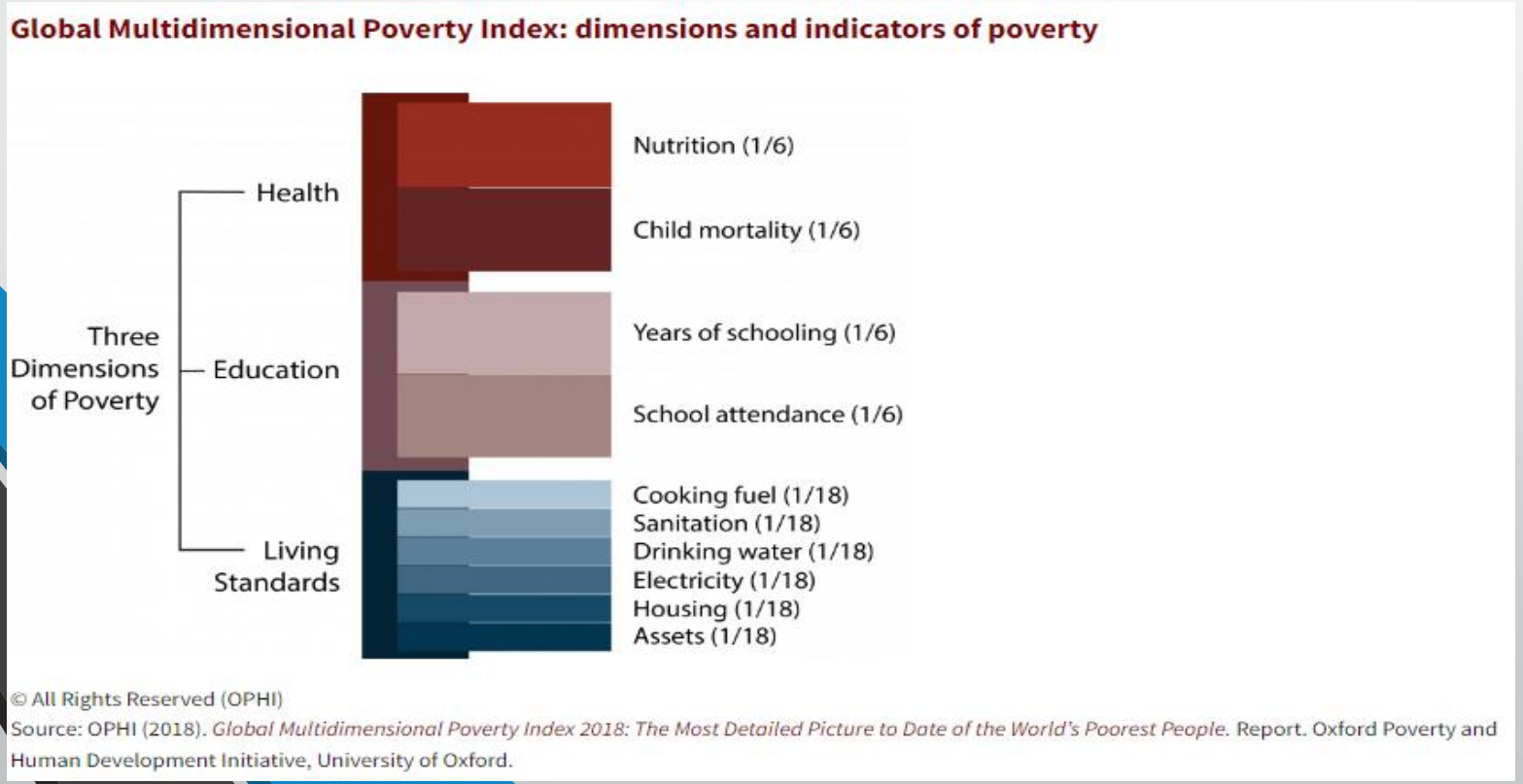
Accessing Multidimensional Poverty Idex (MPI)

