Geographic Information System

Spatial Statistics II
Lab Practice

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Photo credit: ChatGPT

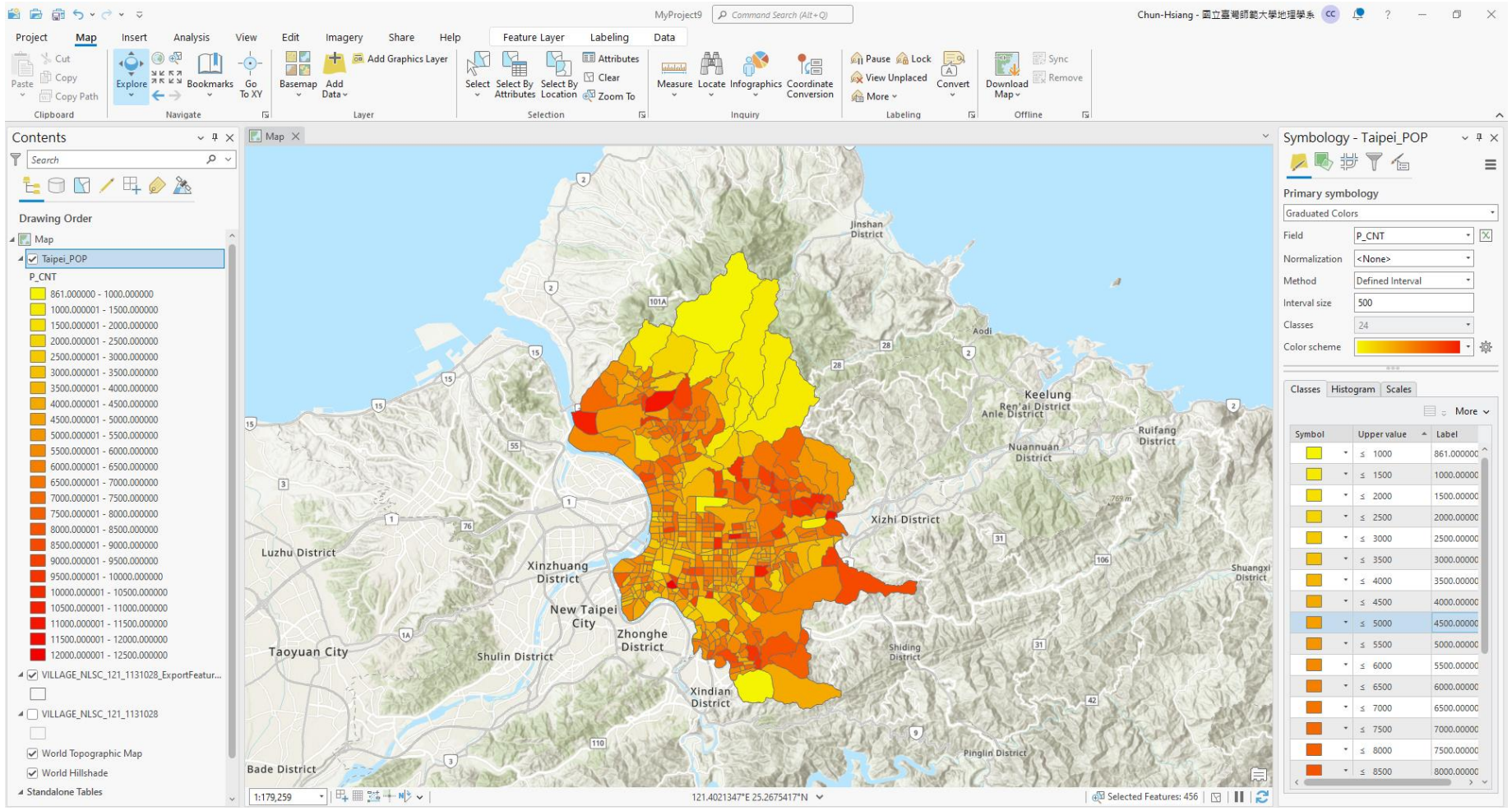
Outline

- Identify the Spatial Distribution of Clusters
- Group the Village with Similar Demographic Attributes

