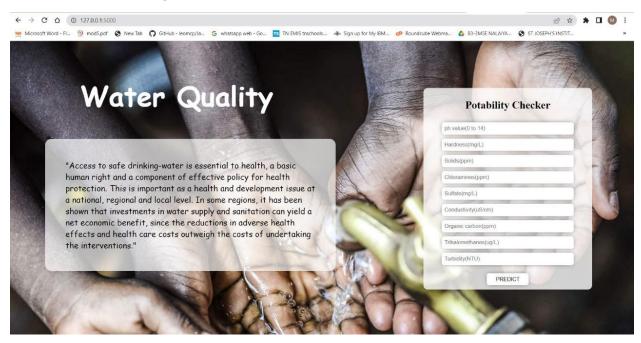
#### Project Development Phase Model Performance Test

Date	18 November 2022
Team ID	PNT2022TMID28091
Project Name	Efficient Water Quality Analysis & Prediction
	using Machine Learning
Maximum Marks	10 Marks

#### **Model Performance Testing:**

Project team shall fill the following information in model performance testing template.

#### Dashboard design



# Data Responsiveness

In [68]:	df.head()										
Out[68]:	р	n Hardne	ss :	Solids Chloran	nines Sulfa	ate Conductivi	ty Organic_carb	on Trihalometh	anes Turbidity	Potability	
	0 Na	204.8904	55 20791.3	18981 7.30	0212 368.5164	41 564.30865	54 10.3797	83 86.99	0970 2.963135	0	
	1 3.71608	129.4229	21 18630.0	57858 6.63	5246 N	aN 592.88535	59 15.1800	13 56.32	9076 4.500656	0	
	2 8.09912	4 224.2362	59 19909.5	41732 9.27	5884 N	aN 418.60621	16.8686	37 66.42	0093 3.055934	0	
	3 8.31676	6 214.3733	94 22018.4	17441 8.05	9332 356.8861	36 363.26651	18.4365	24 100.34	1674 4.628771	0	
	4 9.09222	3 181.1015	09 17978.9	86339 6.54	6600 310.1357	38 398.41081	13 11.5582	79 31.99	7993 4.075075	0	
In [69]:	df.isnull	().sum()									
Out[69]:	ph		491								
	Hardness		0								
	Solids	20	0								
	Chloramin Sulfate	es	0 781								
	Conductiv	itv	0								
		-0.00									
	Urganic c	arbon	60								
	Organic_c		0 162								
	Trihalome	thanes	162								
	Trihalome Turbidity	th <mark>ane</mark> s									
	Trihalome	thanes y	162 0								
In [70]:	Trihalome Turbidity Potabilit	thanes y t64	162 0 0	True)							
10 10	Trihalome Turbidity Potabilit dtype: in	thanes y t64 uplicates	162 0 0 (inplace=	77							
10 10	Trihalome Turbidity Potabilit dtype: in df.drop_d	thanes y t64 uplicates (how='all	162 0 0 (inplace=	77							
In [71]:	Trihalome Turbidity Potabilit dtype: in df.drop_d	thanes y t64 uplicates (how='all	162 0 0 (inplace=	77	Chloramines	Sulfate (	Conductivity Orc	anic_carbon Tr	ihalomethanes	Turbidity	Potability
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in df.drop_d	y t64  uplicates (how='all be()	162 0 0 (inplace=	e=True)	Chloramines 3276.000000		Conductivity Org	anic_carbon Ti 3276.000000		Turbidity 3276.000000	
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri	yyt64  uplicates (how='all be()  ph 55.000000 3	162 0 0 (inplace= ', inplac	e=True) Solids 3276.000000	3276.000000	2495.000000	3276.000000	3276.000000	3114.000000	3276.000000	3276.000000
