

HARRISON CARTER

Turbidity Analysis at Island Park Reservoir

8/24/2022

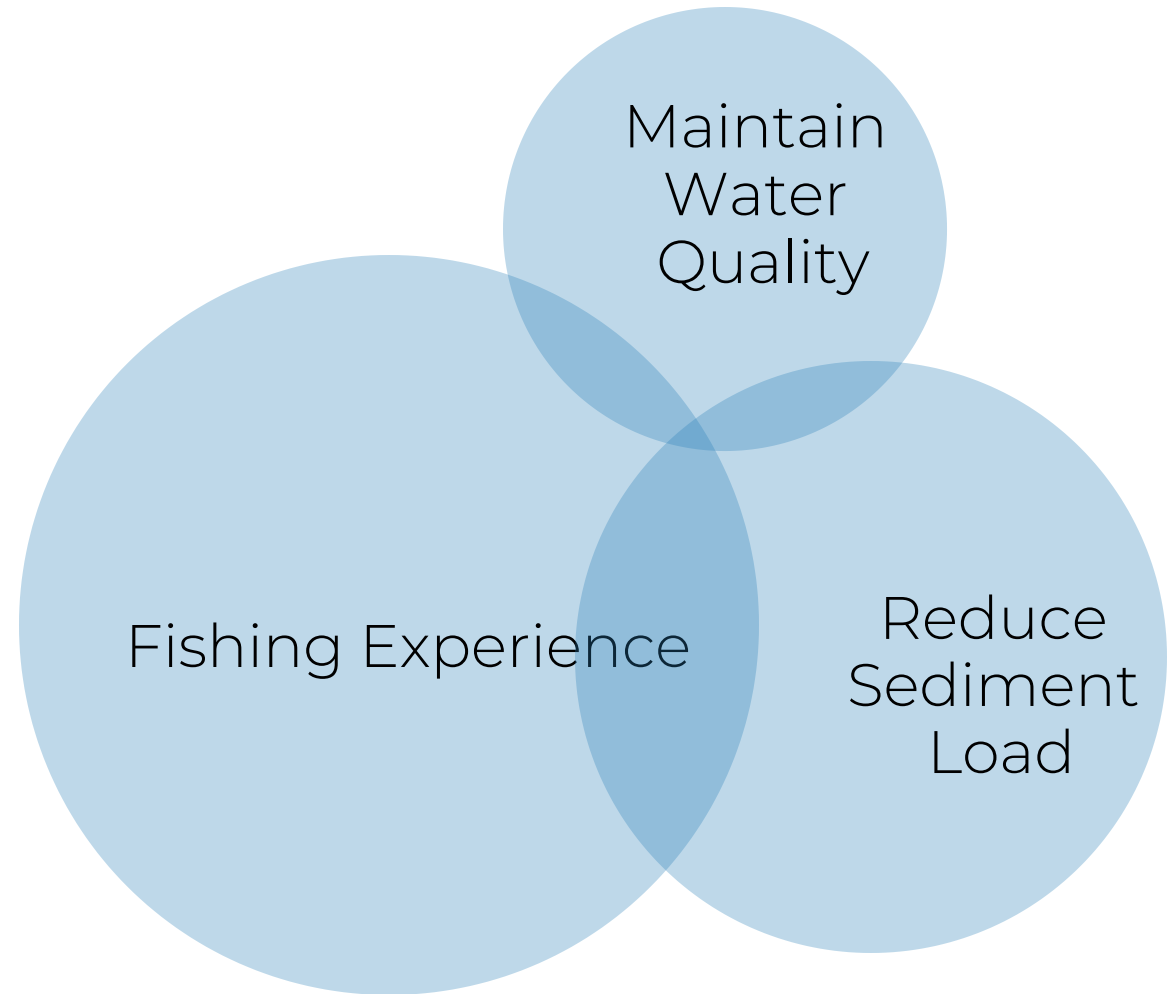


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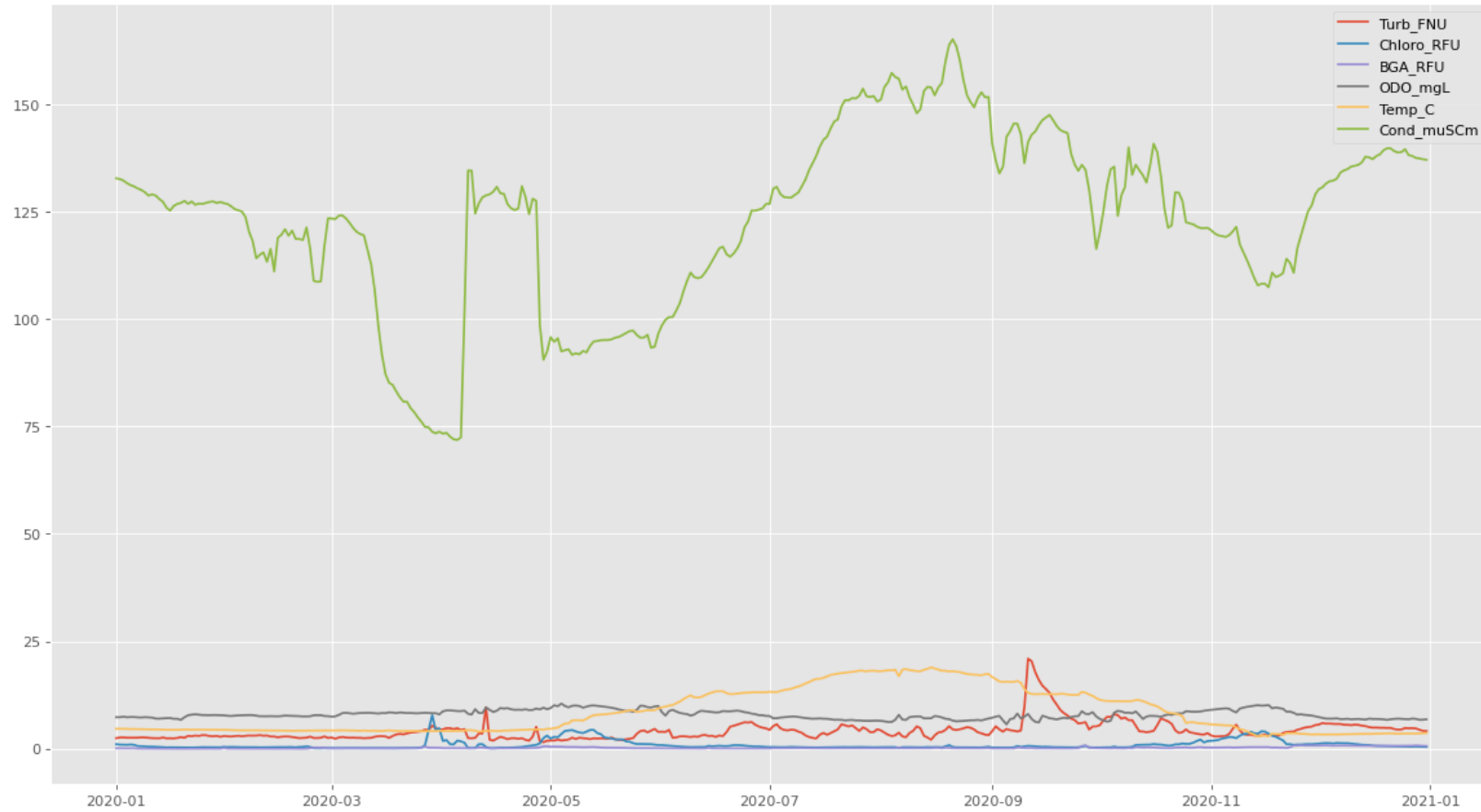
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Objectives

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



Sample Year



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] R^2 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.

Major Points:

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

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

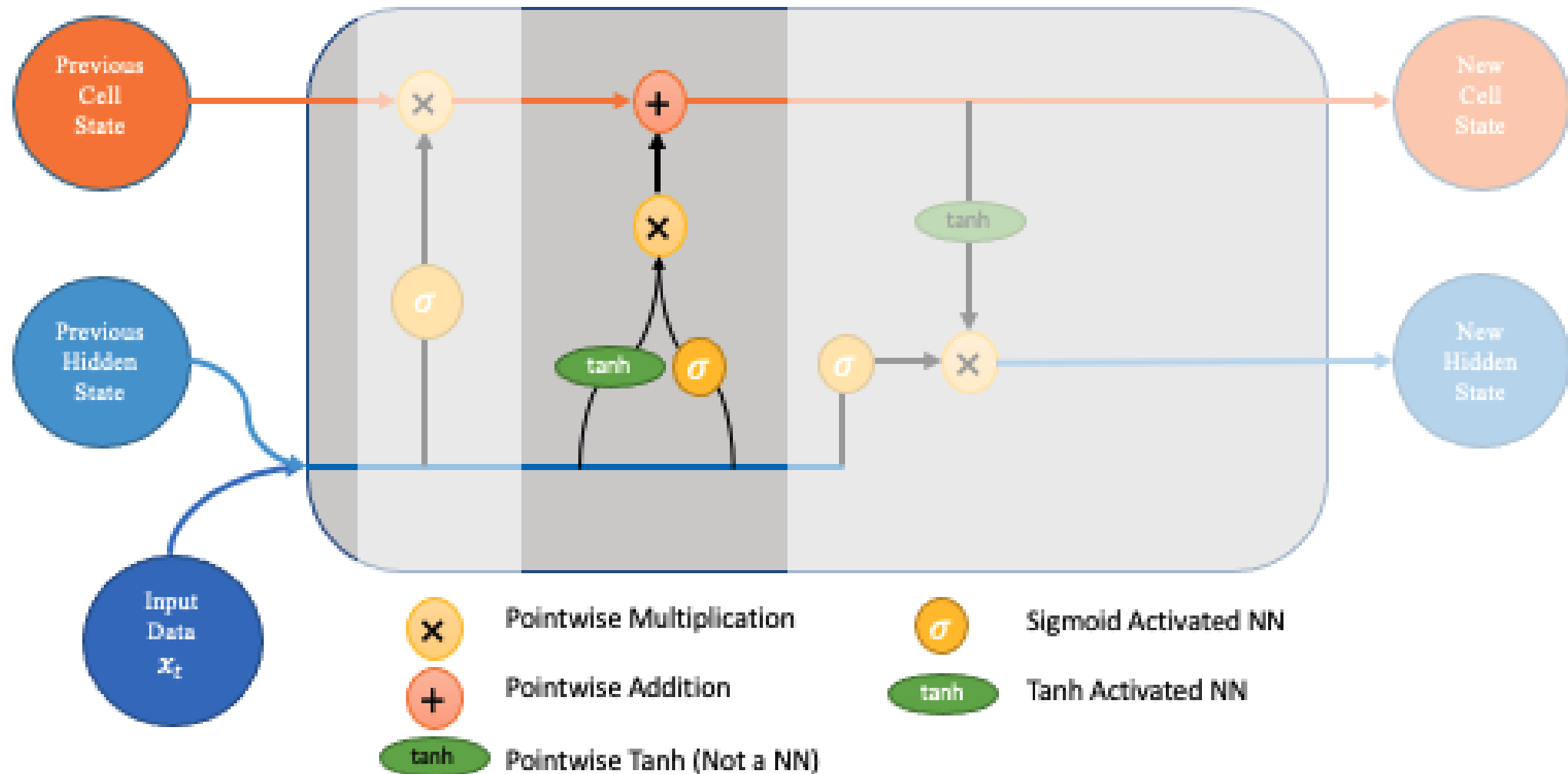
ODO_mgL:
5.760254

Temp_C:
8.339270

Cond_muSCm:
114.060146



LSTM Architecture





LSTM

Predictions

Calculates rough predictions based on current and historical data

Easily Deployable

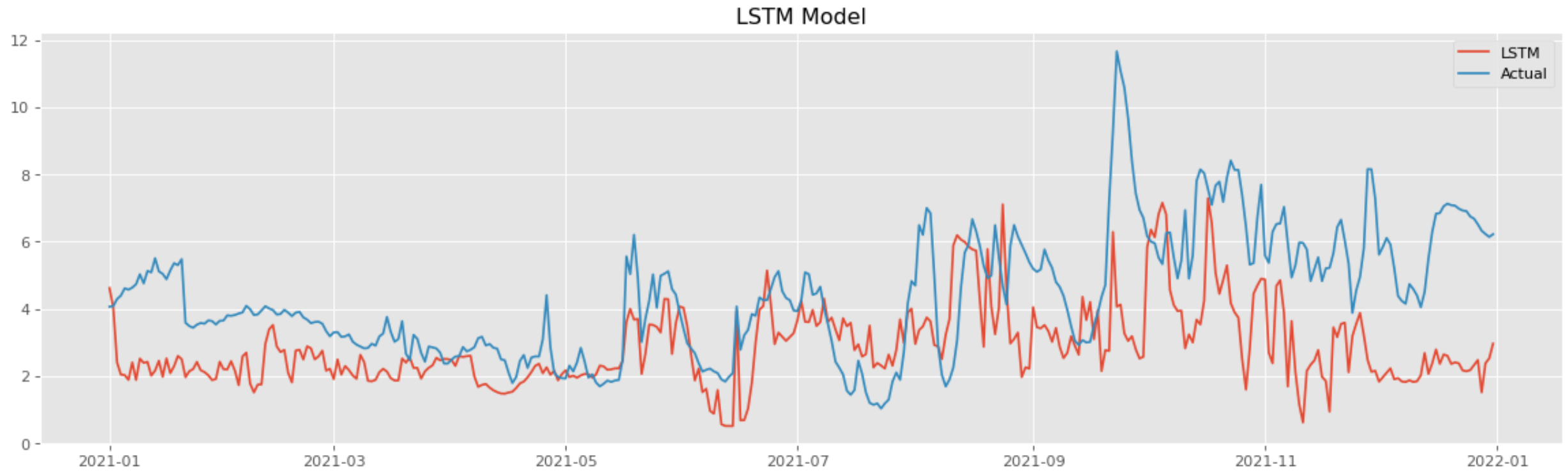
The ML model structure makes it easy to turn this into an app or web based resource

Training Diligence

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

LSTM Mock Up

RMSE: 1.23



Harrison Carter

EDUCATION

Westminster College, 2017 - BS Biology

Flatiron School, 2022 - Data Science Intensive Boot
Camp



LinkedIn



GitHub