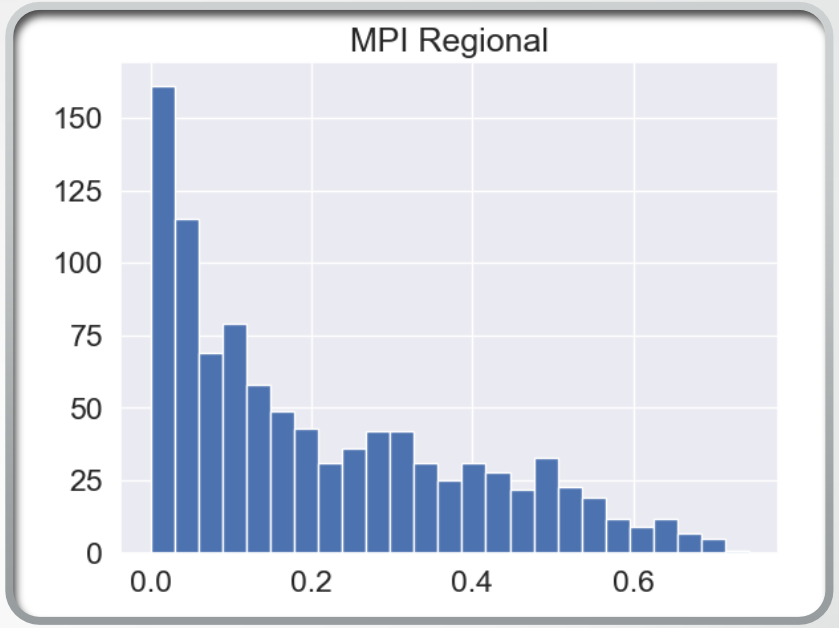
What are we trying to answer:

- Which regions in the world have the highest poverty rate according to MPI?
- Which regions in the world have the highest intensity of depravation according to MPI?
- Is there a correlation between a region and their MPI?



Source: OPHI (2018). *Global Multidimensional Poverty Index 2018: The Most Detailed Picture to Date of the World's Poorest People.* Report. Oxford Poverty and Human Development Initiative, University of Oxford.

Exploring the Data

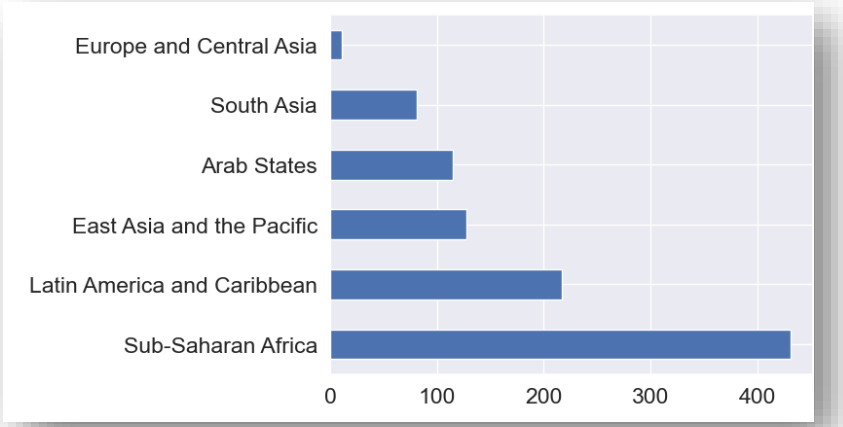


	MPI National	MPI Regional	Headcount Ratio Regional	Intensity of deprivation Regional
count	983.000000	983.000000	983.000000	983.000000
mean	0.204271	0.211545	39.784334	46.722279
std	0.160247	0.183591	29.955845	8.061069
min	0.006000	0.000000	0.000000	33.000000
25%	0.066000	0.053000	12.000000	41.000000
50%	0.174000	0.155000	34.000000	45.000000
75%	0.303000	0.342000	66.000000	51.000000
max	0.605000	0.744000	99.000000	75.000000

Exploring the Data cont.

