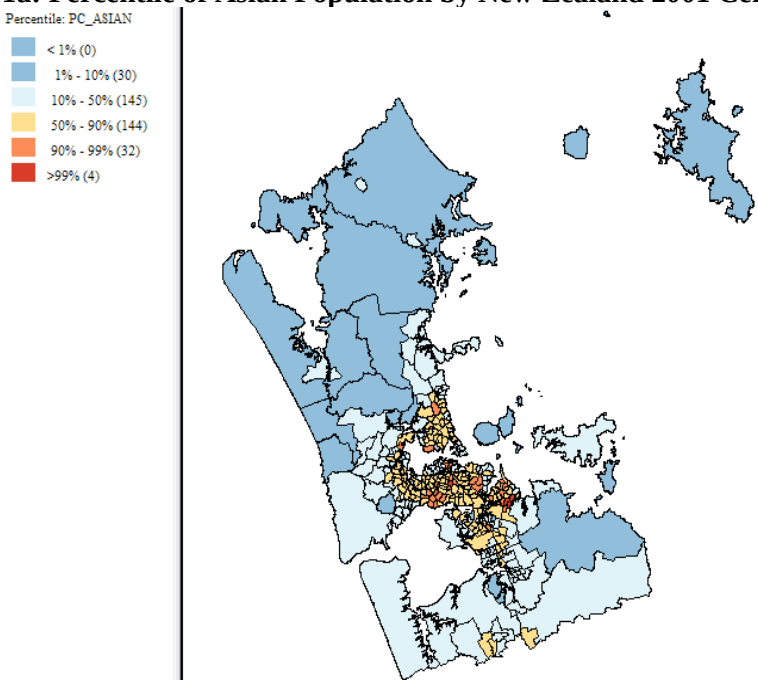
Geography 586 / Project 8 - Spatial Autocorrelation / Bruce Kinner

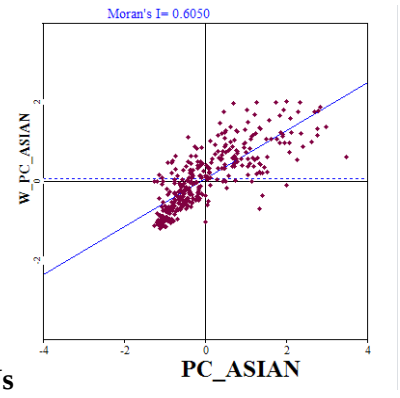
1a: Percentile of Asian Population by New Zealand 2001 Census Areal Units (CAUs)



To remove any confusion - the percentile is not percent of the population that is Asian in a given area but the percentile relative to the percentage of Asians in all the areas, ie. the top 4 areas (with around 40% Asian population) are shown as greater than 99th percentile.

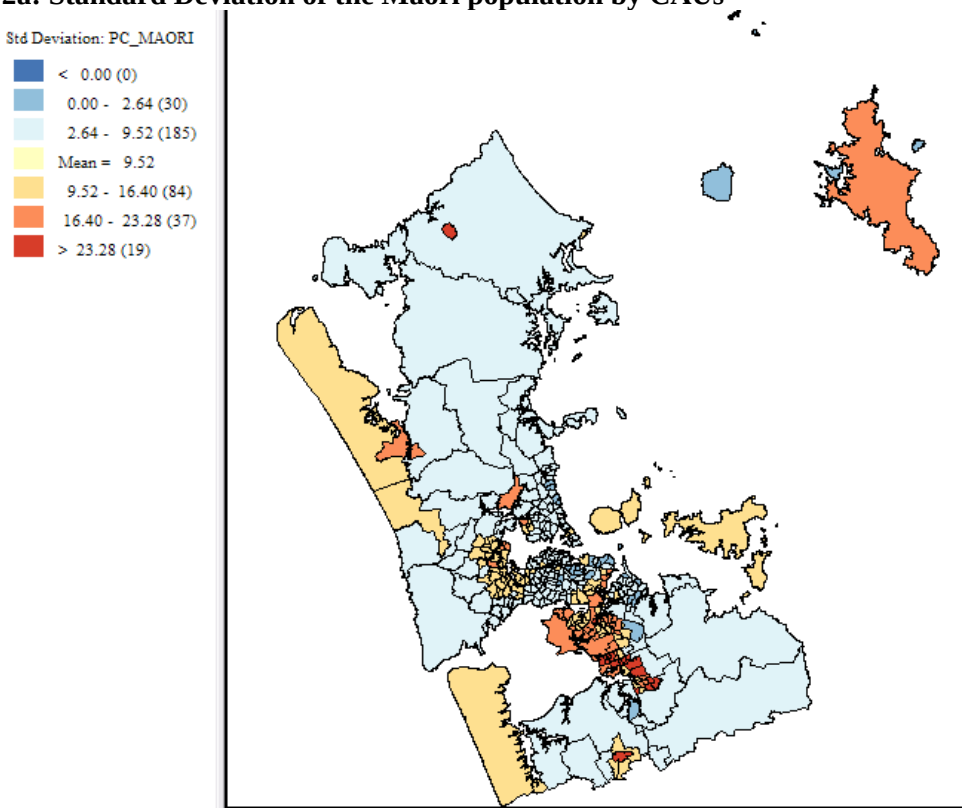
The results of the map are not surprise. A non-native ethnic group has arrived in an urban center to work and study. The population is concentrated in the urban center and with very few exception has not migrated very far. This is very similar to the what would be expected in other Pacific Rim countries like on the west coast of the United States.

