ROCK-TYPE CLASSIFICATION IN WELLS

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INTRODUCTION

Project Goal: To create a model that performs basic rock type classification with minimal user input on new wells.

Objectives: To provide a lithological model based on North Sea wells to petroleum geologists looking to perform a lithological investigation for free with minimal effort.

METHODOLOGY

Preliminary Action

- Collect data from Equinor Volve Dataset
- Lasio to read petroleum-specific files
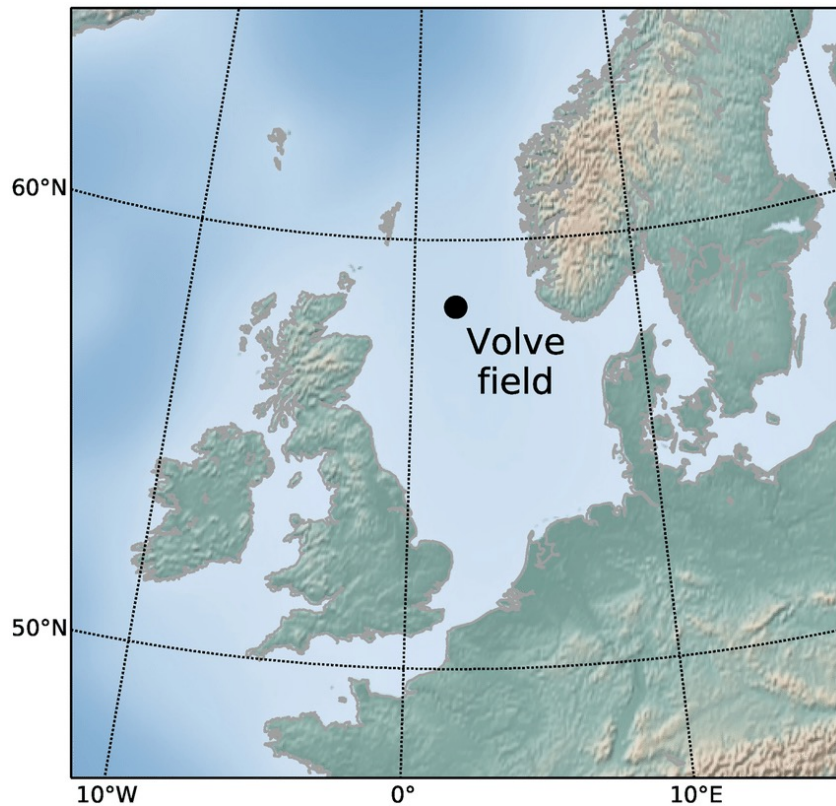- EDA and cleaning data

