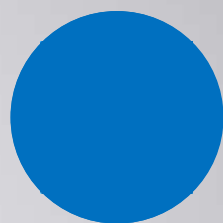


# How Does the United Way Choose its Locations?

Ben Harwood, Kevin Vogel, Kyle Wass, Nina Williams

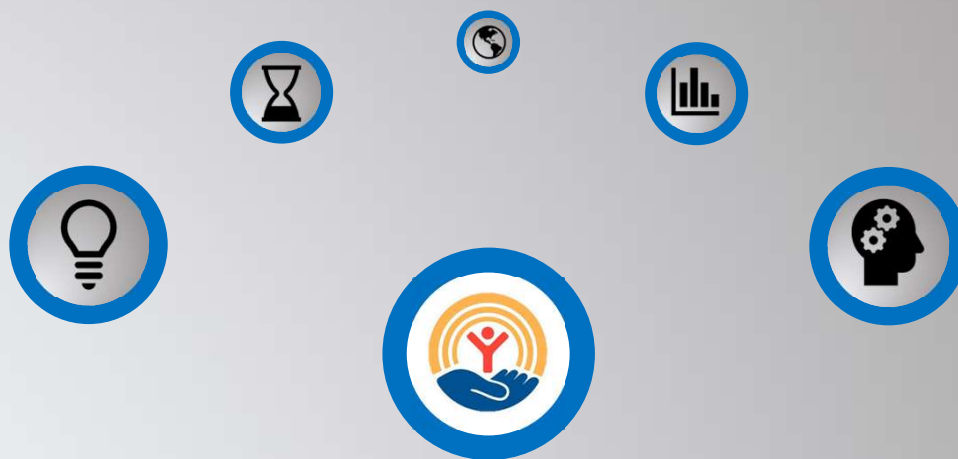


# Agenda





# Agenda



## The United Way

Who they are, what they do, and how they operate.



# Agenda

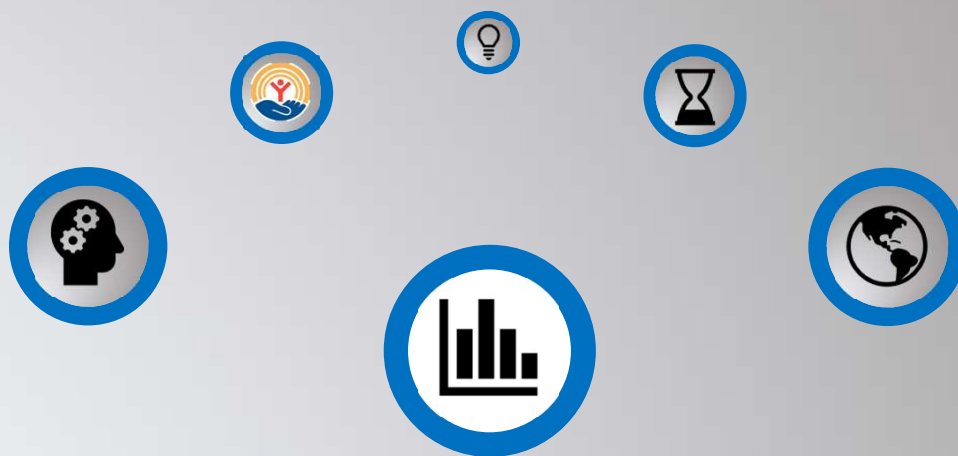


## The Big Idea

What's the study about?