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri  count 278 mean	thanes  y  t64  uplicates  (how='all  be()  ph  5.000000 : 7.080795	162 0 0 (inplace= ', inplac Hardness 276.00000 196.369496	e=True)  Solids 3276.000000 22014.092526	3276.000000 7.122277	2495.000000	3276.000000 426.205111	3276.000000 14.284970	3114.000000 66.396293	3276.000000 3.966786	3276.000000 0.390110
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri  count 278 mean std	thanes  y t64  uplicates (how='all be()  ph 5.000000 : 7.080795 1.594320	162 0 0 (inplace= ', inplac Hardness 276.000000 196.369496 32.879761	Solids 3276.000000 22014.092526 8768.570828	3276.000000 7.122277 1.583085	2495.000000 3 333.775777 41.416840	3276.000000 426.205111 80.824064	3276.000000 14.284970 3.308162	3114.000000 66.396293 16.175008	3276.000000 3.966786 0.780382	3276.000000 0.390110 0.487849
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri  count 278 mean std min	yt64  uplicates (how='all be()  ph 5.000000 3 7.080795 1.594320 0.000000	162 0 0 (inplace= ', inplac 276.00000 196.369496 32.879761 47.432000	Solids 3276.000000 22014.092526 8768.570828 320.942611	3276.000000 7.122277 1.583085 0.352000	2495.000000 3 333.775777 41.416840 129.000000	3276.000000 426.205111 80.824064 181.483754	3276.000000 14.284970 3.308162 2.200000	3114.00000 66.396293 16.175008 0.738000	3276.000000 3.966786 0.780382 1.450000	3276.000000 0.390110 0.487849 0.000000
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri  count 278 mean std min 25%	yt64  uplicates (how='all be()  ph 5.000000 3 7.080795 1.594320 0.000000 6.093092	162 0 0 (inplace= ', inplac 276.00000 196.369496 32.879761 47.432000 176.850538	Solids 3276.000000 22014.092526 8768.570828 320.942611 15666.690297	3276.000000 7.122277 1.583085 0.352000 6.127421	2495.000000 3 333.775777 41.416840 129.000000 307.699498	3276.000000 426.205111 80.824064 181.483754 365.734414	3276.000000 14.284970 3.308162 2.200000 12.065801	3114.00000 66.396293 16.175008 0.738000 55.844536	3276.000000 3.966786 0.780382 1.450000 3.439711	3276.000000 0.390110 0.487849 0.000000 0.000000
In [71]: In [72]:	Trihalome Turbidity Potabilit dtype: in  df.drop_d  df.dropna  df.descri  count 278 mean std min	thanes  y t64  uplicates (how='all be()  ph 5.000000 3 7.080795 1.594320 0.000000 6.093092 7.036752	162 0 0 (inplace= ', inplac 276.00000 196.369496 32.879761 47.432000 176.850538 196.967627	Solids 3276.000000 22014.092526 8768.570828 320.942611	3276.000000 7.122277 1.583085 0.352000	2495.000000 3 333.775777 41.416840 129.000000	3276.000000 426.205111 80.824064 181.483754	3276.000000 14.284970 3.308162 2.200000	3114.00000 66.396293 16.175008 0.738000	3276.000000 3.966786 0.780382 1.450000	3276.000000 0.390110 0.487849 0.000000