Modeling

- KNN, Random Forest, XGBoost
- Lithology prediction visualizations
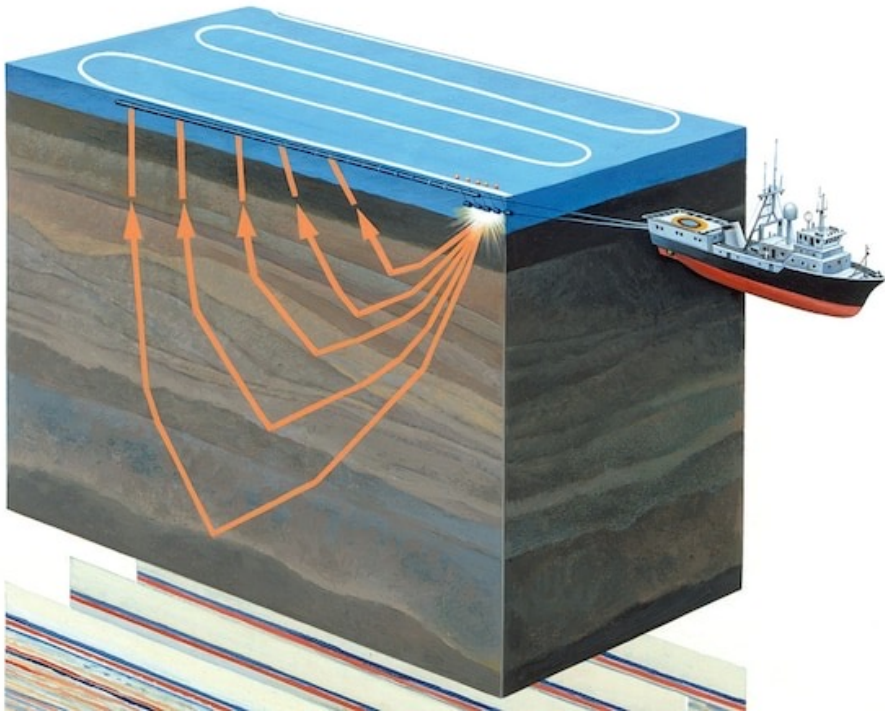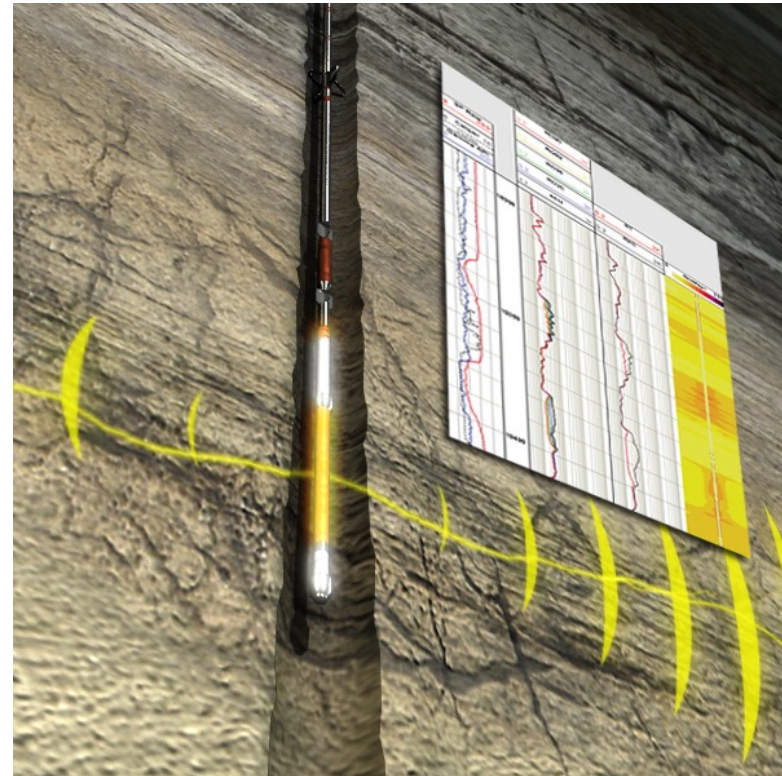
DATA SOURCE

Volve field:

- Produced 2008-2016

- ~4 TB of data released

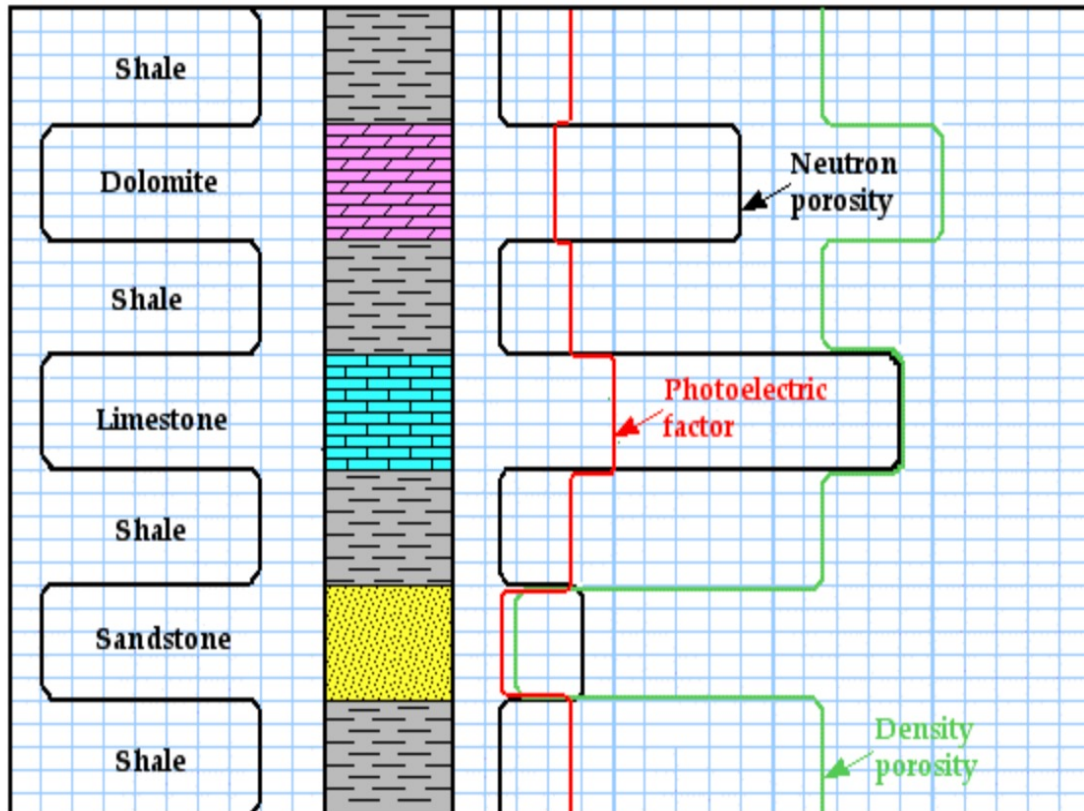- 24 wells (3 of which are currently useable with all data present)