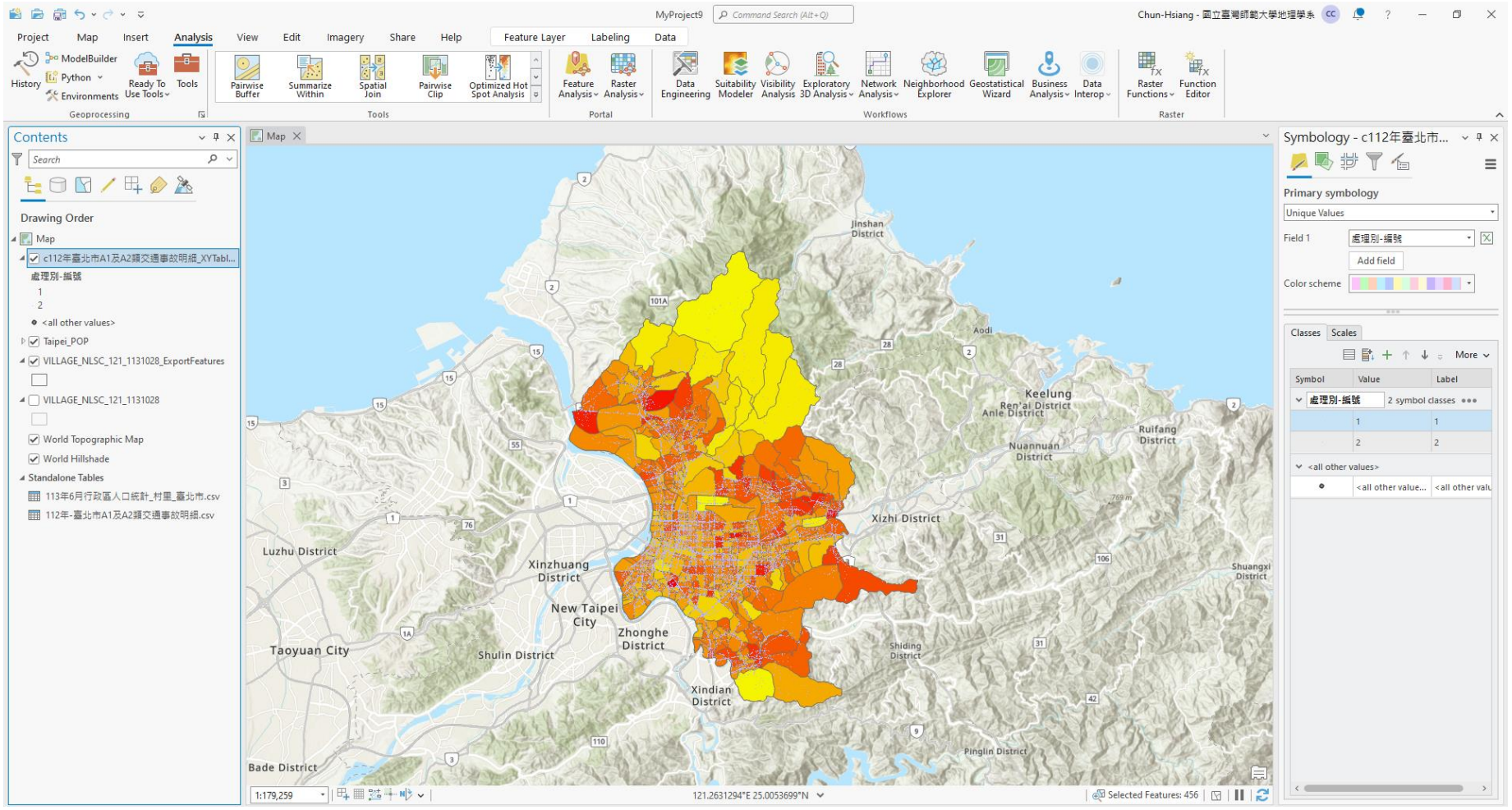
Initial Settings (...)

1) Set up the CRS of the map
2) Load Taipei Population Data, Taipei Traffic Accident Data, and Taiwan Village Data
3) Select all Taipei villages from the Taiwan village data and export as a new feature data named “Taipei_POP”
4) Join Taipei population into Taipei_POP
5) Use XY Table To Point to convert Taipei traffic accident data into Point data
6) Select 112/01 and 112/07 Taipei traffic accident and export as a new feature data named “TrafficAccident_11201” and “TrafficAccident_11207”
7) Spatial Join Taipei traffic accident into Taipei_POP