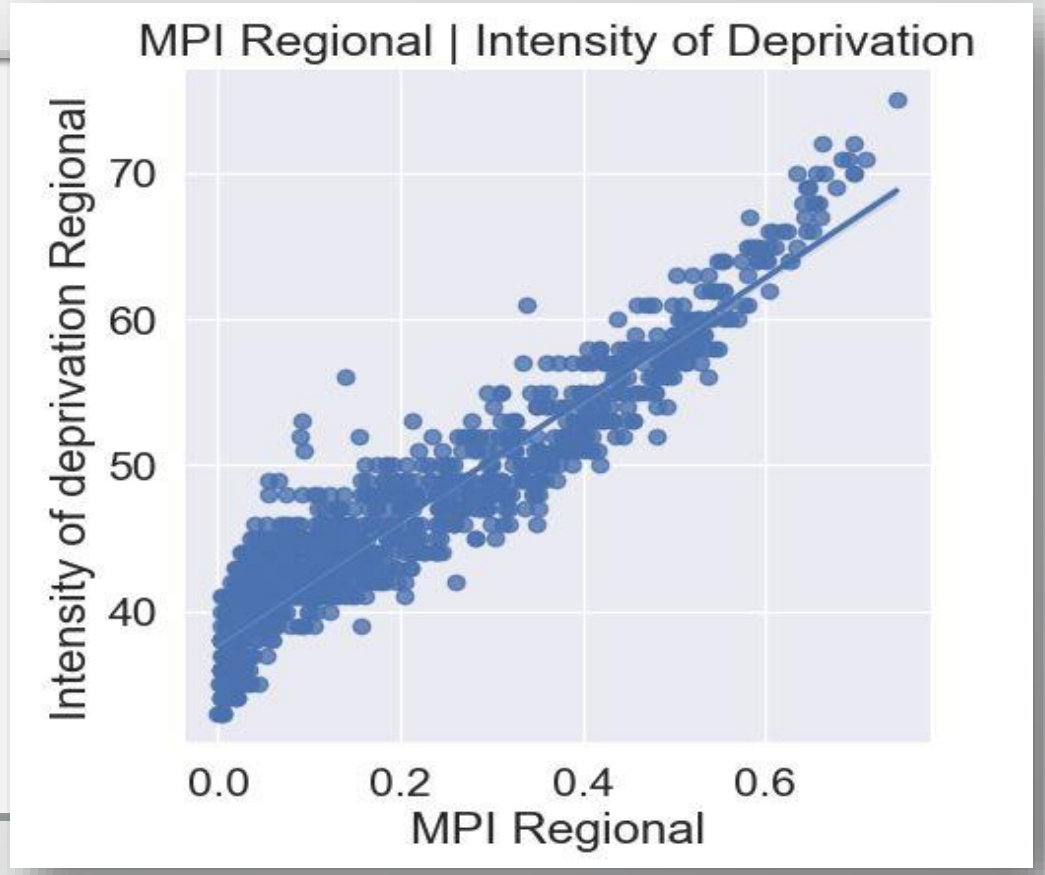
World region	MPI National	MPI Regional	Headcount Ratio Regional	Intensity of deprivation Regional
Europe and Central Asia	0.028909	0.025273	6.181818	36.727273
Latin America and Caribbean	0.054323	0.063959	13.857143	41.082949
Arab States	0.110783	0.115287	22.669565	42.191304
East Asia and the Pacific	0.124328	0.136266	27.898438	45.109375
South Asia	0.209049	0.219630	43.629630	47.209877
Sub-Saharan Africa	0.332030	0.337128	61.069606	51.412993

World region	MPI Regional
Sub-Saharan Africa	0.744
South Asia	0.624
East Asia and the Pacific	0.508
Arab States	0.501
Latin America and Caribbean	0.391
Europe and Central Asia	0.086