## Amount Data to Rendered (DB2 Metrics)

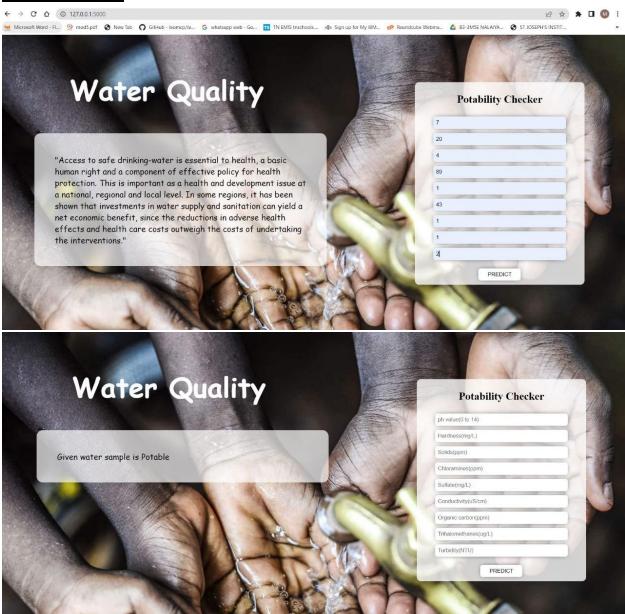
In [68]:	df head	()											
	ui .iieau	()											
Out[68]:		ph Hard	iness	Solids	Chloramin	es Sulf	ate Conductiv	ity Organic_	carbon	Trihalomethane	Turbidity	Potability	
	1 0	NaN 204.8	90455	20791.318981	7.3002	12 368.5164	41 564.3086	54 10	.379783	86.99097	2.963135	0	
	1 3.716	080 129.4	22921	18630.057858	6.6352	46 N	aN 592.8853	59 15	180013	56.32907	4.500656	0	
	2 8.099	124 224.2	36259	19909.541732	9.2758	84 N	aN 418.6062	13 16	.868637	66.42009	3.055934	0	
	3 8.316	766 214.3	73394	22018.417441	8.0593	32 356.8861	36 363.2665	16 18	.436524	100.34167	4.628771	0	
	4 9.092	223 181.1	01509	17978.986339	6.5466	00 310.1357	38 398.4108	13 11	558279	31.99799	4.075075	0	
In [69]:	df.isnu	11().sum											
Out[69]:	ph		49:	1									
	Hardnes	5		9									
	Solids Chloram	ines		9 9									
	Sulfate		78										
	Conduct	ivity		e e									
	Organic			0									
	Trihalo												
			16										
	Turbidi	ty		9									
	Turbidi Potabil	ty ity											
	Turbidi	ty ity		9									
In [70]:	Turbidi Potabil dtype:	ty ity int64	(	9	)								
10 0	Turbidi Potabil dtype: df.drop	ty ity int64 _duplica	ces(in	9	72.								
[n [71]:	Turbidi Potabil dtype: df.drop	ty ity int64 _duplicat na(how='a	ces(in	0 0 place=True	72.								
[n [71]:	Turbidi Potabil dtype: df.drop	ty ity int64 _duplicat na(how='a	ces(inp	0 0 place=True	ue)	hloramines	Sulfate	Conductivity	Organi	c_carbon Triha	omethanes	Turbidity	Potability
In [71]: In [72]:	Turbidi Potabil dtype: df.drop df.drop	ty ity int64 _duplicat na(how='a	ces(inpall', :	0 0 place=True inplace=Tr	ue) Solids C			Conductivity 3276.000000	455	100			Potability 3276.000000
In [71]: In [72]:	Turbidi Potabil dtype: df.drop df.drop	ty ity int64 _duplicat na(how='a	Ha 3276.	place=True inplace=Tr rdness	ue) Solids C			73	327	100			
10 -00	Turbidi Potabil dtype: df.drop df.drop	ty ity int64 _duplicat na(how='a ribe() ph	Ha 3276.	place=True inplace=Tr rdness 000000 32 369496 220	Solids C	276.000000	2495.000000	3276.000000	327 1	76.000000	114.000000	3276.000000	3276.000000 0.390110