Taipei Population Data



Overlay with Traffic Accident Data



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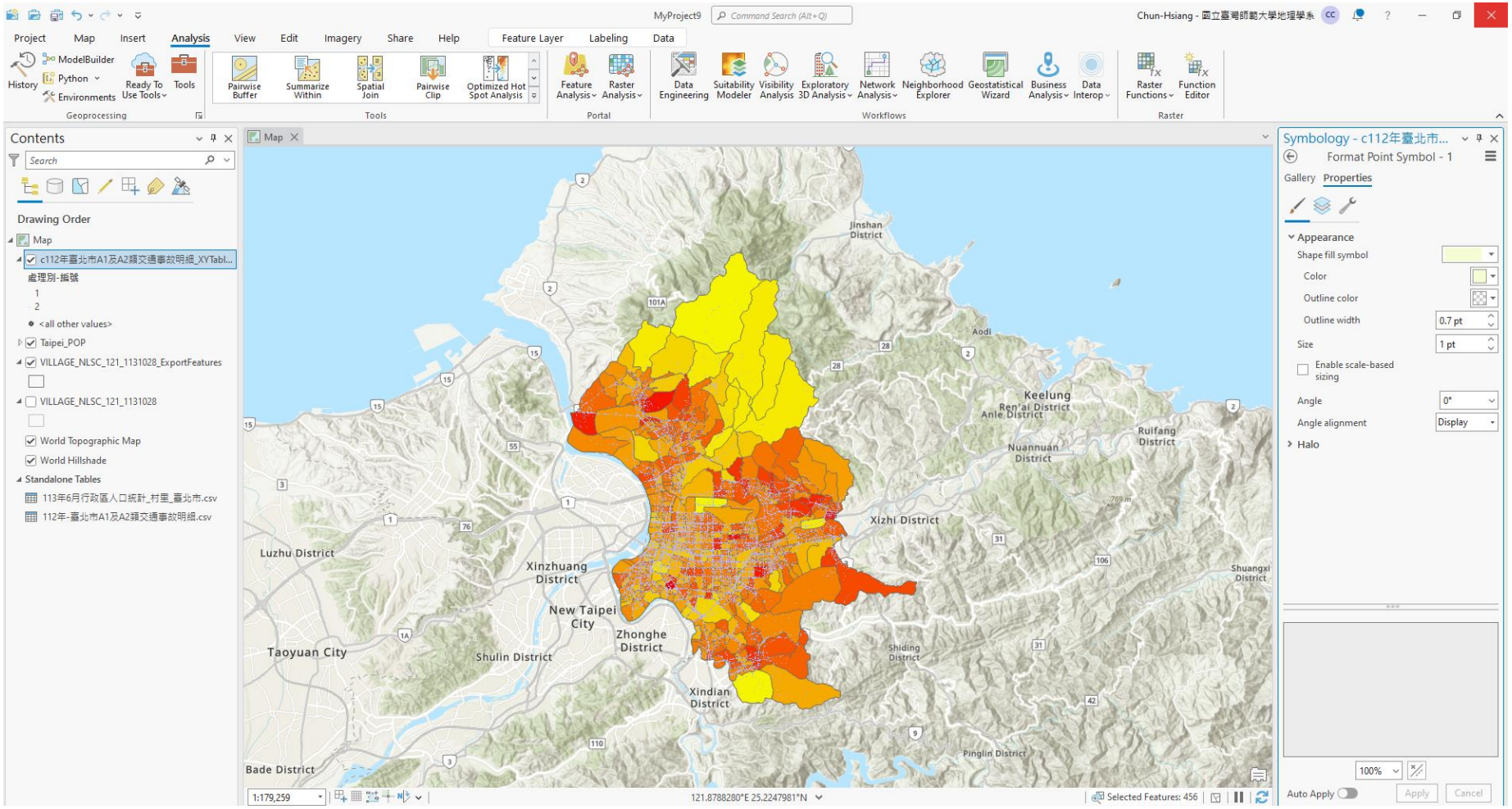
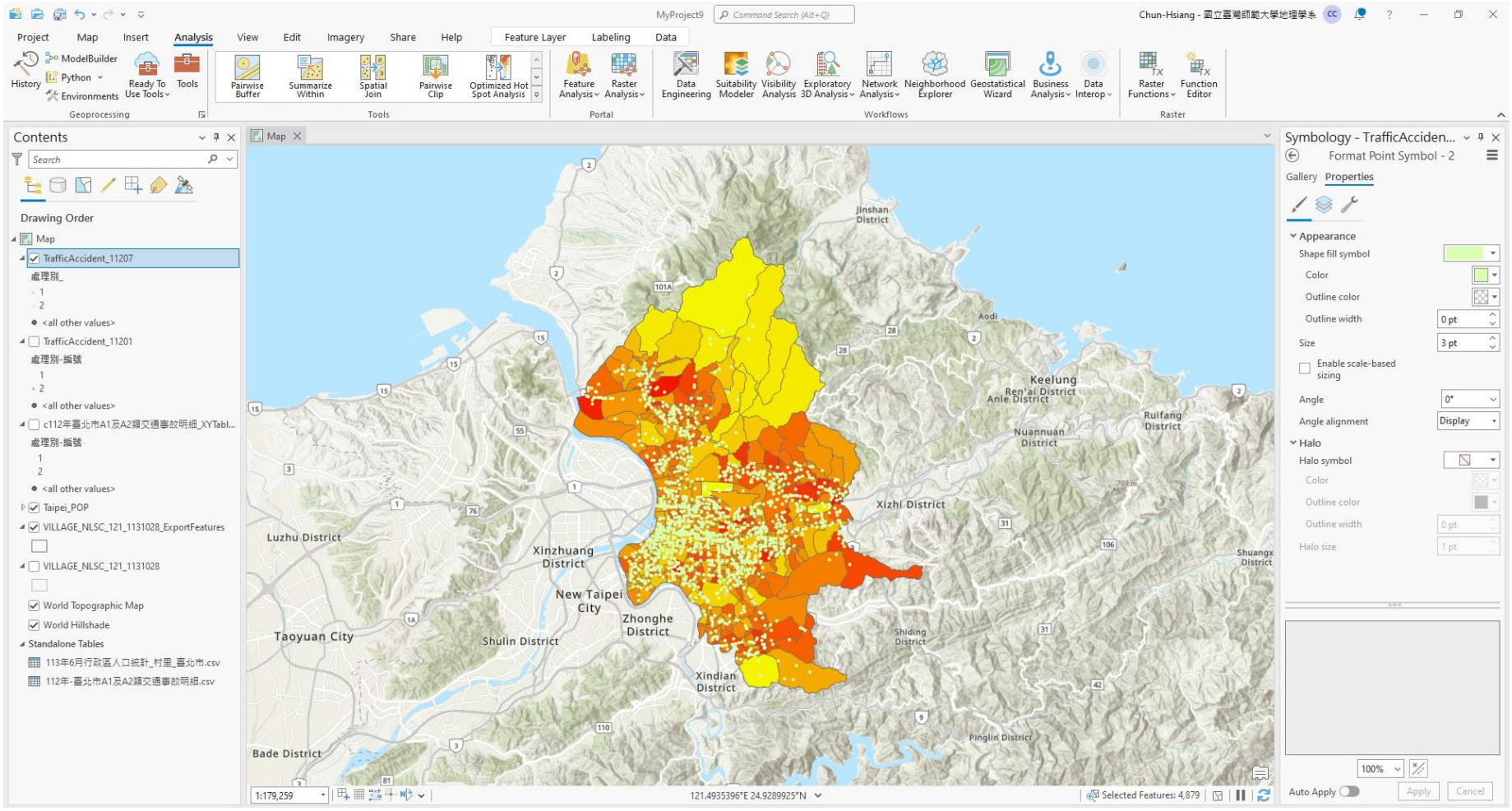
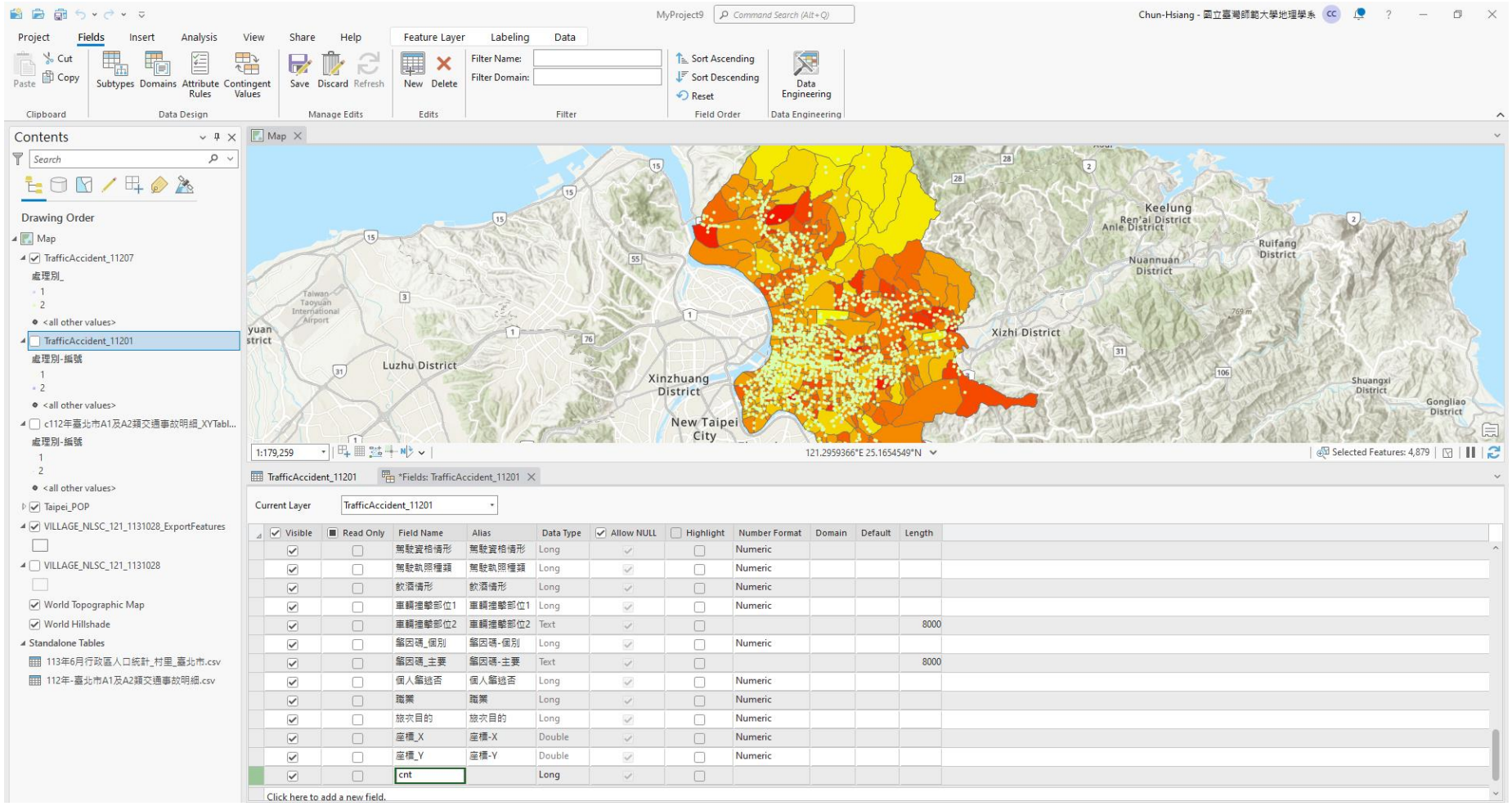


