TEMPLATE

Turbidity Analysis at Island Park Reservoir

Date
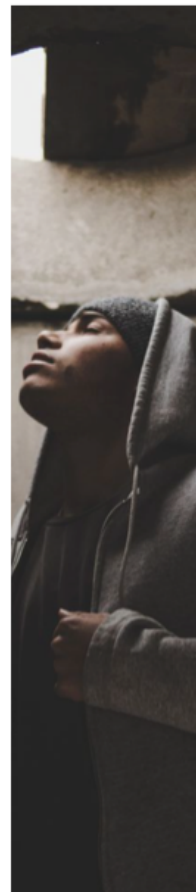
Contents
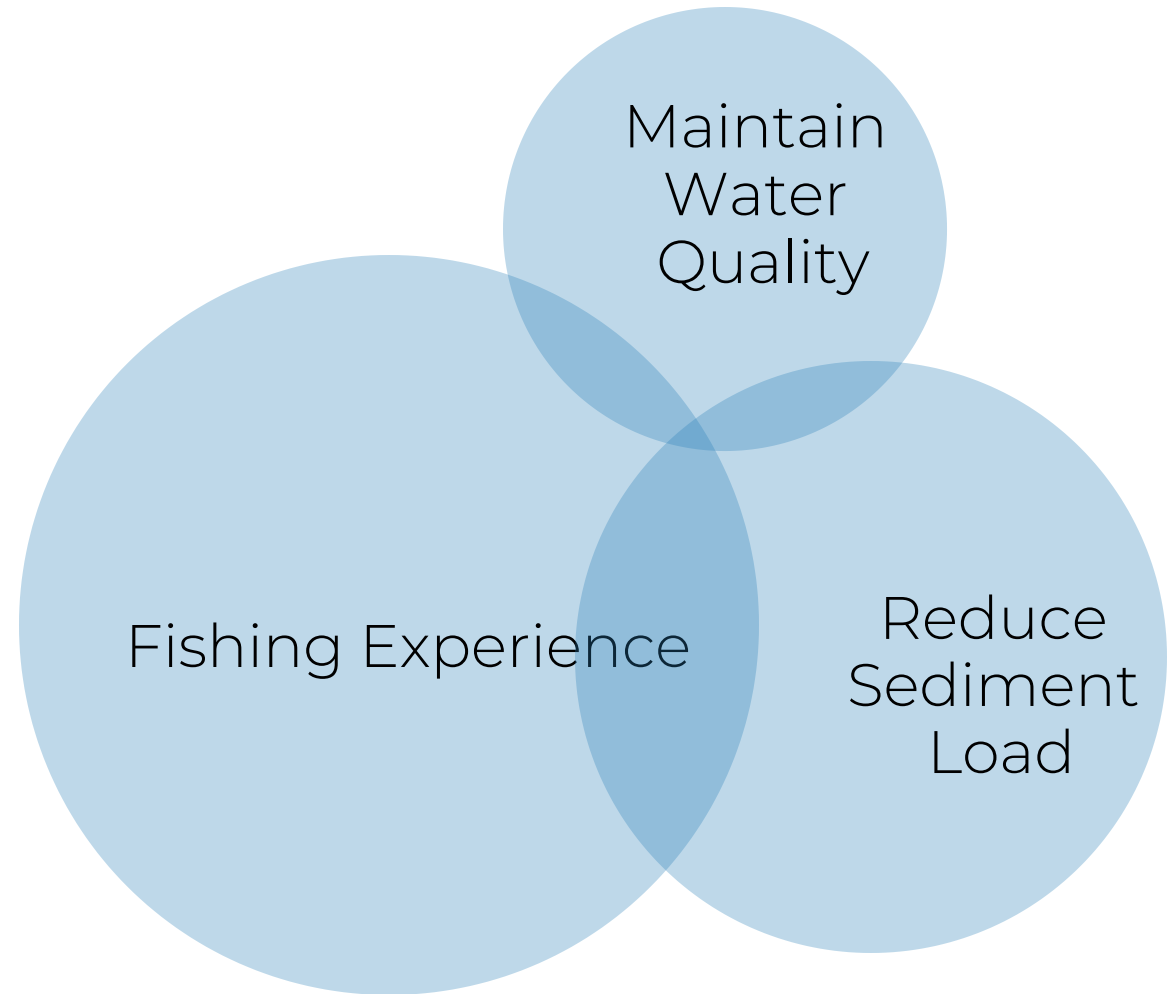
Objectives

