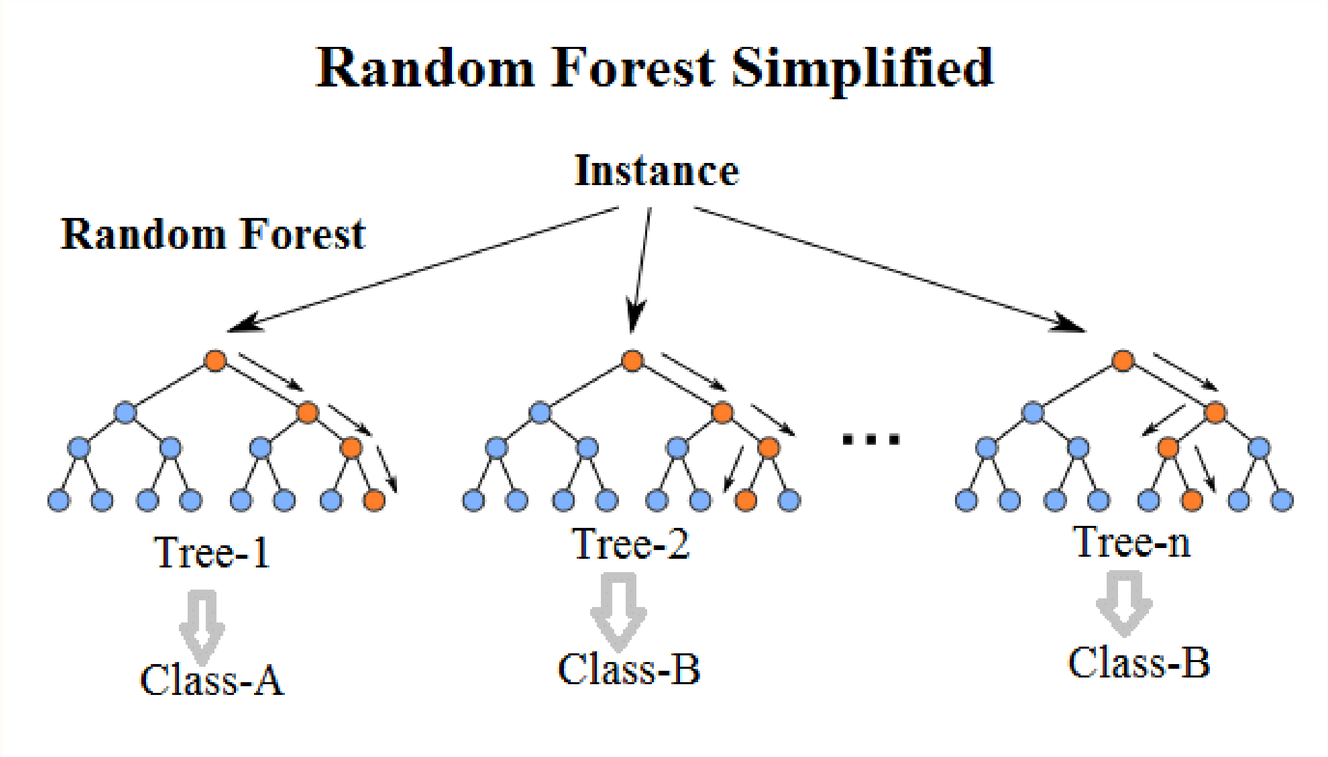
MSE: 0.006027525448399902
RMSE: 0.07763713962015796
MAE: 0.06575717881144356
R2: 0.7321192401467647

Linear Regression_improve the accuracy of model

- cross validation

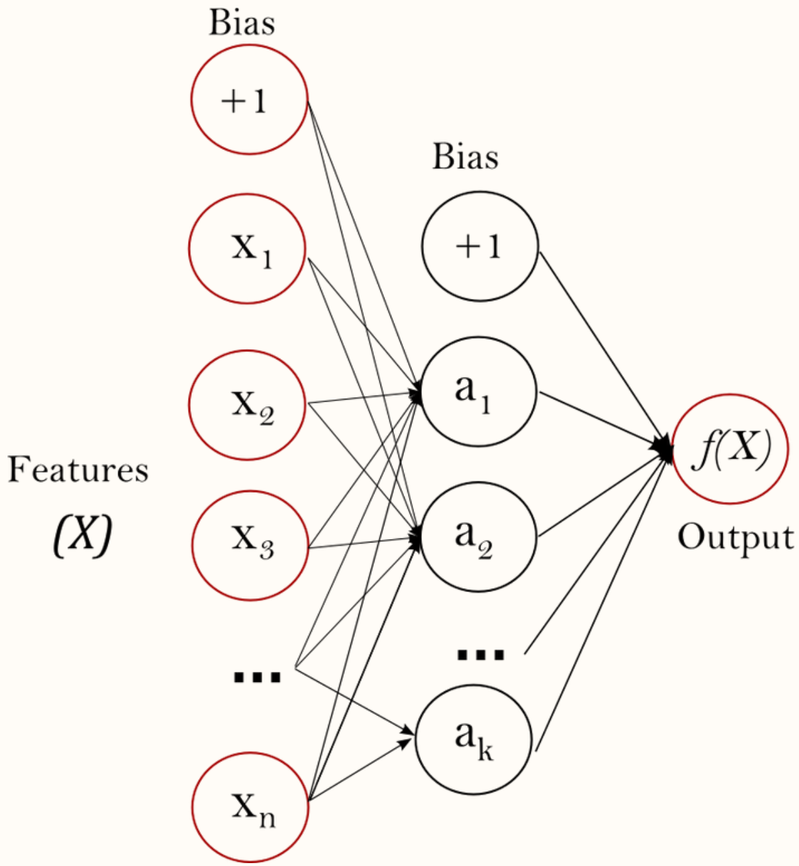
MSE: 0.014415533322022219
RMSE: 0.08063839833506872
MAE: 0.065242646767794
R2 : 0.644585834995217 2

