



## Supplementary Materials

**Table S1.** Range of input variables and their values after normalization

Input variables		Coded value (-)		
		-1	0	1
Original value	UV intensity (W/m <sup>2</sup> , X <sub>1</sub> )*	15.1	26.6	50.8
	Concentration of H <sub>2</sub> O <sub>2</sub> (mM, X <sub>2</sub> )	2	5	8
	Reaction time (min, X <sub>3</sub> )	60	120	180

\* UV intensities are measured under 1, 2, and 3 of UV lamp. Therefore, the UV intensities are not showed linear relationships with coded value

**Table S2.** Results of observed and model predicted removal of color and removal of TOC from the experimental design conditions and the additional conditions

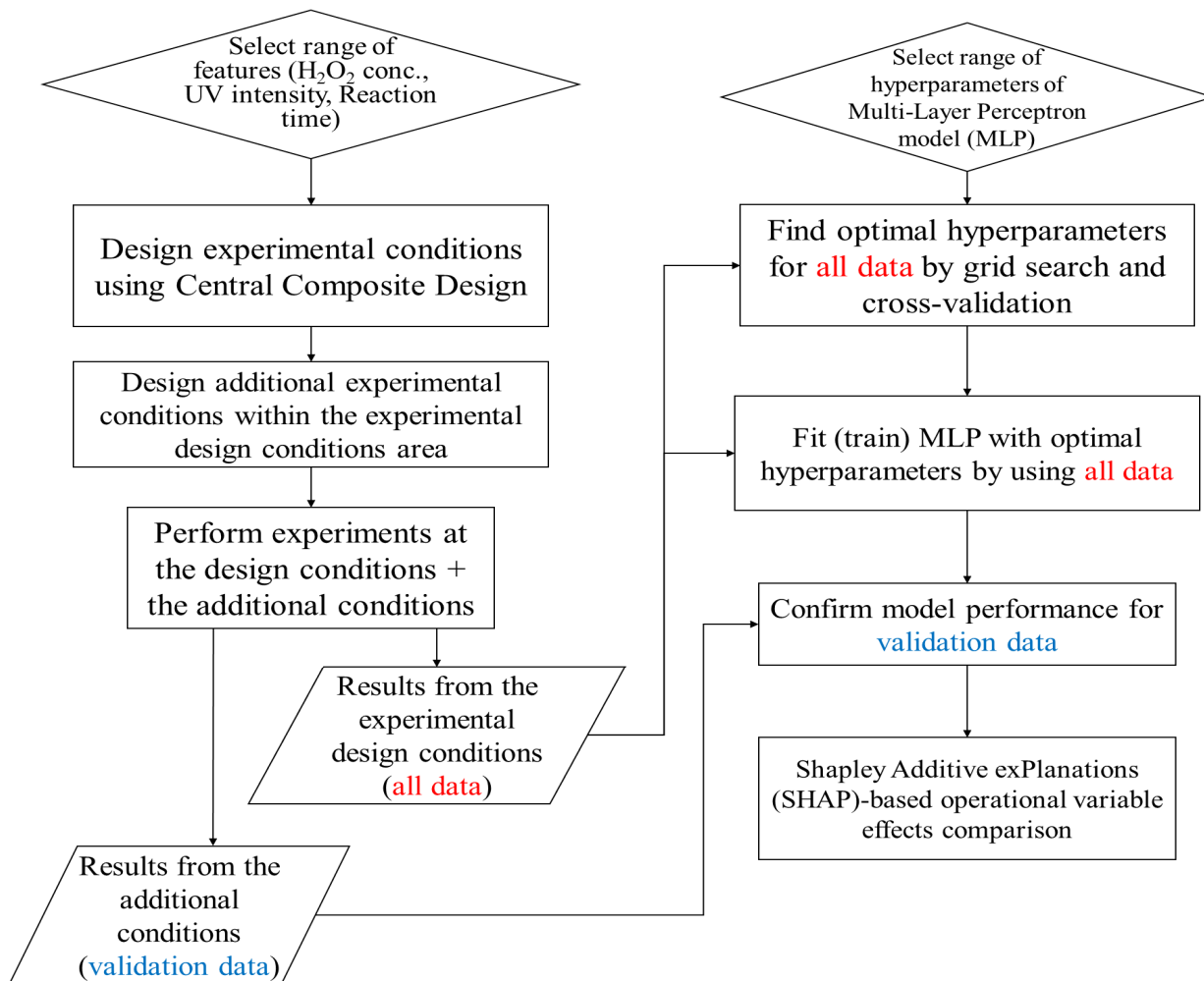
Experimental conditions				Observed and MLP predicted			
				Removal of color (-)		Removal of TOC (-)	
Ex.	Coded UV intensity, X <sub>1</sub>	Coded concentration of H <sub>2</sub> O <sub>2</sub> , X <sub>2</sub>	Coded reaction time, X <sub>3</sub>	Observed	MLP	Observed	MLP
1	-1	-1	-1	-0.238	-0.238	-0.130	0.017
2	-1	-1	1	0.282	0.285	-0.463	-0.114
3	-1	0	0	0.496	0.493	0.004	0.098
4	-1	1	-1	0.442	0.441	0.026	0.307
5	-1	1	1	0.962	0.961	0.298	0.186
6	0	-1	0	0.326	0.324	-0.254	-0.133
7	0	0	-1	0.400	0.404	-0.092	0.085
8	0	0	1	0.992	0.994	0.262	-0.049
9	0	1	0	0.951	0.952	0.323	0.173
10	1	-1	-1	-0.062	-0.062	-0.163	-0.146
11	1	-1	1	0.774	0.773	-0.453	-0.269
12	1	0	0	0.947	0.946	0.025	-0.061
13	1	1	-1	0.908	0.908	0.115	0.161
14	1	1	1	0.970	0.970	-0.627	0.028
15*	0	0	0	0.908	0.916	-0.123	0.018
				0.939		0.072	
				0.924		-0.022	
				0.893		0.156	
A1	-1	-0.9	-0.5	0.374	-0.131	0.108	-0.002
A2	0	-0.8	-0.9	0.878	-0.022	0.321	-0.043
A3	-1	-0.4	-0.1	0.959	0.258	0.257	0.045
A4	0	1	-0.4	0.980	0.938	0.340	0.199

\* Center point

A1-4 are the additional points

**Table S3.** Grid-search conditions and best hyperparameters for multi-layer perceptron model

Hyperparameters for grid-search	Best hyperparameters for removal of color prediction	Best hyperparameters for removal of TOC
'hidden_layer_sizes': [(10,), (20,), (30,)]	'hidden_layer_sizes': (30,)	'hidden_layer_sizes': (10,)
'activation': ['relu', 'logistic', 'tanh']	'activation': 'tanh'	'activation': 'logistic'
'learning_rate': ['constant', 'adaptive'],	'learning_rate': 'constant'	'learning_rate': 'constant'
'solver': ['adam', 'lbfgs', 'sgd']	'solver': 'lbfgs'	'solver': 'adam'
'alpha': [0.0001, 0.001, 0.01]	'alpha': 0.0001	'alpha': 0.0001
'max_iter': [500, 1000],	'max_iter': 500	'max_iter': 1000



**Fig. S1.** Flow chart of the application of multi-layer perceptron model to predict removal of color and TOC of actual textile wastewater using UV/H<sub>2</sub>O<sub>2</sub>.