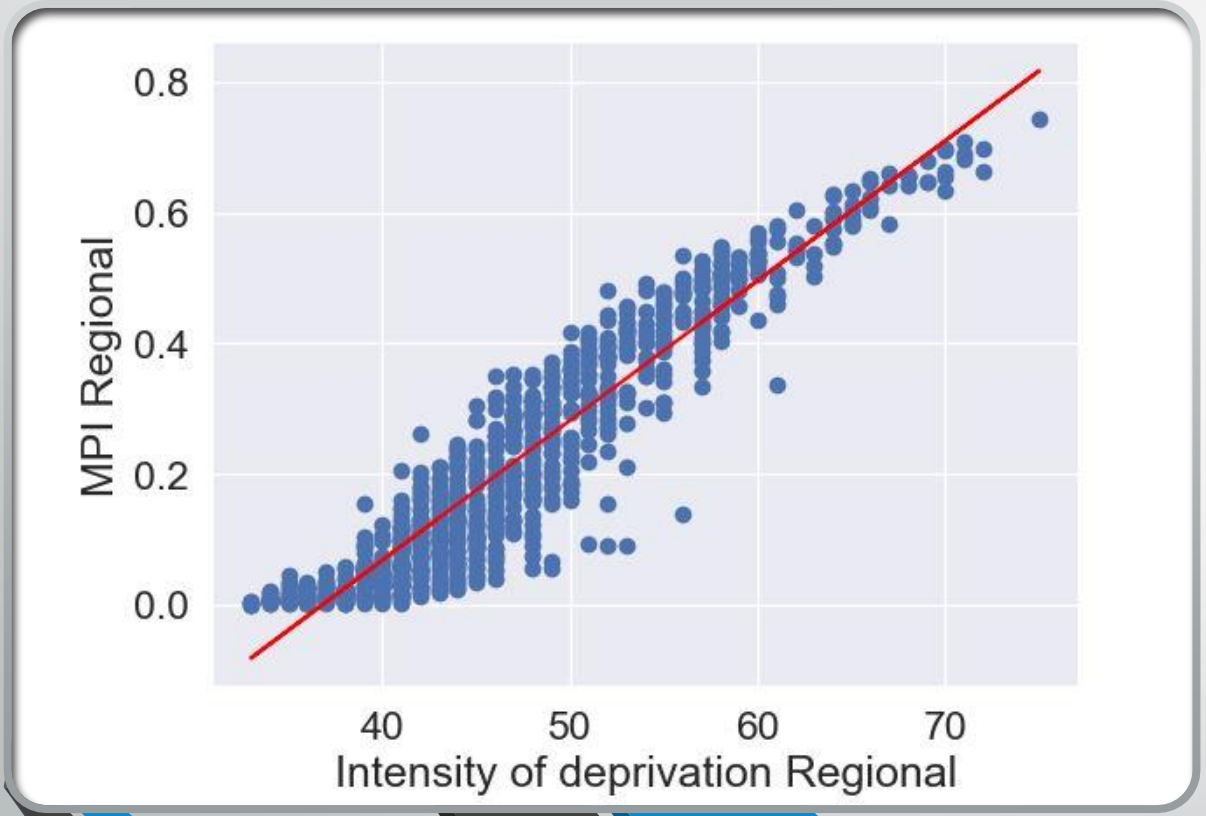


Linear Regression

It seems the higher the deprivation the then the higher the MPI Regional will be of that country.



Linear Regression with Prediction



- The model was able to predict regional MPI based on intensity levels that were not in the training data.
- For example, if the intensity of deprivation is 0 then the MPI Regional would be a negative -0.8, which means there would be no poverty in that region. Also, for an intensity of 70 the regional MPI would be .7, which indicates extreme deprivation.

Testing Error

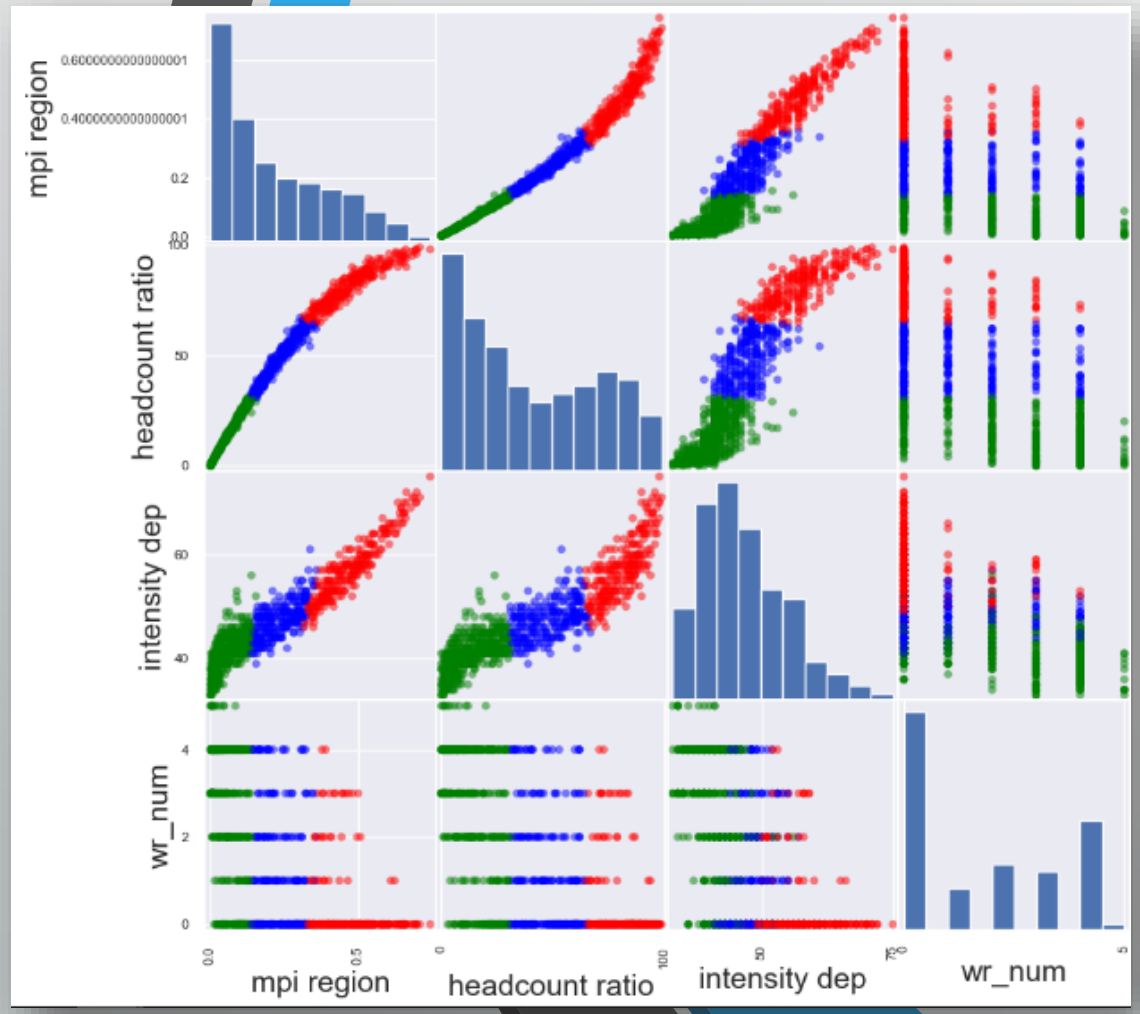
Testing with 1 component
(deprivation)

