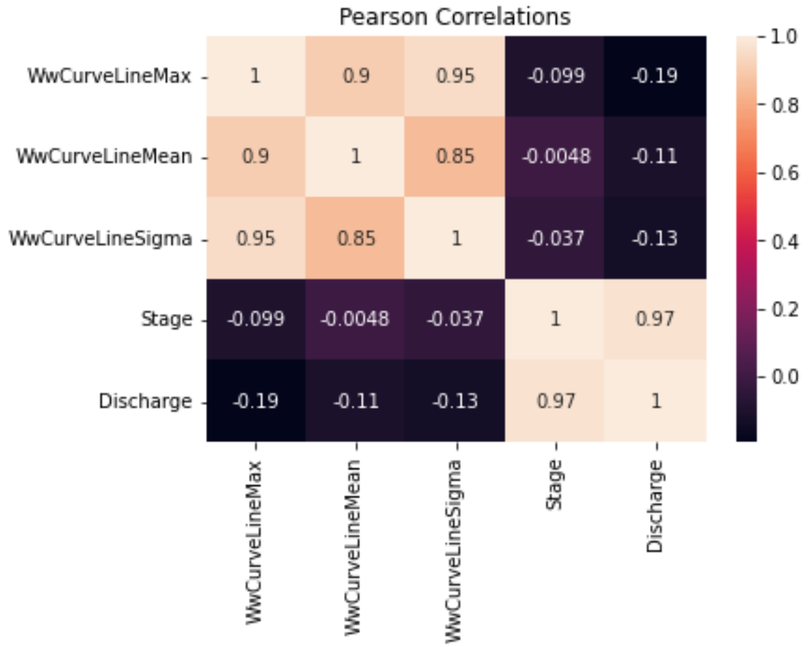
PREDICTOR OF FRESHWATER BODY VARIABLES

B. M. T. DEVELOPMENT TEAM

“

The problem is we don't understand the problem.

Paul MacCready



Understanding Data

DATA IMPORTATION AND GENERAL TESTS.

42059 rows and 59 attributes.

FINDING ATYPICAL DATA

Boxplotting selected variables in order to see how they behave

CLEANING AND TRANSFORMING

Adapt and transform variables to workable formats.

CORRELATION ANALYSIS

Detect the relationship between each of the elements of the dataset.

Pick the most important information

19 OUT OF 59 ATTRIBUTES.

Discharge

39 OUT OF 59 ATTRIBUTES.

Stage

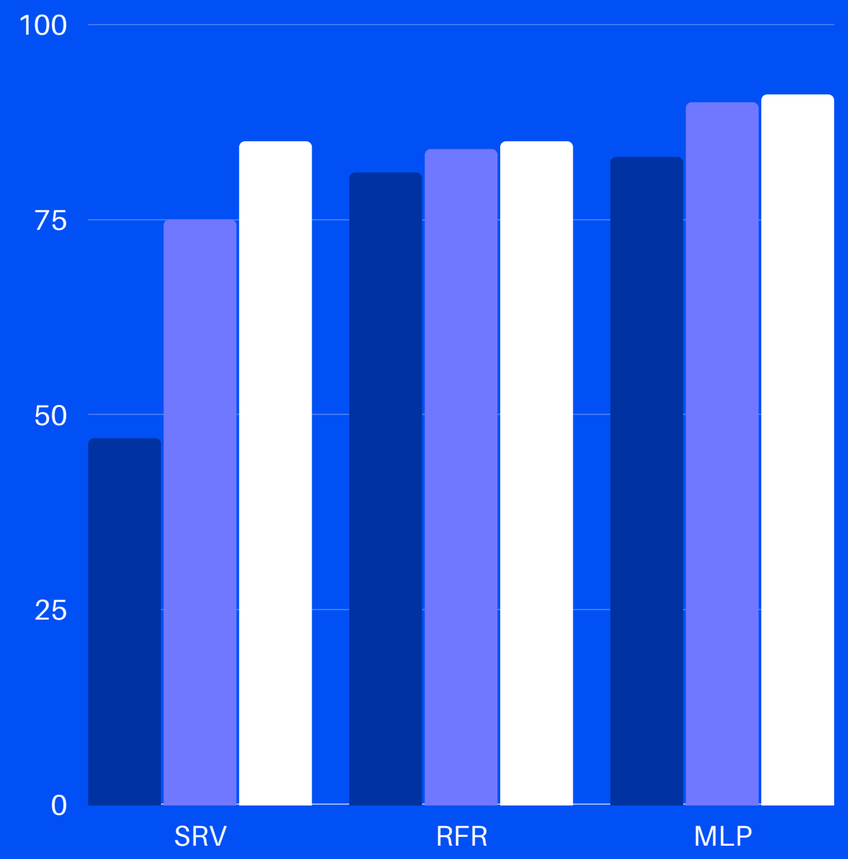
Training

Validation

Testing

Defining the best model

Analyze, compare and decide the best model for this challenge.