DATA ACQUISITION

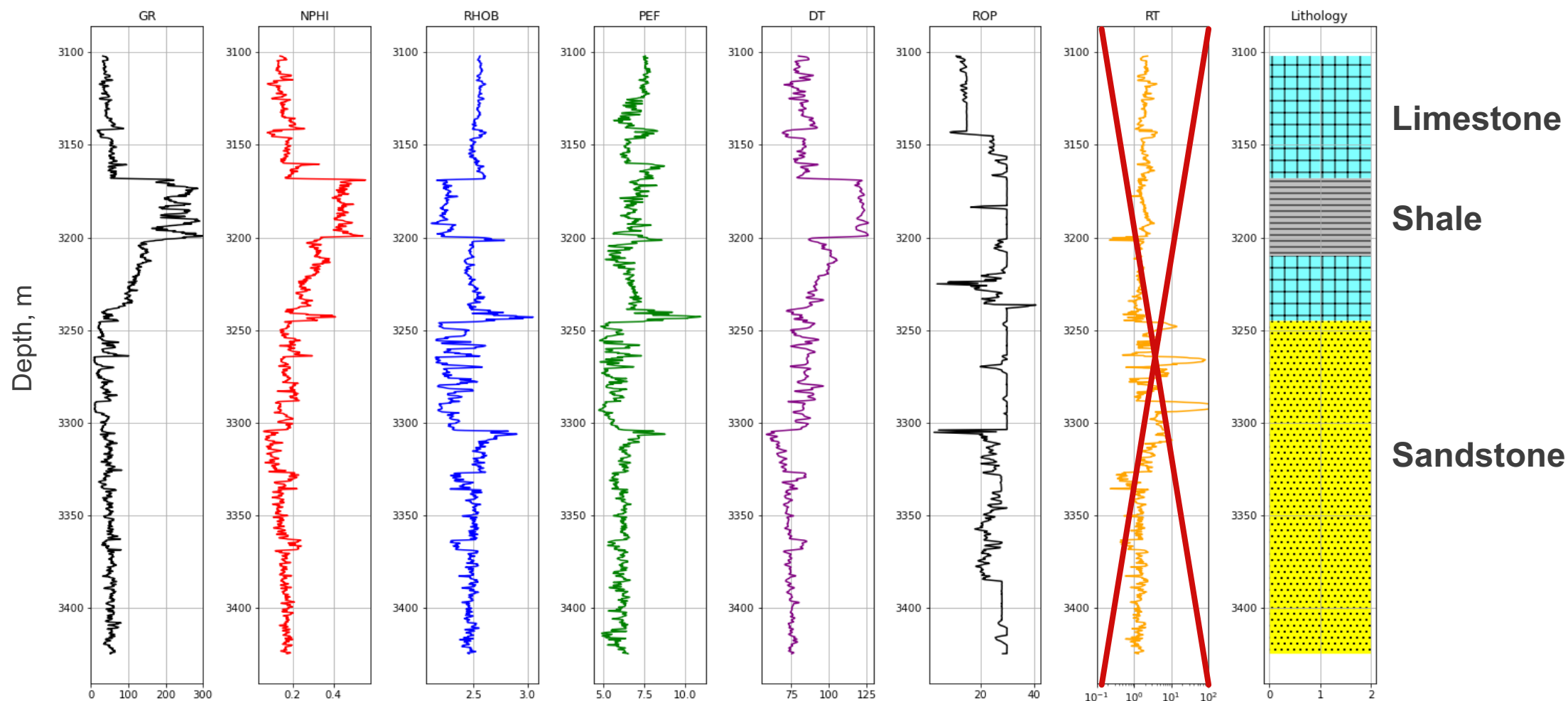**Seismic**

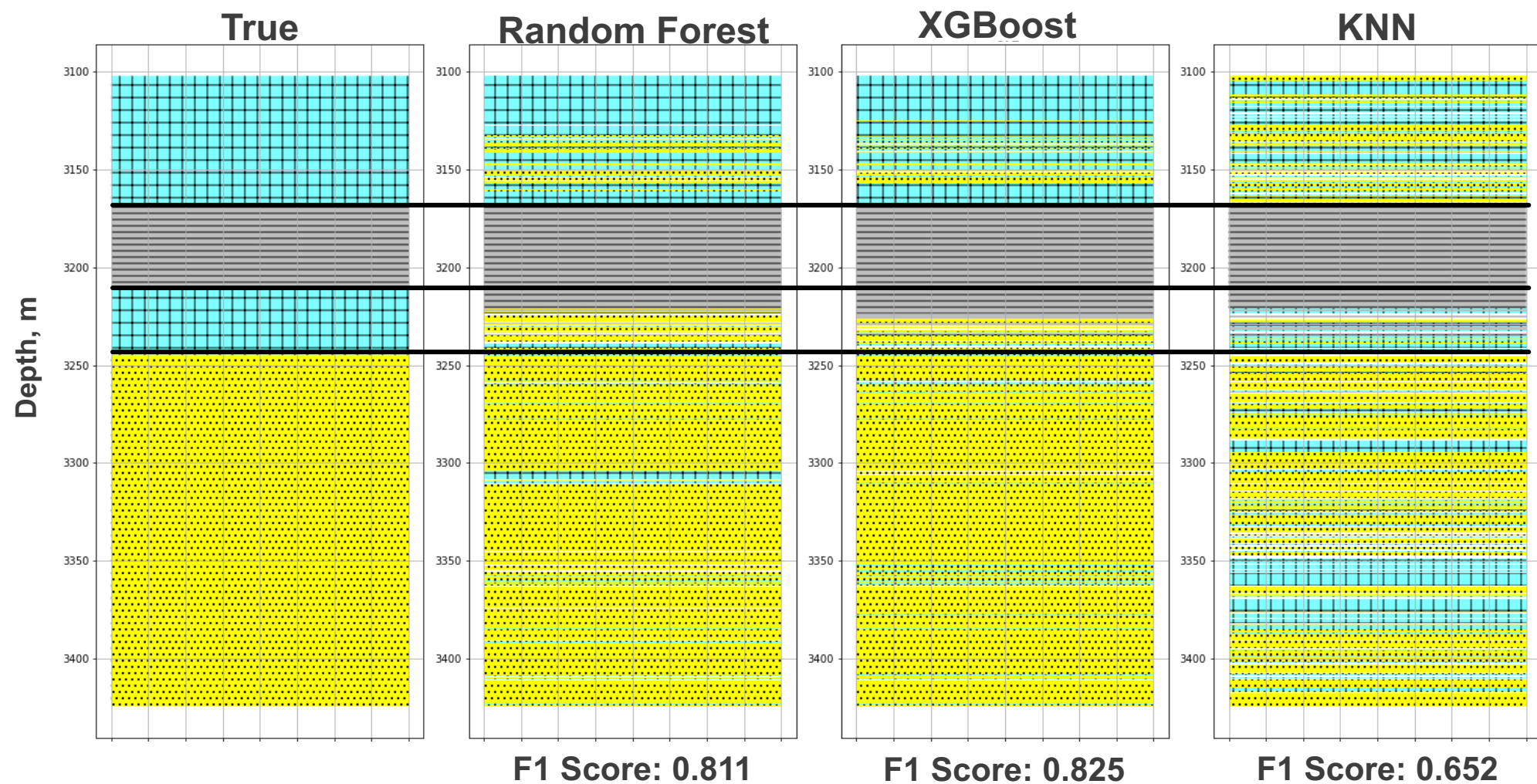**Logging**

DATA SUMMARY

Logging Measurements

- Gamma ray (GR): radioactive response
- Neutron Porosity (NPHI): pore volume
- Bulk Density (RHOB): rock density
- Photoelectric (PEF): photo-electric absorption
- Sonic Velocity (DT)
- Rate of Penetration (ROP)