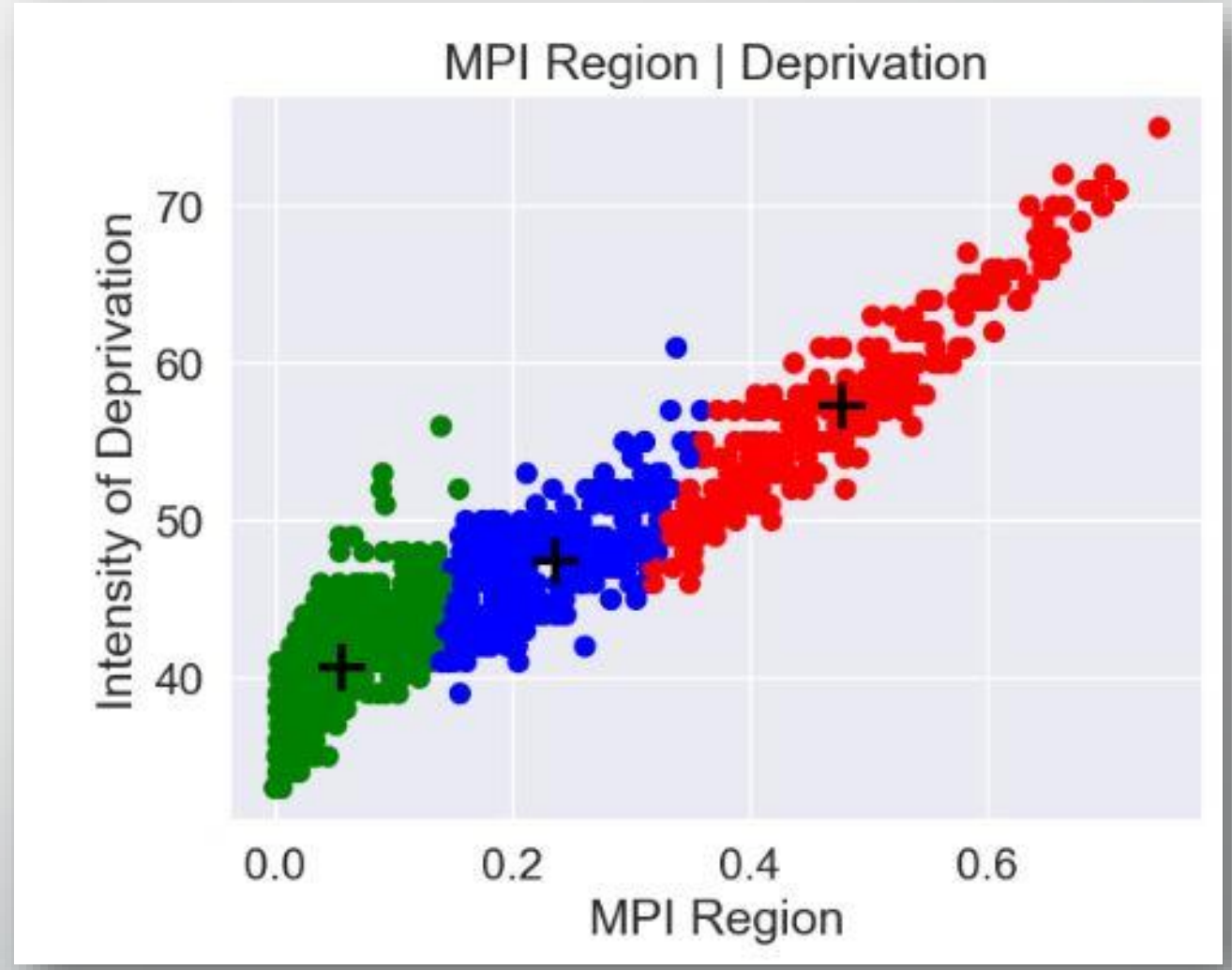
```
Training MSE: 0.0035335159250050635
Testing MSE:  0.0039166729083420 9

Training RMSE: 0.059443384198790 9
Testing RMSE:  0.062583327718667 13
```