Ensure homeostasis of existing habitats, mitigate man made changes, improve overall experience

Maintain Water Quality

Fishing Experience

Reduce Sediment Load

Ordinary Least Squares

```
                            OLS Regression Results
==============================================================================
Dep. Variable:              Turb_FNU   R-squared (uncentered):              0.819
Model:                           OLS   Adj. R-squared (uncentered):         0.815
Method:                Least Squares   F-statistic:                         269.9
Date:               Thu, 18 Aug 2022   Prob (F-statistic):               1.01e-129
Time:                       14:27:36   Log-Likelihood:                    -774.52
No. Observations:                365   AIC:                                 1561.
Df Residuals:                    359   BIC:                                 1584.
Df Model:                          6
Covariance Type:           nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Turb_FNU      -0.1053      0.044     -2.376      0.018      -0.193      -0.018
Chloro_RFU     0.2313      0.050      4.642      0.000       0.133       0.329
BGA_RFU       -0.0996      0.256     -0.390      0.697      -0.602       0.403
ODO_mgL        0.2450      0.048      5.056      0.000       0.150       0.340
Temp_C        -0.1310      0.042     -3.120      0.002      -0.214      -0.048
Cond_muSCm     0.0273      0.004      7.712      0.000       0.020       0.034
==============================================================================
Omnibus:                      27.438   Durbin-Watson:                       0.127
Prob(Omnibus):                 0.000   Jarque-Bera (JB):                   32.262
Skew:                          0.645   Prob(JB):                         9.87e-08
Kurtosis:                      3.677   Cond. No.                            323.
==============================================================================

Notes:
[1] R² is computed without centering (uncentered) since the model does not contain a constant.
[2] Standard Errors assume that the covariance matrix of the errors is correctly specified.
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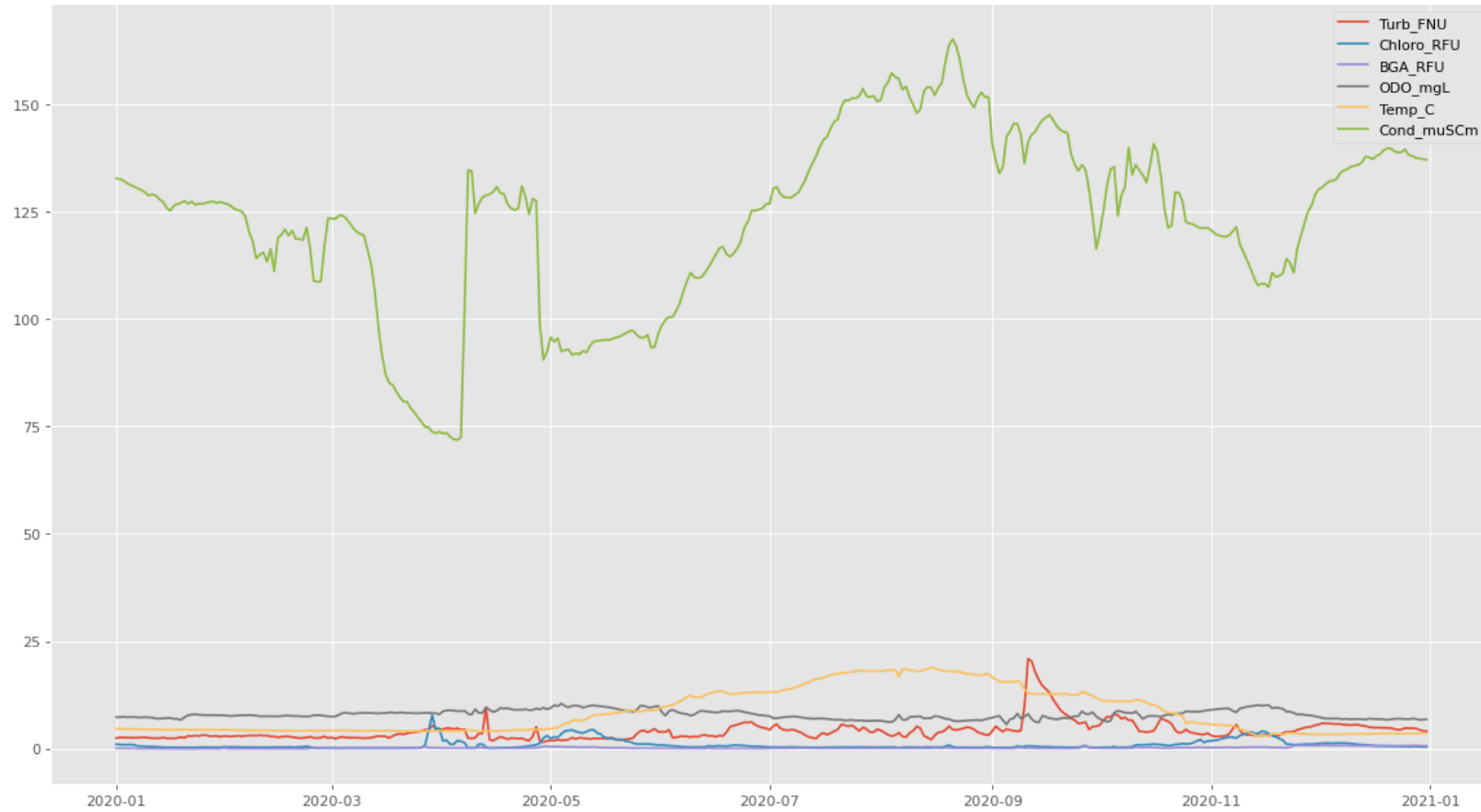
Major Points:

- 82% of the variance is captured by the provided variables