In [71]: In [72]:	Turbidi Potabil dtype: df.drop df.drop df.desc	tty ity int64 _duplicat na(how='a ribe() _ph 2785.000000 7.080795	Ha 3276.	place=True inplace=Tr rdness 000000 32 369496 220 879761 87	Solids C	276.000000 7.122277	2495.000000 333.775777	3276.000000 426.205111	<b>32</b> 7	76.000000 3 14.284970	114.0 <mark>0</mark> 0000 66.396293	3276.000000 3.966786	3276.000000 0.390110
In [71]: In [72]:	Turbidi Potabil dtype: df.drop df.drop df.desc	ty ity int64 _duplicat na(how='a ribe() ph 2785.000000 7.080798 1.594320	Ha 3276. 196. 32. 47.	place=True inplace=Tr rdness 0000000 32 3369496 220 879761 87 432000 3	Solids C 76.000000 3 14.092526 88.570828	276.000000 7.122277 1.583085	2495.000000 333.775777 41.416840	3276.000000 426.205111 80.824064	327	76.000000 3 14.284970 3.308162	114.000000 66.396293 16.175008	3276.000000 3.966786 0.780382	3276.000000 0.390110 0.487849
In [71]: In [72]:	Turbidi Potabil dtype: df.drop df.drop df.desc	ty ity int64 _duplicat na(how='a ribe() ph 2785.000000 7.080795 1.594320 0.0000000	Ha 3276. 196. 32. 47.	place=True inplace=Tr rdness 0000000 32 3369496 220 879761 87 432000 3	Solids C 6.000000 3 14.092526 88.570828 20.942611 66.690297	276.000000 7.122277 1.583085 0.352000	2495.000000 333.775777 41.416840 129.000000	3276.000000 426.205111 80.824064 181.483754	327	76.000000 3 14.284970 3.308162 2.200000	114.000000 66.396293 16.175008 0.738000	3276.000000 3.966786 0.780382 1.450000	3276.000000 0.390110 0.487849 0.000000
n [71]: n [72]:	Turbidi Potabil dtype: df.drop df.drop df.desc count 2 mean std min 25%	ty ity int64 _duplicat na(how='a ribe() ph 2785.000000 7.080795 0.000000 6.093092	Ha 3276. 196. 176. 196.	place=True	Solids C 6.000000 3 14.092526 88.570828 20.942611 66.690297	276.000000 7.122277 1.583085 0.352000 6.127421	2495.000000 333.775777 41.416840 129.000000 307.699498	3276.000000 426.205111 80.824064 181.483754 365.734414	327 1	76.000000 3 14.284970 3.308162 2.200000 12.065801	114.000000 66.396293 16.175008 0.738000 55.844536	3276.000000 3.966786 0.780382 1.450000 3.439711	3276.000000 0.390110 0.487849 0.000000 0.000000 0.000000