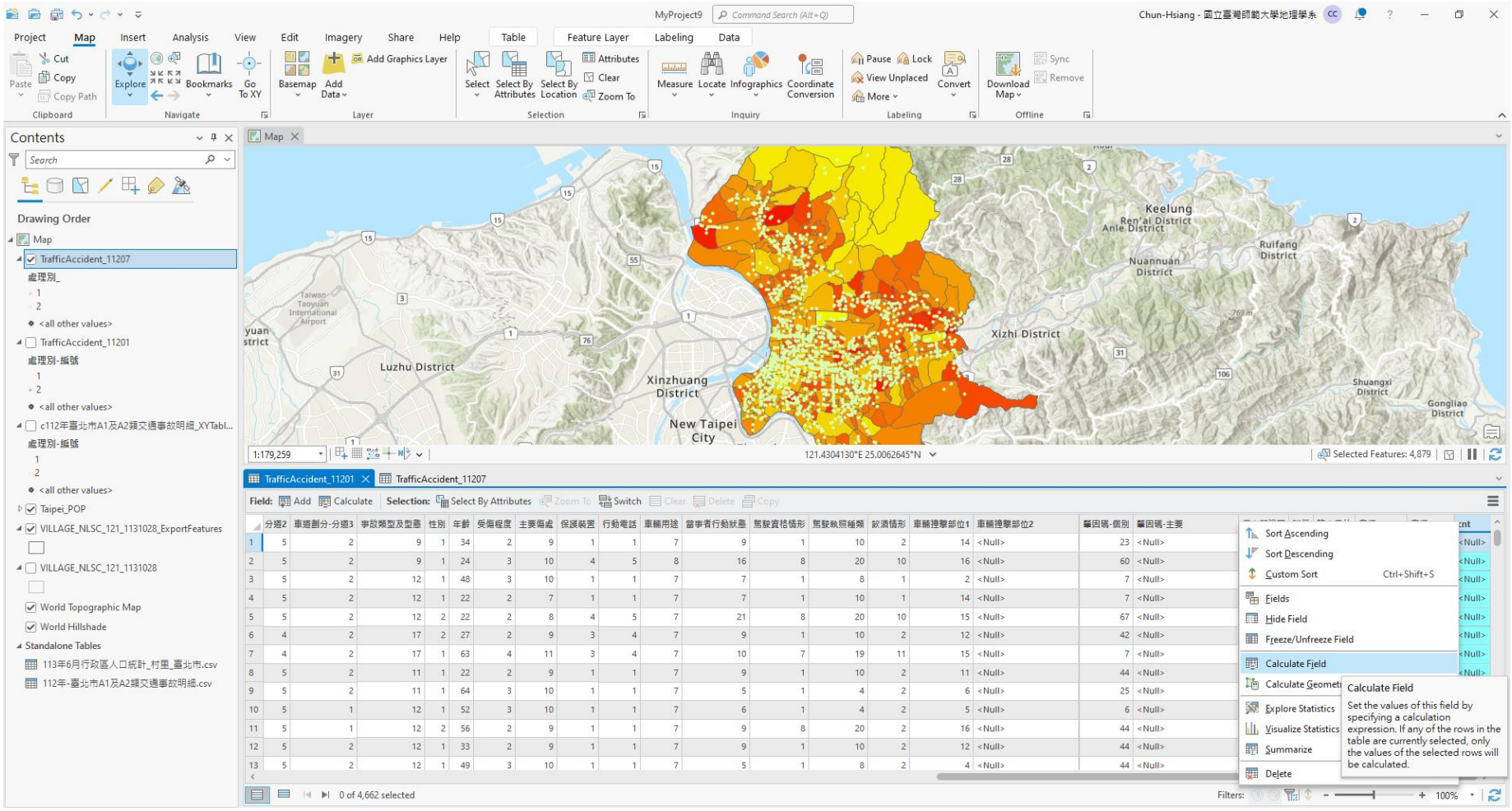
Overlay with Traffic Accident Data



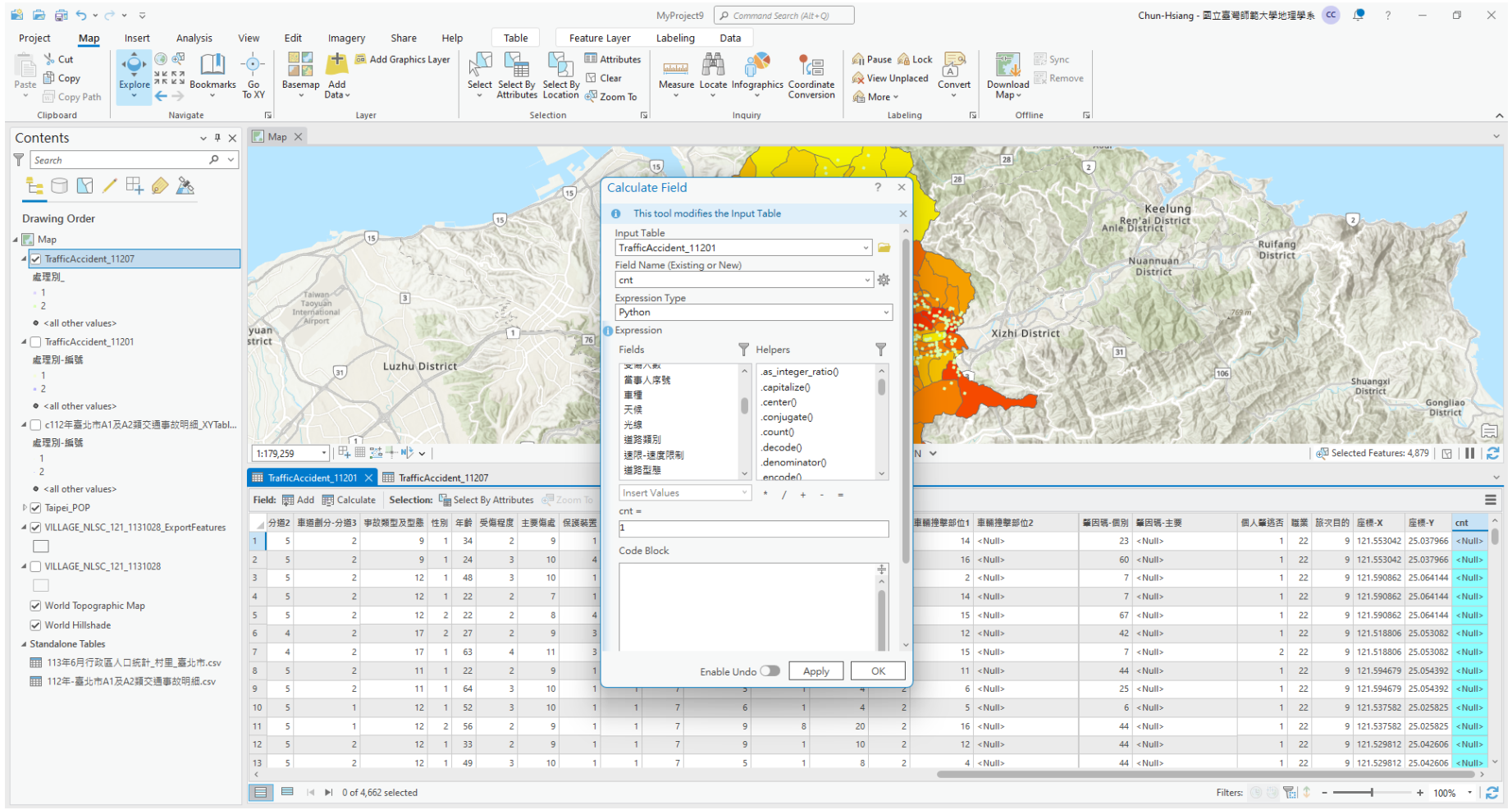
Add a New Field ”cnt” to both 11201 & 11207