Testing with 2 components
(deprivation + headcount)

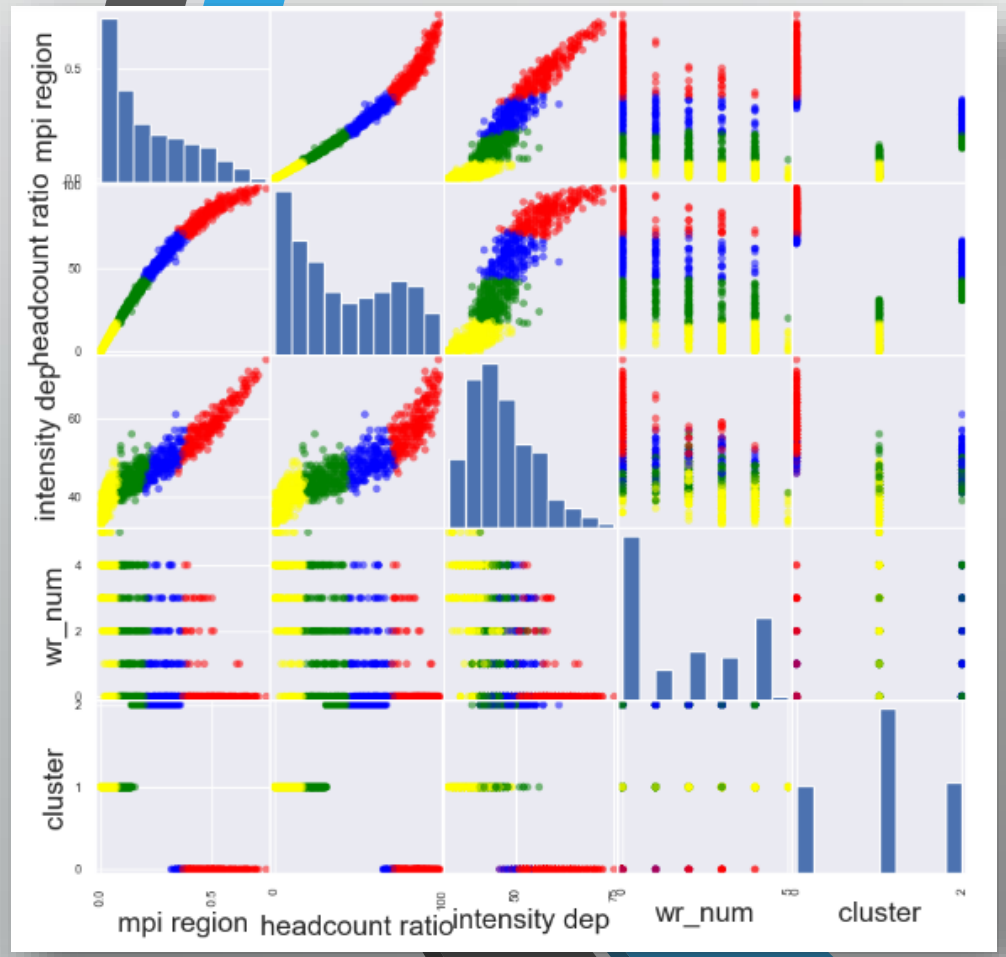
```
Training MSE: 0.0005018548552112515
Testing MSE:  0.0005073271112408047

Training RMSE: 0.022402117203765618
Testing RMSE:  0.022523923087260013
```