# Agenda

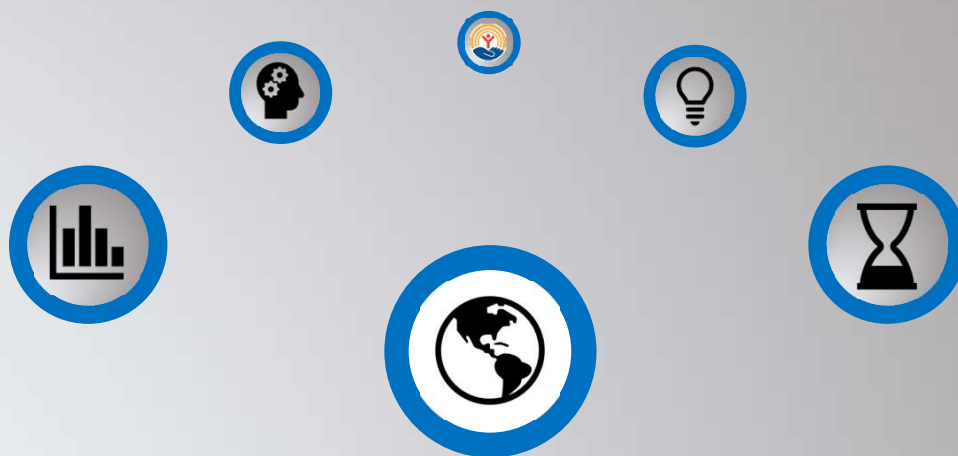


## A bit About Data

This IS data science,  
after all



# Agenda

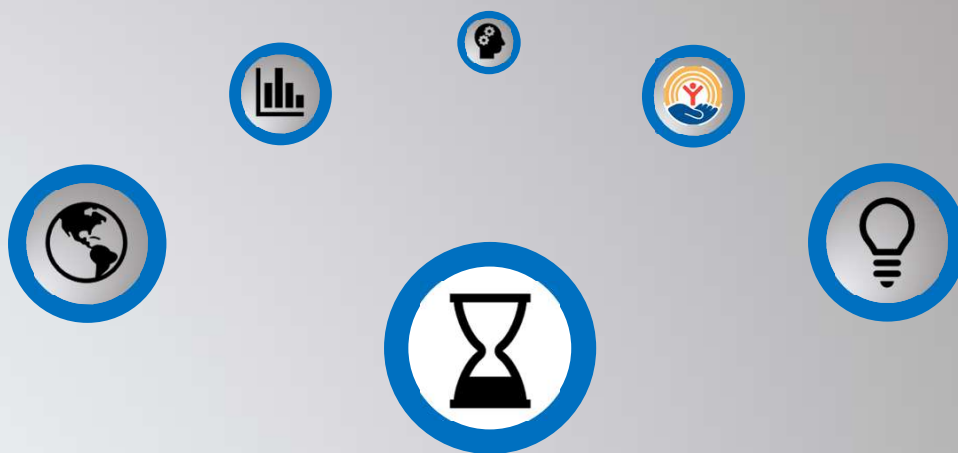


## The Path to Success

How to achieve our goal



# Agenda



## Results

And the verdict is...