STAGE

PRIOR ELIMINATING THE RESIDUES

RANDOM FOREST
REGRESSION 81%

MULTILAYER PERCEPTRON
REGRESSION 84%

SUPPORT VECTOR
REGRESSION 80%

AFTER ELIMINATING THE RESIDUES

RANDOM FOREST
REGRESSION 84%

MULTILAYER PERCEPTRON
REGRESSION 85%

SUPPORT VECTOR
REGRESSION 82%

DISCHARGE

PRIOR ELIMINATING THE RESIDUES

RANDOM FOREST
REGRESSION 82%

MULTILAYER PERCEPTRON
REGRESSION 90%

SUPPORT VECTOR
REGRESSION 47%

AFTER ELIMINATING THE RESIDUES

RANDOM FOREST
REGRESSION 82%

MULTILAYER PERCEPTRON
REGRESSION 91%

SUPPORT VECTOR
REGRESSION 48%

Project Enemies

Noise

Project Enemy #1

Classification Model

1

Divide one tenth of the total number of images into correct and incorrect.

2

Train a model of correct and incorrect image classification.

3

Classify and eliminate images that are considered noisy.

Tested Models

1. VGG16
2. VGG50
3. MOBILNETV2
4. RESNET101V2

Limited Resources

Project Enemy #2

1

COLLAB WITH GPU

2

AWS CHEAPEST PLAN

3

PERSONAL COMPUTER

MobileNet101V2

The Chosen One

TOTAL PARAMS: 44,609,282
TRAINABLE PARAMS: 44,511,618
NON-TRAINABLE PARAMS: 97,664

TRAINING:
LOSS: 0.0156
ACCURACY: 0.9929

VALIDATION
LOSS: 0.5579
ACCURACY: 0.9507

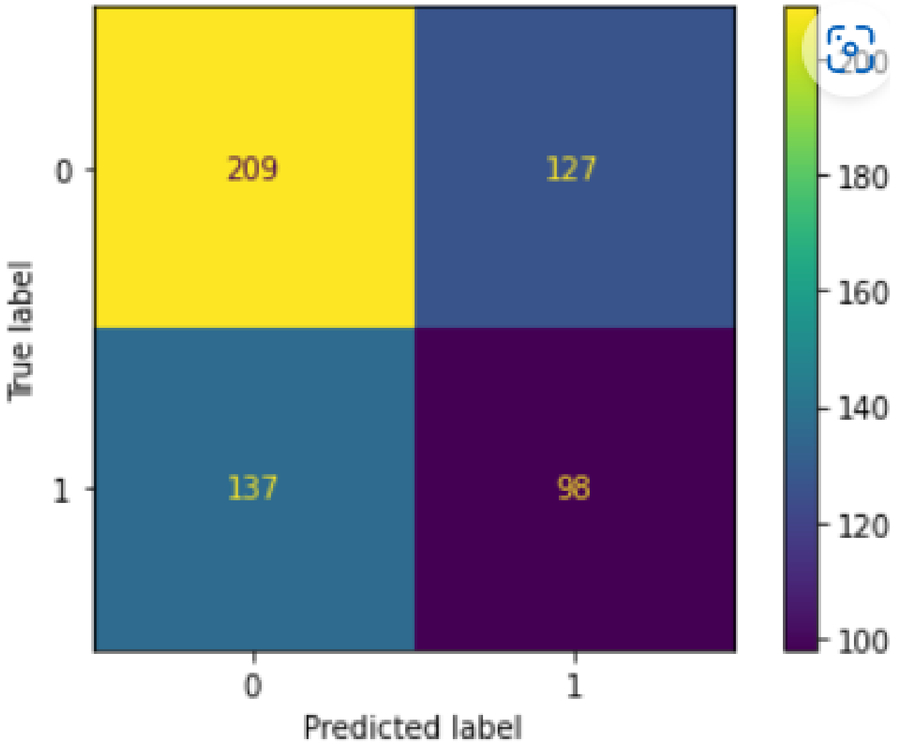
TESTING
LOSS: 0.00345
ACCURACY: 0.998

Nearby Ranges

Project Enemy #3

WHAT HAPPENS IF THE MODEL DOES NOT DECIDE BETWEEN ONE CLASS AND ANOTHER?

WHAT HAPPENS IF IT LEANS 40% TOWARDS ONE CLASS AND 60% TOWARDS ANOTHER?



0 - INCORRECT
1 - CORRECT

FINAL RESULTS

CONSECUTIVE SEASONS

DISCHARGE 92.28%

STAGE 91.01%

DIFFERENT SEASONS

DISCHARGE 91.57%

STAGE 89.40%

BMT Development Team

Thank you

Monterrey Institute of Technology