

Using Plumber to Expose Models in Excel

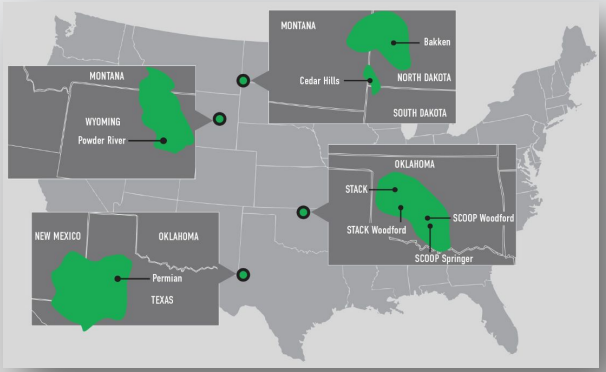
Ryan Klein

Principal Data Scientist, Continental Resources

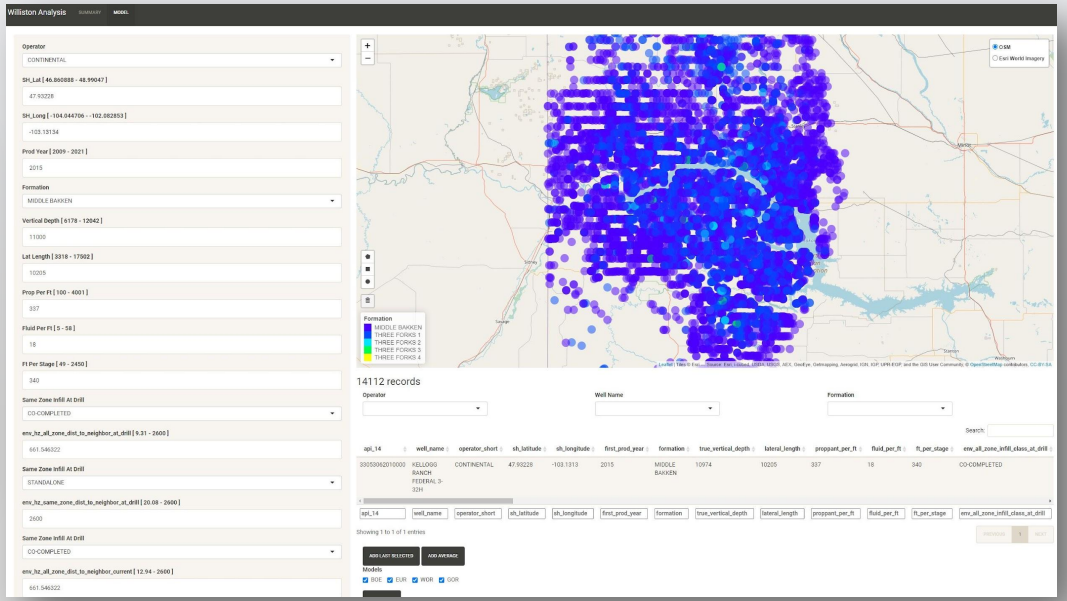
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Use Case – Continental Resources

- ~6K wells
- $8MM gross per well
- ShinyR interface: 50 input fields
- Need to test multiple setups of a site