# Agenda



**Conclusion**





# Agenda





# The United Way

1200 branches

Community chest organization





# The Big Idea





# The Big Idea





# Data



United States®  
**Census**  
Bureau



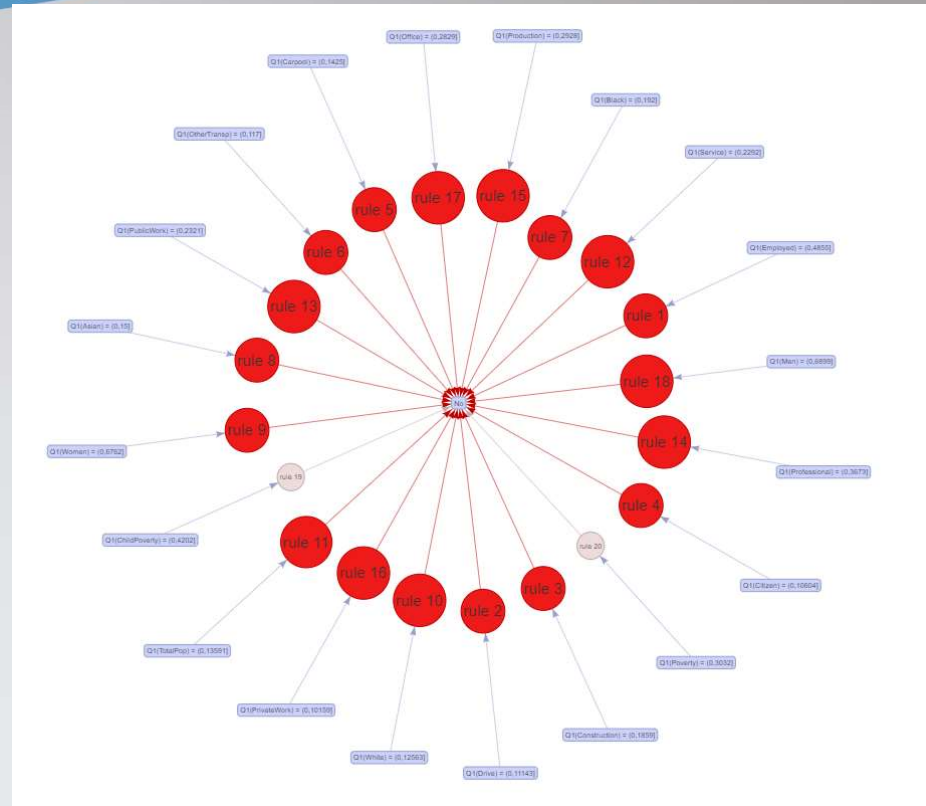




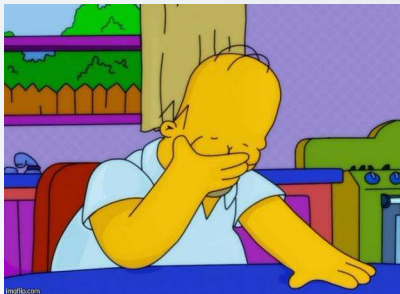
# The Path to Success



“Yes rules”