Therefore, a significant positive spatial autocorrelation should be expected and as shown below in the Moran's scatter plot this is confirmed. The surprising result is the compact nature of the lower left quadrant of the map (that represent areas with a small percentage of Asians). It would be interesting to calculate Moran's I for just that quadrant. Relative to the rest of the graph it appears it would have a larger spatial autocorrelation but it is difficult to tell if this is true based on that quadrant alone. If so it would support a theory that there are is a significant spatial relationship between areas with small Asian populations (since by and large they haven't moved to these less central areas or urban areas already dominated by a non-white group) and as the Asian population spreads out over time it becomes less spatially auto correlated (though still significant) as the city becomes more locally diverse.



1b: Scatterplot of percentile of Asian population by CAUs

2a: Standard Deviation of the Maori population by CAUs



In contrast to the most newly arrived Asian population, the Maori are the native inhabitants of New Zealand. A general assumption would be the Maori have been marginalized in some way, first with the arrival of Europeans and potentially again with later immigration trends. This could happen in two ways: the rural outskirts and the urban 'ghetto', as shown in the contemporary New Zealand films 'Once Were Warriors' and 'Whale Rider'*. Figure 2a shows there is some visual merit to these assumptions: two 'urban' clusters (to the west and to the south) of the central city and numerous outlying concentrations, especially to the west (less developed) part of the region.

2b: LISA Cluster Map of Maori Population

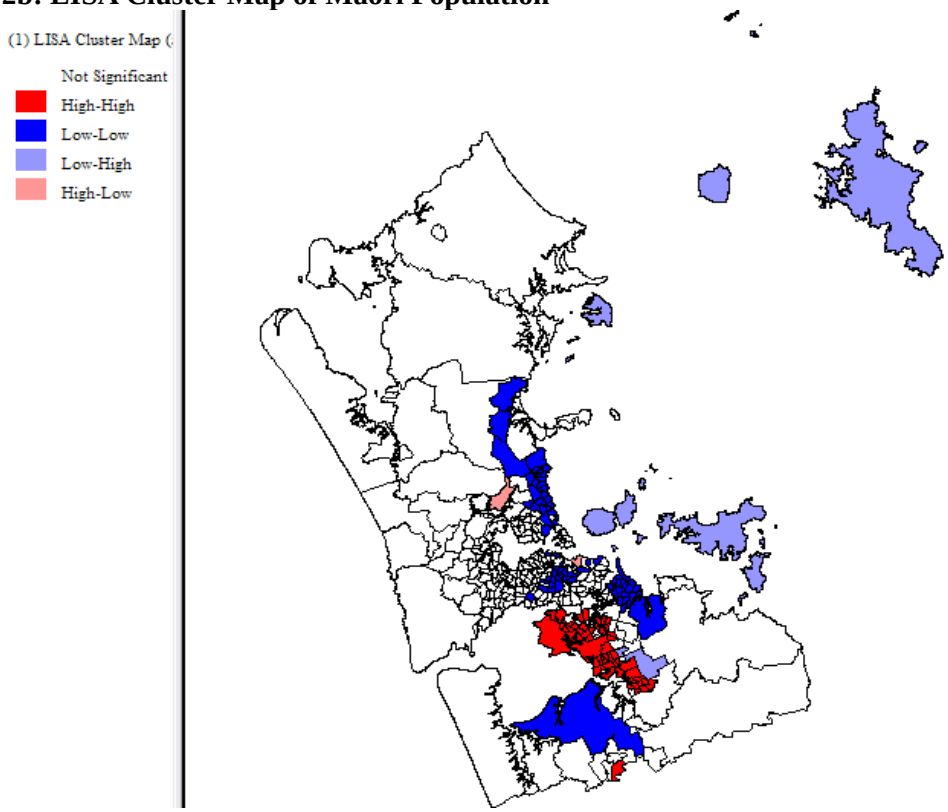
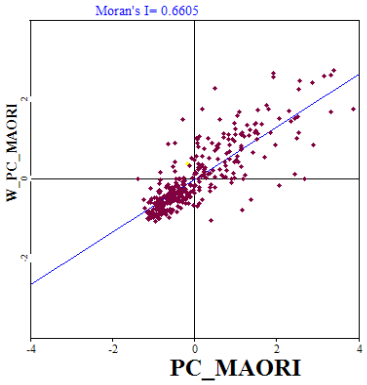