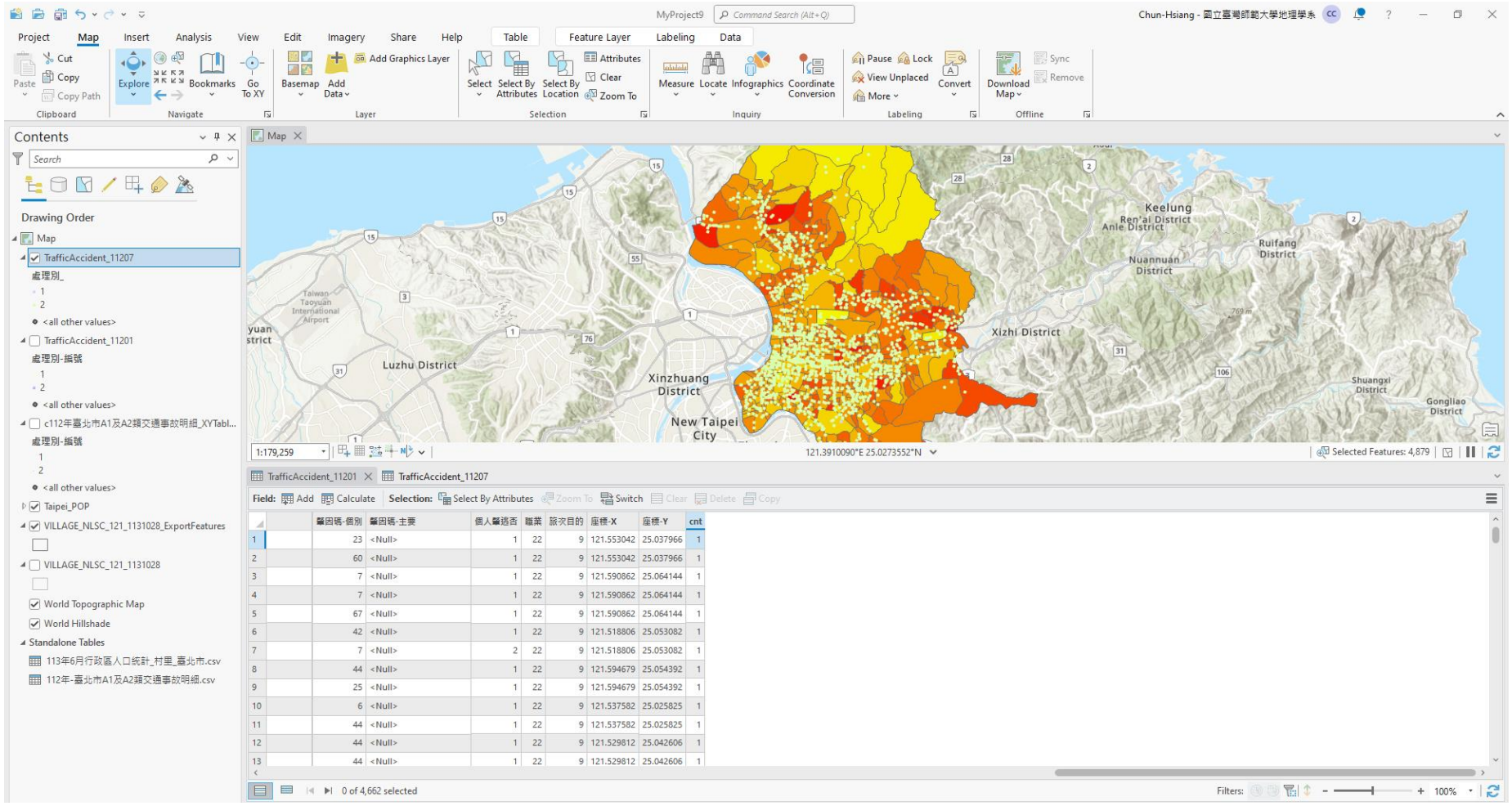
Fill 1 into “cnt” Field to both 11201 & 11207