ShinyR



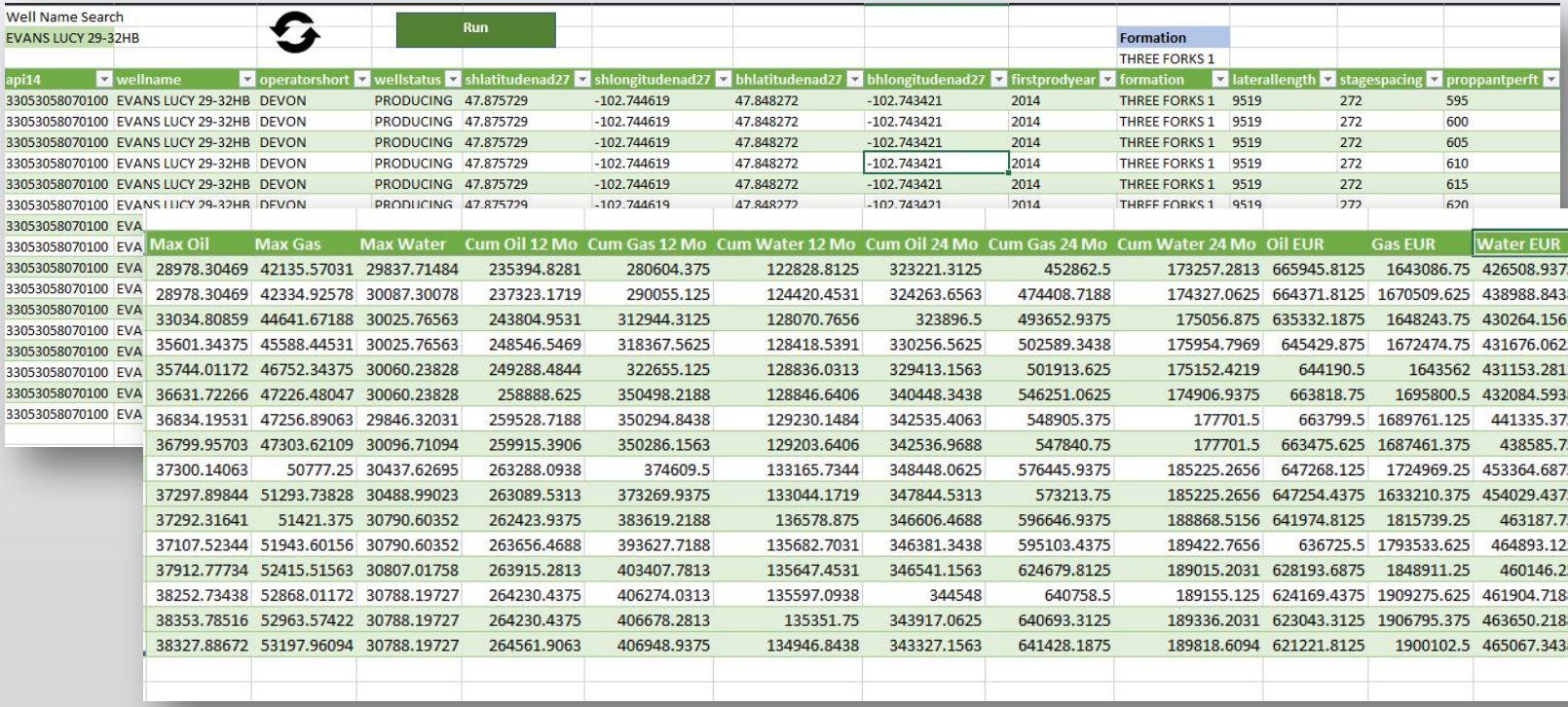
The Solution

- EXCEL!
  - Everyone (or mostly everyone) knows Excel
  - Most widely used BI tool in existence
  - Built-in functionality
  - Meet the customer where they are
- Allows for further financial analysis
- Formatted for proposal submissions



^
(and python)