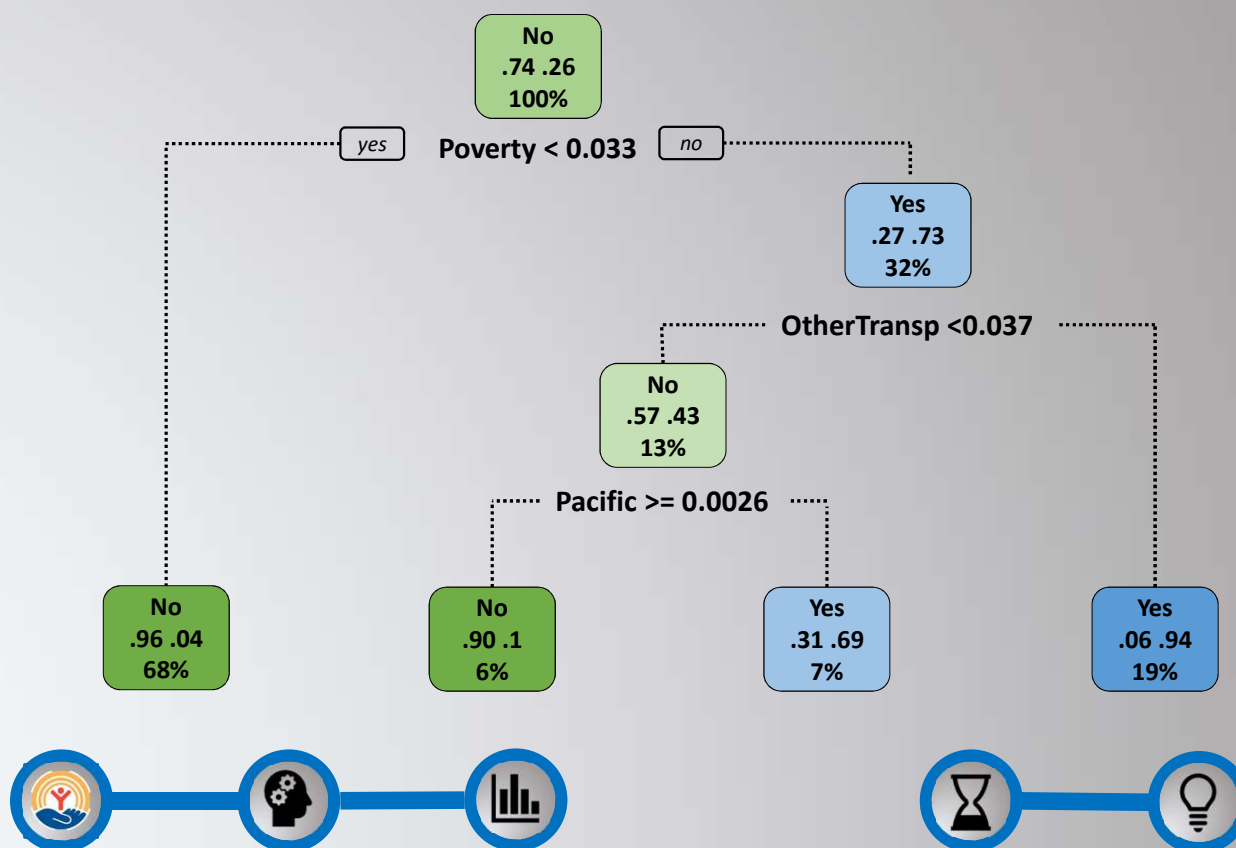


Did he just say the “no” rules  
had a FLORAL shape?





# The Path to Success





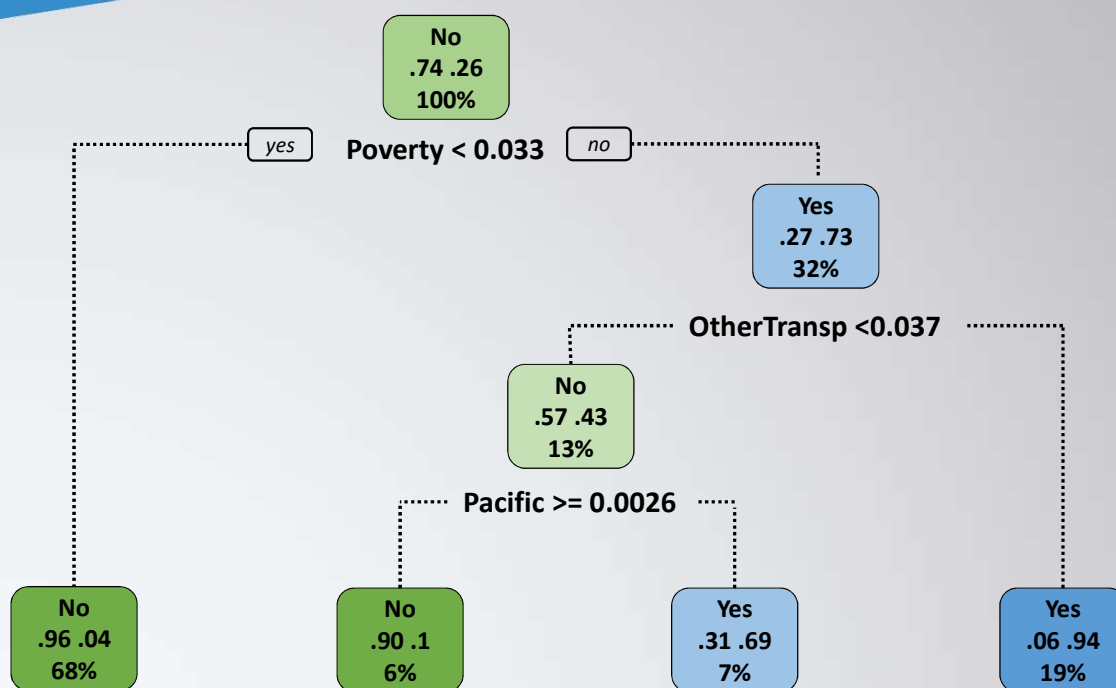
# The Path to Success



Observations:

Low poverty implies no United Way location...??

Not super low poverty with not super low numbers of "Other Transporters" has 19% chance of a U-Way location