- Not all explanatory variables included
-

Sample Year

VAR Model

Vectorized AR

Forecast all values using their existing relationships

Future values

Future predictions are difficult without advanced weather data. Predicts for most typical year, where the years are getting less typical sequentially

RMSE

Turb_FNU: 3.581602

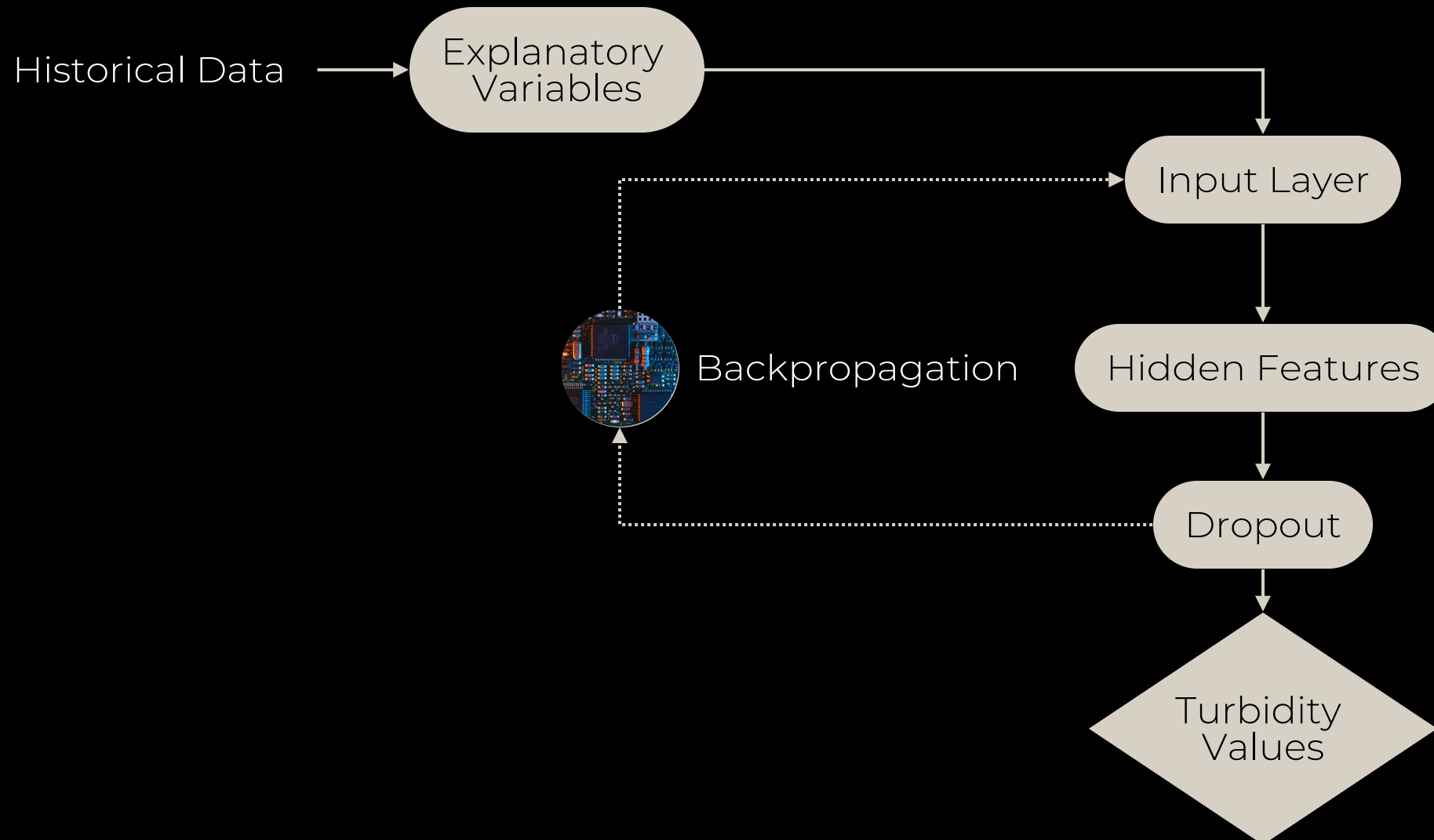Chloro_RFU: 8.776376

BGA_RFU: 3.024561

ODO_mgL: 5.760254

Temp_C: 8.339270

Cond_muSCm: 114.060146

LSTM Architecture

Historical Data → Explanatory Variables

Explanatory Variables → Input Layer

Input Layer → Hidden Features

Hidden Features → Dropout

Dropout → Turbidity Values

Backpropagation

LSTM

Predictions

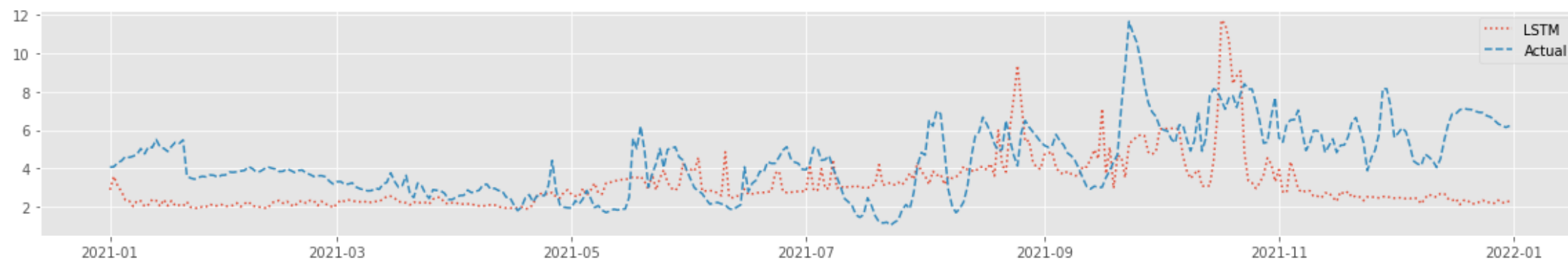Calculates rough predictions based on current data

Easily Deployable

The ML model structure makes it easy to turn this into an app or web based resource

Training Diligence

Updating the dataset will be important in order to better predict future values

LSTM Mock Up

Harrison Carter

EDUCATION

Westminster College, 2017 - BS Biology

Flatiron School, 2022 - Data Science Intensive Boot Camp

LinkedIn

GitHub