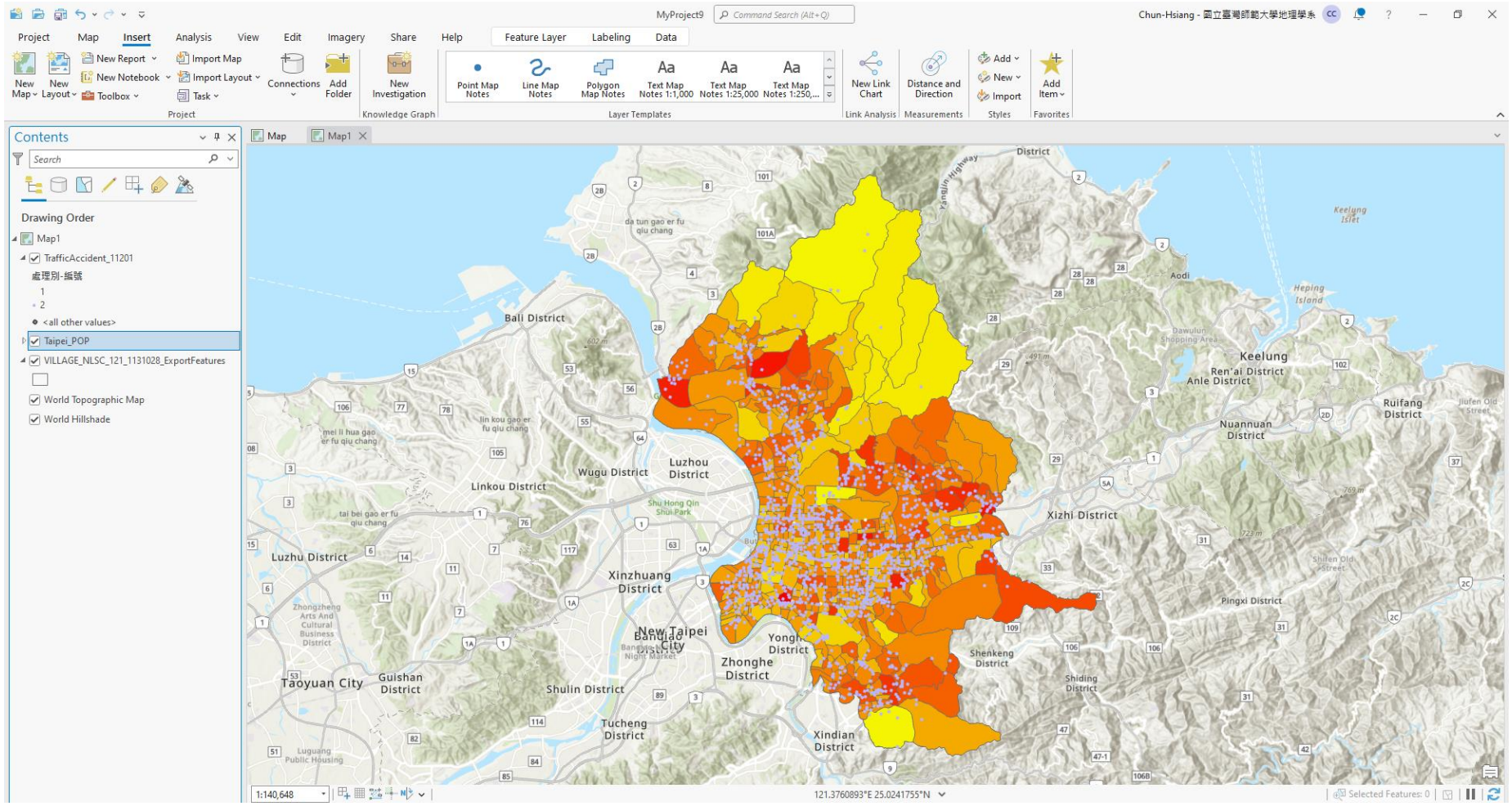
Fill 1 into “cnt” Field to both 11201 & 11207