Random Forest Simplified



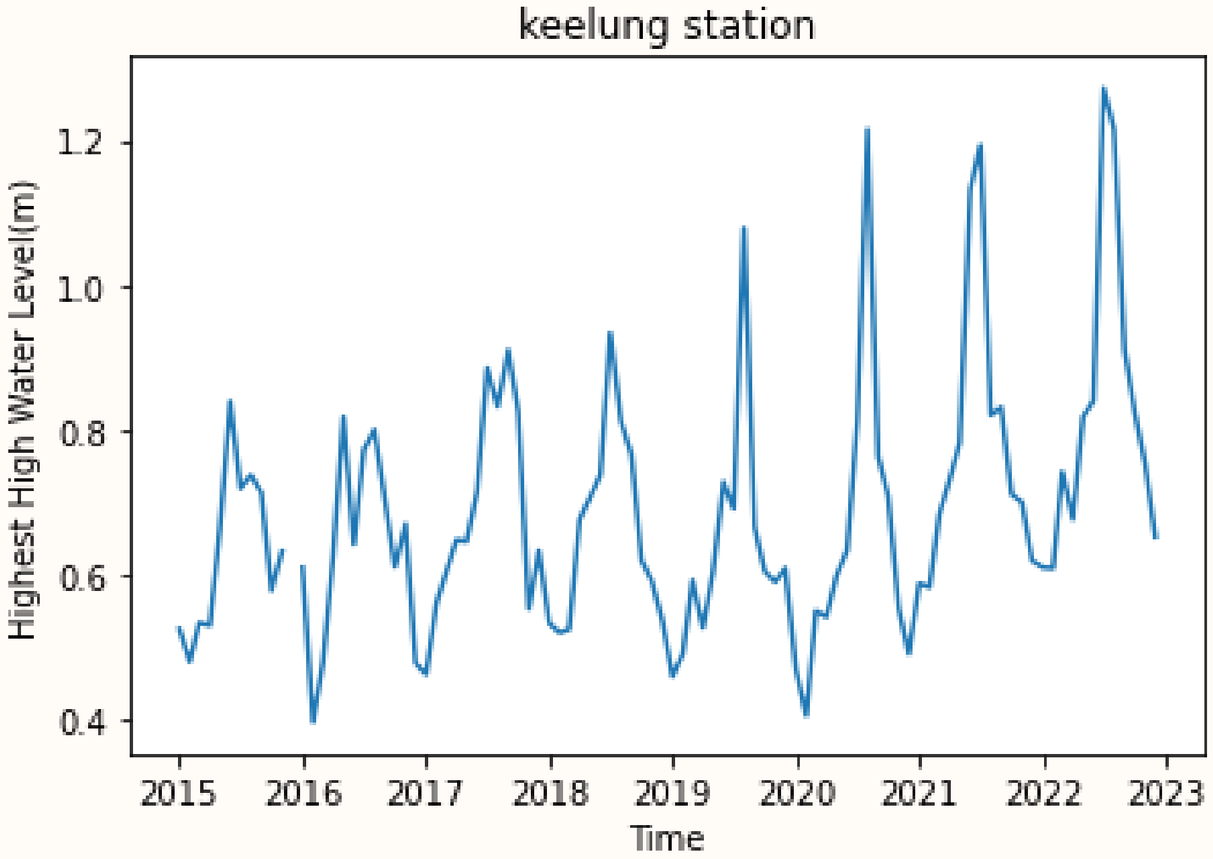
MAPE: 1.2861786983940537

Neural Network



R2=0.7928832039528243

Fill in missing values



Conclusion

Conclusion

- Problem:
    a. ability
    b. variables
    c. little data

- Outlook for the future:
    a. keep trying
    b. different latitude

Reference

- 台灣四周海域海流數值模擬研究(三) — 基隆港海域潮汐與潮流之數值模擬研究
- Analysis on the symmetry of tides at Keelung and Kaohsiung port
- Predicting regional coastal sea level changes with machine learning
- https://haichaobiao.com/tw/taiwan/ting-tou-o-shan#_tidal_coefficient

Thank you for attention.