		Prediction	
		No	Yes
UW	No	26	6
	Yes	1	10

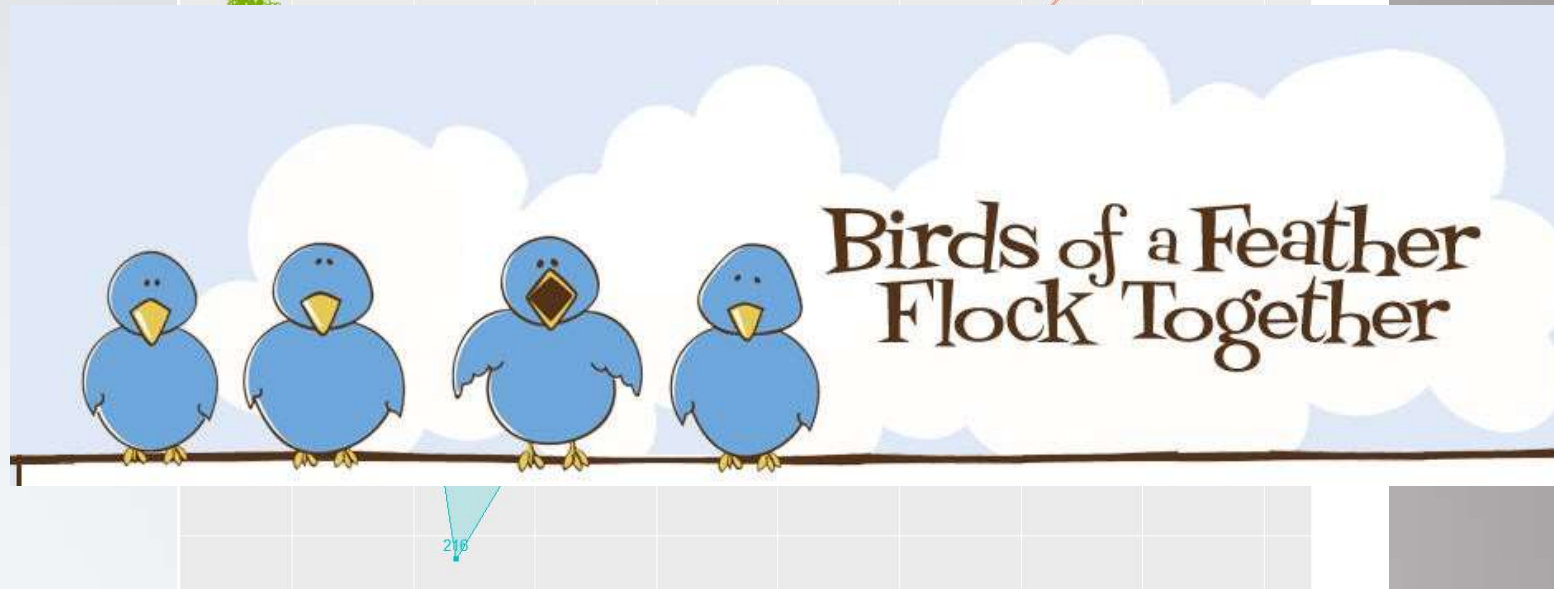
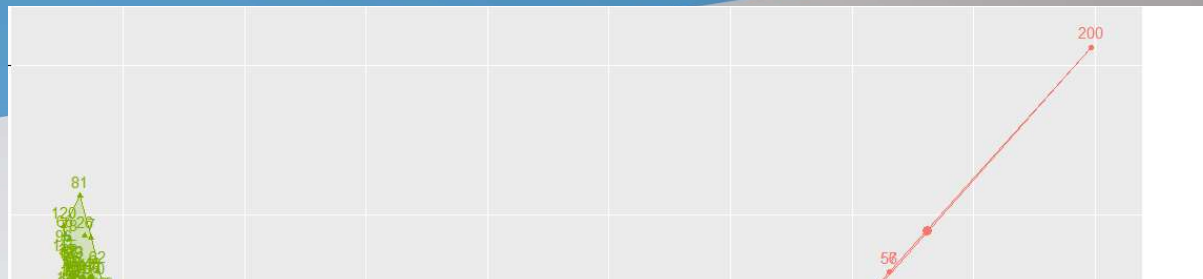
Accuracy: 83.7%