Figure 2b shows the southern urban cluster is indeed significant. Even though there are a significant number of areas in the western cluster with populations above the mean, there are none in the highest groups above the mean. As a result this cluster is washed out by the surrounding areas whose populations are not significantly below the mean. The Low-High results are somewhat due to areas with no people but it is interesting it is mostly the islands which display this behavior as their adjacency is questionable. There are quite a few groups of Low-Low areas which suggests this trend is meaningful. The Moran's I scatter plot, shown below in Figure 2c, displays very similar behavior to the Asian scatter plot, where as discussed previously, it was theorized that this is indeed an important feature of the data.

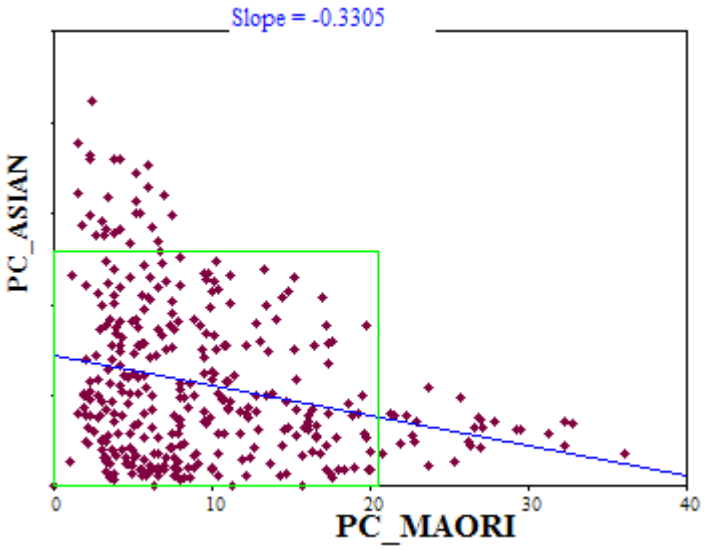


2c: Scatterplot of Maori population by CAUs

The striking similarity of the Maori and Asian scatter plots warrants some further investigation. Figure 3 shows a scatter plot comparing the two populations. A negative autocorrelation exists but there is a more hidden aspect. Both populations show when there is the highest number of one population it is very likely there is a very low number of the other. This is not surprising as there are many examples of ethnic enclaves in the world's cities. What is interesting is the area in the green box. If the autocorrelation was calculated for just this part of the data the slope

would be much flatter, indicate a lack of autocorrelation and random-like dispersion. The next questions (not answerable here): are these areas of mixed populations where there is intermingling of the Asian and Maori populations? Or are the populations mutually exclusive? The maps seem to argue for exclusivity but the scatter plot is less clear. Maybe the plot of another film will speak to these questions!

3: Maori vs. Asian scatterplot



*Author's note: For total disclosure, I should state my mother was an AFS student in New Zealand in high school and I even visited New Zealand myself for a month in 1984 when I was eight years old. So my pre-conceptions of the data were informed by more than just the films mentioned, even if they were really good movies!