#### **Utilization of Data Filters**

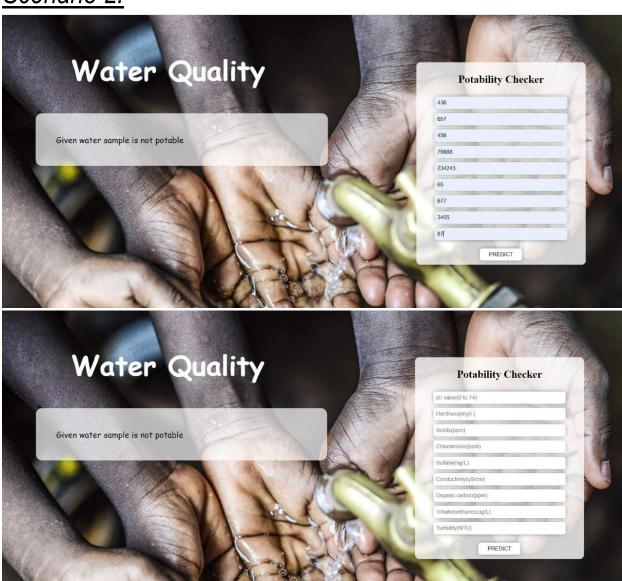
	10.1	123											
In [68]:	dT.head	1()											
Out[68]:		ph Ha	rdness	Soli	is Chloram	ines Sul	ate Conductiv	ity Organic_	carbon	Trihalomethane	Turbidity	Potability	
	0	NaN 204.	390455	20791.3189	1 7.300	212 368.516	441 564.3086	54 10.	379783	86.99097	2.963135	0	
	1 3.71	6080 129.	122921	18630.0578	8 6.635	5246 N	IaN 592.8853	59 15.	180013	56.32907	4.500656	0	
	2 8.09	9124 224.	236259	19909.5417	9.275	i884 N	IaN 418.6062	13 16.	868637	66.42009	3.055934	0	
	3 8.31	6766 214.	373394	22018.4174	1 8.059	356.886	136 363.2665	16 18.	436524	100.34167	4.628771	0	
	4 9.09	2223 181.	101509	17978.9863	9 6.546	6600 310.135	738 398.4108	13 11.	558279	31.99799	4.075075	0	
In [69]:	df.isn	ull().sum	1()										
Out[69]:	ph		49	91									
15 78	Hardne	55		0									
	Solids Chlora	nines		0									
	Sulfate		7	81									
	Conduc	ivity		0									
	Organi	_carbon		0									
	Organi Trihal	_carbon omethanes	10	0 62									
	Organi Trihal Turbid	_carbon omethanes ity	. 1	0 62 0									
	Organi Trihal Turbid Potabi	carbon methanes ity lity	; 10	0 62									
	Organi Trihal Turbid	carbon methanes ity lity	: 10	0 62 0									
In [70]:	Organi Trihal Turbid Potabi dtype:	carbon omethanes ity lity int64		0 62 0	e)								
10 0	Organio Trihalo Turbid Potabi dtype: df.dro	c_carbon omethanes lty lity int64 o_duplica	ıtes(i	0 62 0 0	7/								
In [71]:	Organi Trihal Turbid Potabi dtype: df.dro	c_carbon methanes ity lity int64 o_duplica ona(how='	ıtes(i	0 62 0 0 nplace=Tru	7/								
[n [71]:	Organi Trihal Turbid Potabi dtype: df.dro	c_carbon omethanes tty lity int64 o_duplica ona(how='	ates(in	0 62 0 0 nplace=Tru	rue)	Chloramines	Sulfate	Conductivity	Organic	c_carbon Trihal	omethanes	Turbidity	Potability
In [71]: In [72]:	Organi Trihald Turbid Potabi dtype: df.dro df.dro	c_carbon omethanes tty lity int64 o_duplica ona(how='	tes(intes(intes))	0 62 0 0 nplace=Tre inplace=1	rue) Solids			Conductivity 3276.000000	450	(A)			Potability 3276.000000
In [71]: In [72]:	Organi Trihald Turbid Potabi dtype: df.dro df.dro	carbon methanes tty lity int64  o_duplica ona(how='	h H H 0 3276	0 62 0 0 nplace=Tru inplace=1	rue) Solids				327	(A)			
10 0	Organi Trihal Turbid Potabi dtype: df.dro df.dro	carbon methanes ity lity int64  o_duplica ona(how=' cribe()	h H H 0 3276	0 62 62 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Solids 276.000000	3276.000000	2495.000000	3276.000000	327	6.000000 3	114.000000	3276.000000	3276.000000
In [71]: In [72]:	Organi Trihal Turbid Potabi dtype: df.dro df.dro df.des	carbon methanes tity tity int64 p_duplica cna(how=' cribe() p_ 2785.00000 7.08078	h H 0 3276 5 196	0 62 62 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Solids 276.000000 014.092526	3276.000000 7.122277	2495.000000 333.775777	3276.000000 426.205111	327 1	6.000000 3 4.284970	114.000000 66.396293	3276.000000 3.966786	3276.000000 0.390110
In [71]: In [72]:	Organi Trihal Turbid Potabi dtype:  df.dro  df.dro  df.desc  count mean std	carbon methanes tity int64 p_duplica cna(how=' cribe() p_2785.00000 7.08078 1.59432	h H 0 3276 5 196 0 32 0 47	0 62 62 60 60 62 60 60 60 60 60 60 60 60 60 60 60 60 60	Solids 276.000000 014.092526 768.570828	3276.000000 7.122277 1.583085	2495.000000 333.775777 41.416840	3276.000000 426.205111 80.824064	327	6.000000 3 4.284970 3.308162	114.000000 66.396293 16.175008	3276.000000 3.966786 0.780382	3276.000000 0.390110 0.487849
In [71]: In [72]:	Organi Trihal Turbid Potabi dtype:  df.dro  df.dro  df.des  count mean std min	carbon methanes tribe()  p_duplica ona(how='cribe()  2785.00000  7.08079  1.59432	h H H 00 32765 1965 1960 4702 1760	0 62 62 60 60 62 60 60 60 60 60 60 60 60 60 60 60 60 60	Solids 276.000000 014.092526 768.570828 320.942611 566.690297	3276.000000 7.122277 1.583085 0.352000	2495.000000 333.775777 41.416840 129.000000	3276.000000 426.205111 80.824064 181.483754	327	6.000000 3 4.284970 3.308162 2.200000	114.000000 66.396293 16.175008 0.738000	3276.000000 3.966786 0.780382 1.450000	3276.000000 0.390110 0.487849 0.000000

## **Effective User Story**

#### Scenario 1:



## Scenario 2:



# **Descriptive Reports:**