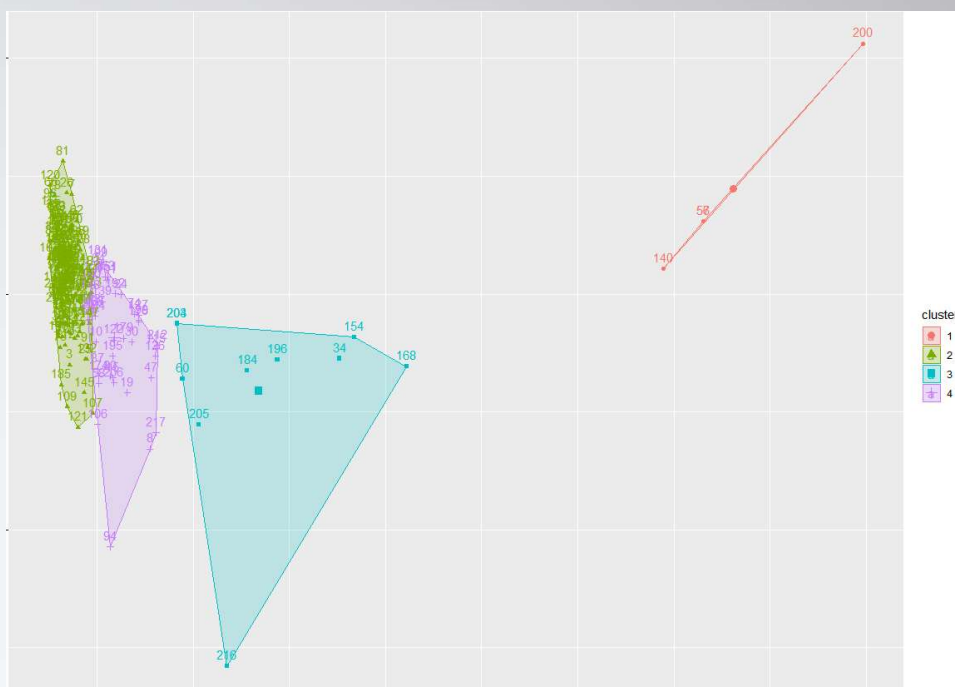


# The Path to Success





# The Path to Success



		Cluster			
		1	2	3	4
UW	No	0	146	0	14
	Yes	45	15	10	28





# The Path to Success



Summary statistics for  
Cluster 2

	min	max	range	median	mean	var	std.dev
TotalPop	2208.00	45986.00	43778.00	17931.00	19925.07	110016354.41	10488.87
Men	1100.00	22691.00	21591.00	8801.00	9881.68	26155736.77	5114.27
Women	1108.00	23295.00	22187.00	9025.00	10043.39	29073515.88	5391.99
Hispanic	0.00	5316.00	5316.00	322.00	499.74	428665.84	654.73
White	2188.00	41437.00	39249.00	16542.00	18066.39	87180578.76	9337.05
Black	0.00	10986.00	10986.00	391.00	929.83	2861883.17	1691.71
Native	0.00	364.00	364.00	24.00	38.55	2205.81	46.97
Asian	0.00	843.00	843.00	34.00	67.71	9426.39	97.09
Pacific	0.00	166.00	166.00	0.00	5.39	319.66	17.88
Citizen	1791.00	34520.00	32729.00	13745.00	15240.73	62401475.08	7899.46
Income	20306.09	63618.55	43312.45	36810.82	37265.64	56620845.69	7524.68
IncomePerCap	10879.72	30490.00	19610.28	19285.43	19694.04	10191312.35	3192.38
Poverty	486.00	11615.00	11129.00	3995.00	4308.85	5395673.10	2322.86
ChildPoverty	905.00	16537.00	15632.00	5624.00	5861.36	9937319.37	3152.35
Professional	693.00	15346.00	14653.00	4661.00	5351.50	9385950.79	3063.65
Service	431.00	8486.00	8055.00	3020.00	3428.01	3392649.51	1841.91
Office	250.00	10644.00	10394.00	3958.00	4395.09	6337444.95	2517.43
Construction	342.00	6223.00	5881.00	2399.00	2511.06	1568738.27	1252.49
Production	367.00	12373.00	12006.00	3670.00	4239.73	5815386.57	2411.51
Drive	1718.00	39163.00	37445.00	14669.00	16609.08	78997823.76	8888.07
Carpool	333.00	6301.00	5968.00	1878.00	2094.52	1429394.84	1195.57
Transit	0.00	434.00	434.00	32.00	54.92	4583.96	67.70
Walk	6.00	2515.00	2509.00	217.00	328.33	121127.95	348.03
OtherTransp	0.00	1072.00	1072.00	164.00	239.71	37956.55	194.82
WorkAtHome	15.00	2162.00	2147.00	484.00	599.17	169245.93	411.40
MeanCommute	17.18	37.68	20.50	26.37	26.56	19.15	4.38
Employed	806.00	21103.00	20297.00	6792.00	7662.43	20130162.68	4486.66
PrivateWork	1731.00	37088.00	35357.00	13502.00	15050.57	67956720.96	8243.59
PublicWork	406.00	8740.00	8334.00	2978.00	3343.20	2999311.09	1731.85
SelfEmployed	71.00	4807.00	4736.00	1321.00	1487.05	715025.04	845.59
FamilyWork	0.00	314.00	314.00	26.00	44.65	2957.10	54.38
Unemployment	148.00	5709.00	5561.00	1754.00	1967.86	1296715.31	1138.73