The Outcome



Well Name Search: EVANS LUCY 29-32HB

Run

Formation: THREE FORKS 1

api14	wellname	operatorshort	wellstatus	shlatitudenad27	shlongitudenad27	bhlatitudenad27	bhlongitudenad27	firstprodyear	formation	laterallength	stagespacing	proppantperft
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	595
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	600
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	605
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	610
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	615
33053058070100	EVANS LUCY 29-32HB	DEVON	PRODUCING	47.875729	-102.744619	47.848272	-102.743421	2014	THREE FORKS 1	9519	272	620
33053058070100	EVA											
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33053058070100	EVA											
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Max Oil	Max Gas	Max Water	Cum Oil 12 Mo	Cum Gas 12 Mo	Cum Water 12 Mo	Cum Oil 24 Mo	Cum Gas 24 Mo	Cum Water 24 Mo	Oil EUR	Gas EUR	Water EUR	Outlier Score
28978.30469	42135.57031	29837.71484	235394.8281	280604.375	122828.8125	323221.3125	452862.5	173257.2813	665945.8125	1643086.75	426508.9375	0.0231144317151568
28978.30469	42334.92578	30087.30078	237323.1719	290055.125	124420.4531	324263.6563	474408.7188	174327.0625	664371.8125	1670509.625	438988.8438	0.0233607620435489
33034.80859	44641.67188	30025.76563	243804.9531	312944.3125	128070.7656	323896.5	493652.9375	175056.875	635332.1875	1648243.75	430264.1563	0.0233607620435489
35601.34375	45588.44531	30025.76563	248546.5469	318367.5625	128418.5391	330256.5625	502589.3438	175954.7969	645429.875	1672474.75	431676.0625	0.0232702232062054
35744.01172	46752.34375	30060.23828	249288.4844	322655.125	128836.0313	329413.1563	501913.625	175152.4219	644190.5	1643562	431153.2813	0.0232899911075472
36631.72266	47226.48047	30060.23828	258888.625	350498.2188	128846.6406	340448.3438	546251.0625	174906.9375	663818.75	1695800.5	432084.5938	0.0232899911075472
36834.19531	47256.89063	29846.32031	259528.7188	350294.8438	129230.1484	342535.4063	548905.375	177701.5	663799.5	1689761.125	441335.375	0.0232899911075472
36799.95703	47303.62109	30096.71094	259915.3906	350286.1563	129203.6406	342536.9688	547840.75	177701.5	663475.625	1687461.375	438585.75	0.02333027500696
37300.14063	50777.25	30437.62695	263288.0938	374609.5	133165.7344	348448.0625	576445.9375	185225.2656	647268.125	1724969.25	453364.6875	0.0229882166913618
37297.89844	51293.73828	30488.99023	263089.5313	373269.9375	133044.1719	347844.5313	573213.75	185225.2656	647254.4375	1633210.375	454029.4375	0.0230633343974788
37292.31641	51421.375	30790.60352	262423.9375	383619.2188	136578.875	346606.4688	596646.9375	188868.5156	641974.8125	1815739.25	463187.75	0.0230633343974788
37107.52344	51943.60156	30790.60352	263656.4688	393627.7188	135682.7031	346381.3438	595103.4375	189422.7656	636725.5	1793533.625	464893.125	0.0230633343974788
37912.77734	52415.51563	30807.01758	263915.2813	403407.7813	135647.4531	346541.1563	624679.8125	189015.2031	628193.6875	1848911.25	460146.25	0.024698005169598
38252.73438	52868.01172	30788.19727	264230.4375	406274.0313	135597.0938	344548	640758.5	189155.125	624169.4375	1909275.625	461904.7188	0.0245600321153773
38353.78516	52963.57422	30788.19727	264230.4375	406678.2813	135351.75	343917.0625	640693.3125	189336.2031	623043.3125	1906795.375	463650.2188	0.0240213041581634
38327.88672	53197.96094	30788.19727	264561.9063	406948.9375	134946.8438	343327.1563	641428.1875	189818.6094	621221.8125	1900102.5	465067.3438	0.0239939666772329

To the demo…

Excel Editor

```
let
house_age_Col = Excel.CurrentWorkbook(){[Name="house_age"]}[Content]{0}[Column1],
distance_to_train_Col = Excel.CurrentWorkbook(){[Name="distance_to_train"]}[Content]{0}[Column1],
num_of_conv_store_Col = Excel.CurrentWorkbook(){[Name="num_of_conv_store"]}[Content]{0}[Column1],
latitude_Col = Excel.CurrentWorkbook(){[Name="latitude"]}[Content]{0}[Column1],
longitude_Col = Excel.CurrentWorkbook(){[Name="longitude"]}[Content]{0}[Column1],
 Source = Json.Document(Web.Contents("http://127.0.0.1:8000/echo?house_age=" & house_age_Col &
"&distance_to_train=" & distance_to_train_Col &
"&num_of_conv_store=" & num_of_conv_store_Col &
"&latitude=" & latitude_Col &
"&longitude=" & longitude_Col& "")),
    #"Converted to Table" = Table.FromList(Source, Splitter.SplitTextByDelimiter(":"), null, null, ExtraValues.Error),
    #"Changed Type" = Table.TransformColumnTypes(#"Converted to Table",{{"Column1", type number}, {"Column2", type number}}),
    #"Renamed Columns" = Table.RenameColumns(#"Changed Type",{{"Column1", "Prediction"}, {"Column2", "Outlier_Score"}})
in
    #"Renamed Columns"
```

Gotchas

- Power Query limit of approx. 2000 characters
  - May have to perform in batches, depending on columns
- Ensure port is standardized
  - pr(“..\\plumber.R") %>% pr_run(port=8000)

THANKS!