DATA INVESTIGATION

MODEL PREDICTIONS

True | Random Forest | XGBoost | KNN

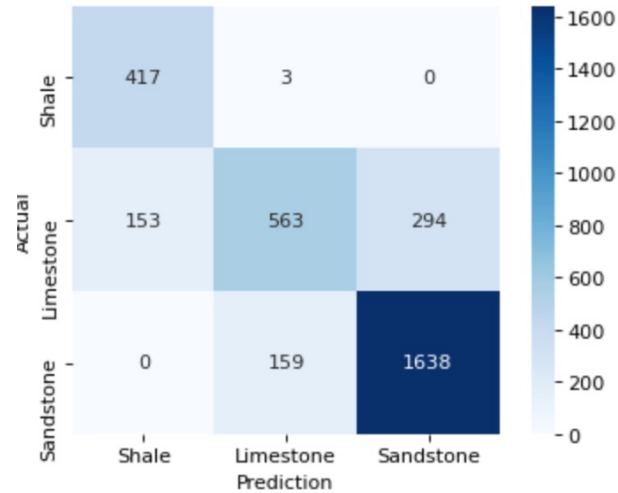**F1 Score: 0.811** **F1 Score: 0.825** **F1 Score: 0.652**
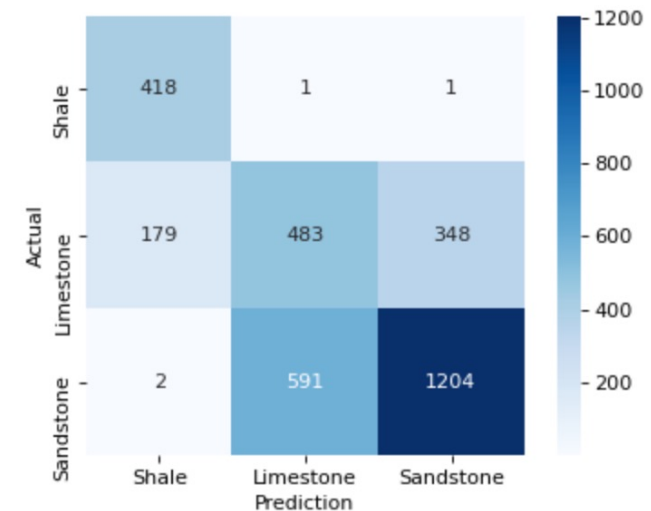
FUTURE WORK

- Include other well file data such as .DLIS

- Another model to classify fluid type

- Expand the classification to include other lithologies
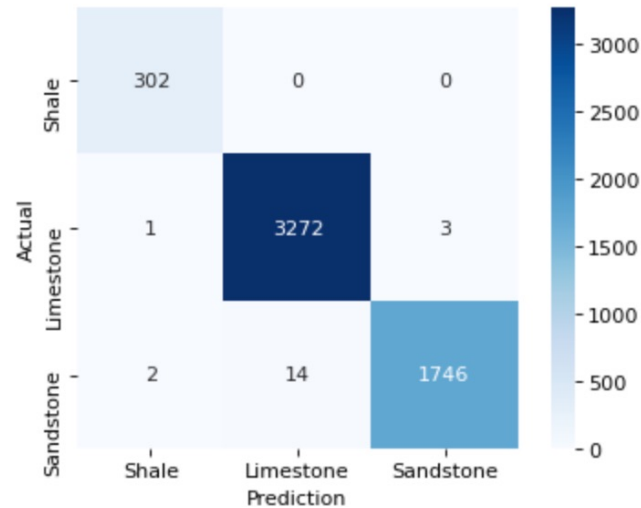
CONFUSION MATRICES

Random Forest Test

KNN Test

CONFUSION MATRICES

XGBoost Validation

XGBoost Test