# The Path to Success







# The Path to Success





# The Path to Success





# The Path to Success

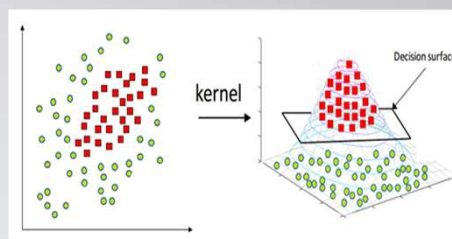


## Probability

$$P(Y/X)$$

Accuracy: 79.1%

## Linear Algebra



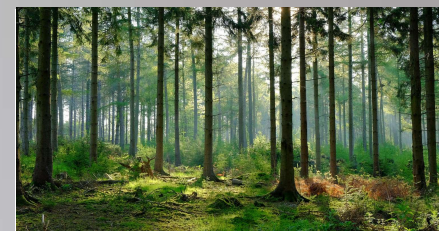
Accuracy: 83.7%

## Neighbors



Accuracy: 83.7%

## Trees



Accuracy: 83.7%



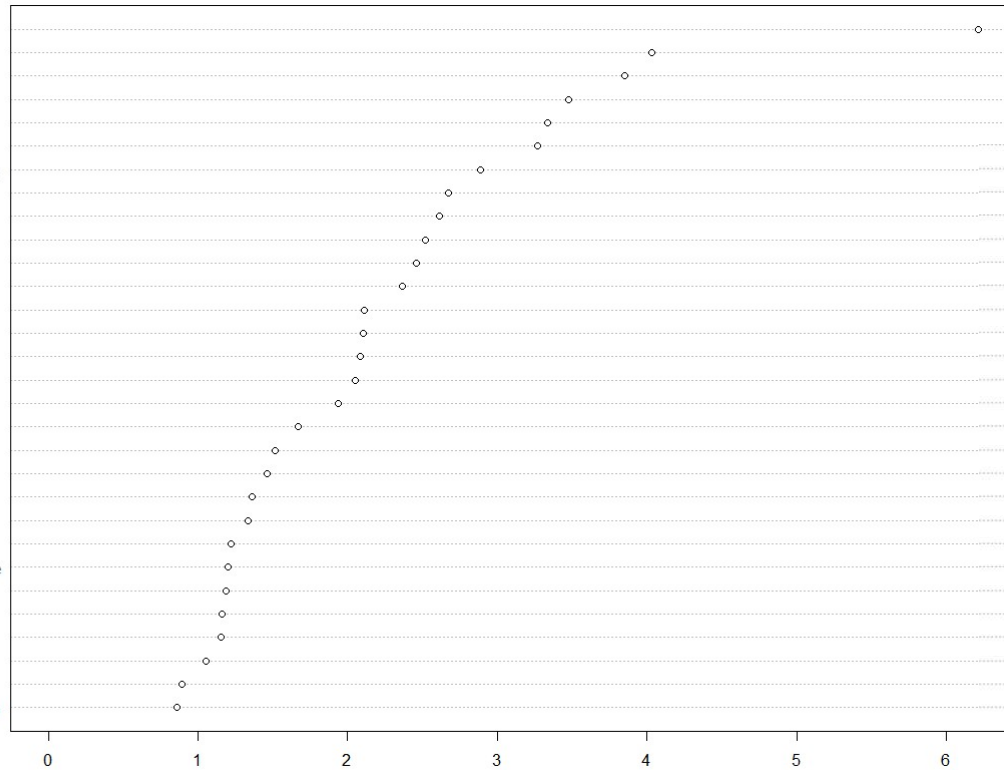




# The Path to Success



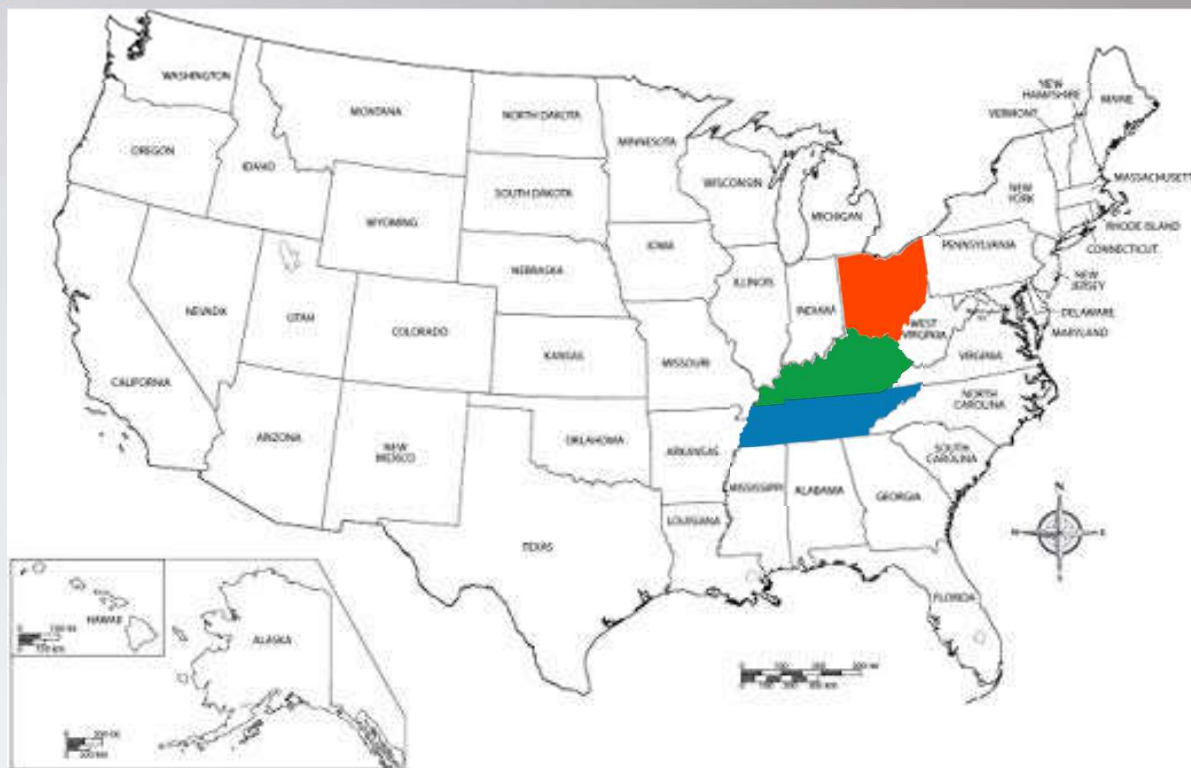
Poverty  
ChildPoverty  
Service  
Citizen  
PublicWork  
OtherTransp  
Unemployment  
Construction  
Professional  
TotalPop  
Native  
Women  
Men  
White  
Carpool  
Drive  
Office  
Production  
Income  
Asian  
Hispanic  
Walk  
PrivateWork  
MeanCommute  
WorkAtHome  
SelfEmployed  
Employed  
Black  
FamilyWork  
IncomePerCap







# Results



# Results



1

**OH has more locations than KY and TN combined**

2

**No model was over 55% accurate when applied to Ohio**

3

**Very likely that more than demographics influences UW location placement**



# Results



1

OH has more  
locations than  
KY and TN  
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2

No model was  
over 55%  
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Very likely that  
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# Conclusion