Run

house_age	distance_to_train	num_of_conv_store	latitude	longitude
3	339.2289	1	24.97519	121.53151
5	55	2	24.97886	121.53464
7	187	2	24.94898	121.49621
8	289.3248	5	24.98203	121.54348
9	1735.595	2	24.96464	121.51623
10	329.9747	9	24.98254	121.54395
12.7	339.2289	1	24.97519	121.53151
1.5	23.38284	7	24.96772	121.54102
14.1	2615.465	0	24.95495	121.56174
31.4	1446	3	24.97285	121.5173
11.5	1360.139	1	24.95204	121.54842
29.3	529.7771	8	24.98102	121.53655
12.9	250.631	7	24.96606	121.54297
13	492.2313	5	24.96515	121.53737
50	208.3905	6	24.95618	121.53844

Run

house_age	distance_to_train	num_of_conv_store	latitude	longitude	Prediction	Outlier_Score
3	339.2289	1	24.97519	121.53151	45.73355532	0.22917563
5	55	2	24.97886	121.53464	48.83961759	0.263286135
7	187	2	24.94898	121.49621	32.82226885	0.597003014
8	289.3248	5	24.98203	121.54348	52.72958323	0.066233608
9	1735.595	2	24.96464	121.51623	27.50027292	0.171047376
10	329.9747	9	24.98254	121.54395	51.38113154	0.235633924
12.7	339.2289	1	24.97519	121.53151	35.9612225	0.131741185
1.5	23.38284	7	24.96772	121.54102	48.98887696	0.185202877
14.1	2615.465	0	24.95495	121.56174	23.31355502	0.598907007
31.4	1446	3	24.97285	121.5173	24.71113979	0.283772795
11.5	1360.139	1	24.95204	121.54842	28.02470503	0.20680038
29.3	529.7771	8	24.98102	121.53655	39.90178798	0.158345262
12.9	250.631	7	24.96606	121.54297	42.00972234	0.068759922
13	492.2313	5	24.96515	121.53737	40.49407227	0.024302274
50	208.3905	6	24.95618	121.53844	38.77407338	0.548354508

	A	B	C	D	E	F	G	H
	Run							
	house_age	distance_to_train	num_of_conv_store	latitude	longitude	Prediction	Outlier_Score	
	3	100	2	24.97519	121.53151	48.59672176	0.248354697	
	3	75	2	24.97886	121.53464	48.95584581	0.274561595	
	3	50	2	24.94898	121.49621	34.7863815	0.613393111	
	8	289.3248	5	24.98203	121.54348	52.72958323	0.066233608	
	9	1735.595	2	24.96464	121.51623	27.50027292	0.171047376	
	10	329.9747	9	24.98254	121.54395	51.38113154	0.235633924	
	12.7	339.2289	1	24.97519	121.53151	35.9612225	0.131741185	
	1.5	23.38284	7	24.96772	121.54102	48.98887696	0.185202877	
	14.1	2615.465	0	24.95495	121.56174	23.31355502	0.598907007	
	31.4	1446	3	24.97285	121.5173	24.71113979	0.283772795	
	11.5	1360.139	1	24.95204	121.54842	28.02470503	0.20680038	
	29.3	529.7771	8	24.98102	121.53655	39.90178798	0.158345262	
	12.9	250.631	7	24.96606	121.54297	42.00972234	0.068759922	
	13	492.2313	5	24.96515	121.53737	40.49407227	0.024302274	
	50	208.3905	6	24.95618	121.53844	38.77407338	0.548354508	