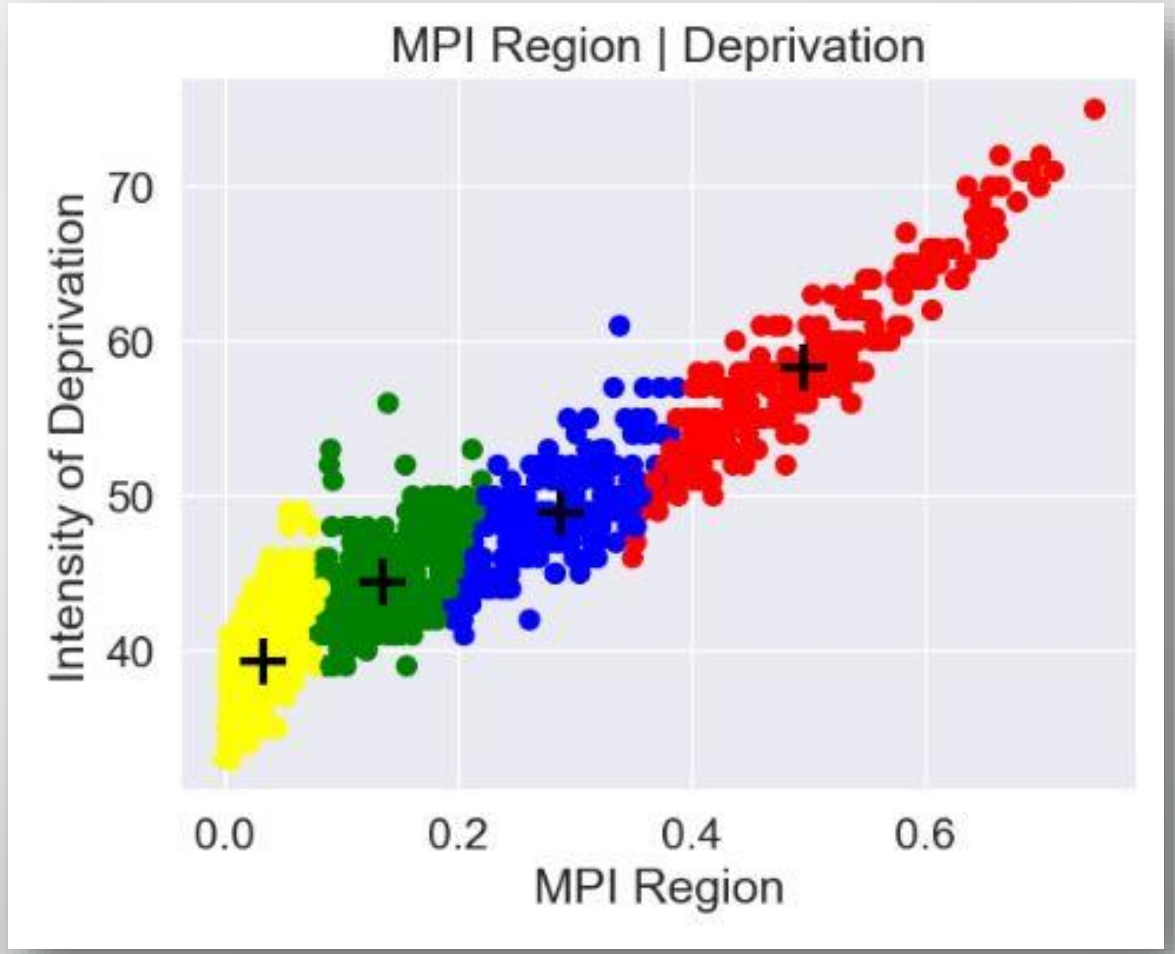
K-Means Clustering: 3 Points





K-Means Clustering: 4 Points





Conclusion

- This data overall had a strong relationship between its values across the board. Based on this we can predict a countries poverty index based on the deprivation and even the headcount ratio.