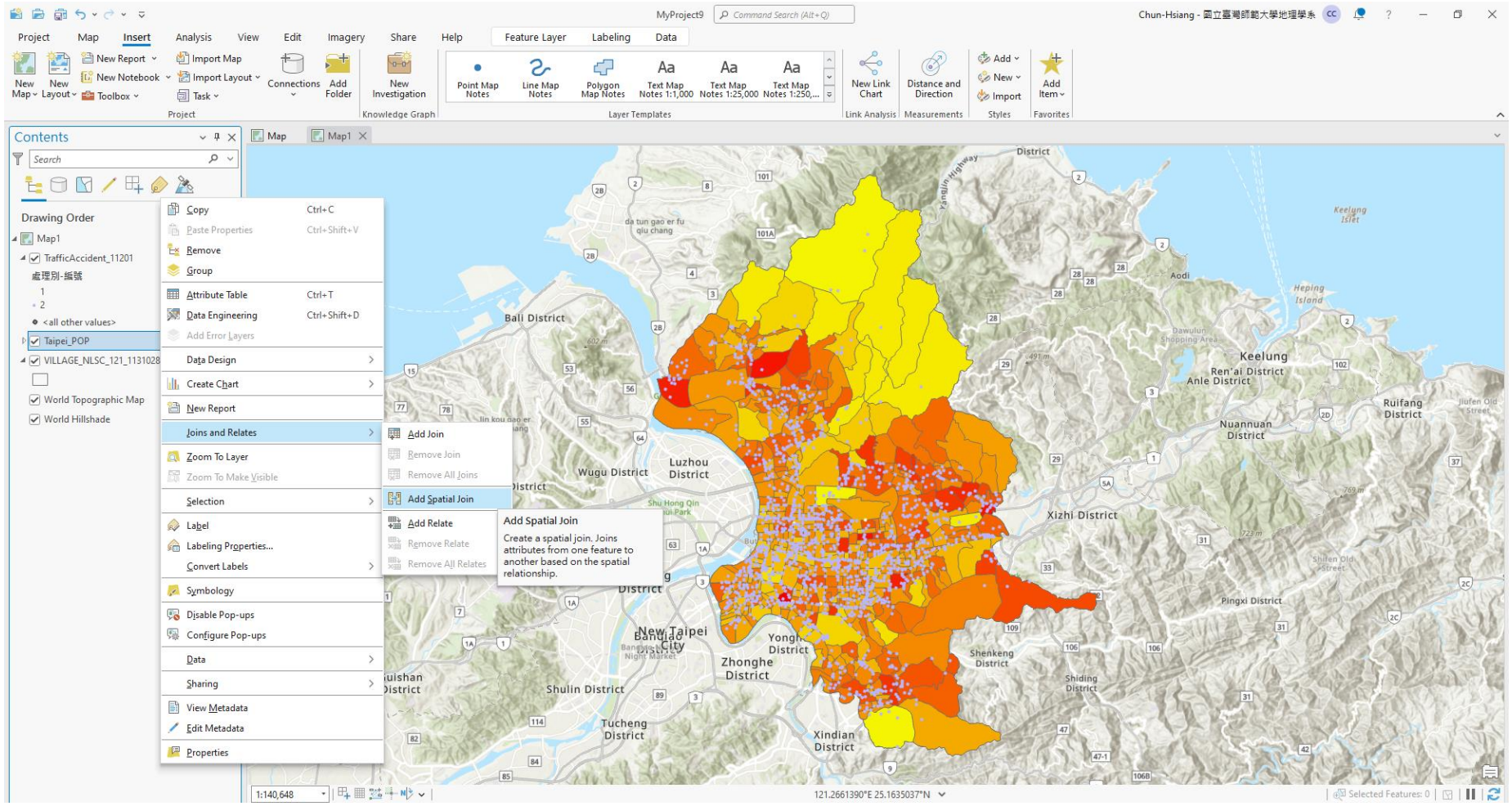
Fill 1 into “cnt” Field to both 11201 & 11207



Spatial Join Taipei Traffic Accident Data



Spatial Join Traffic Accident Data into Village



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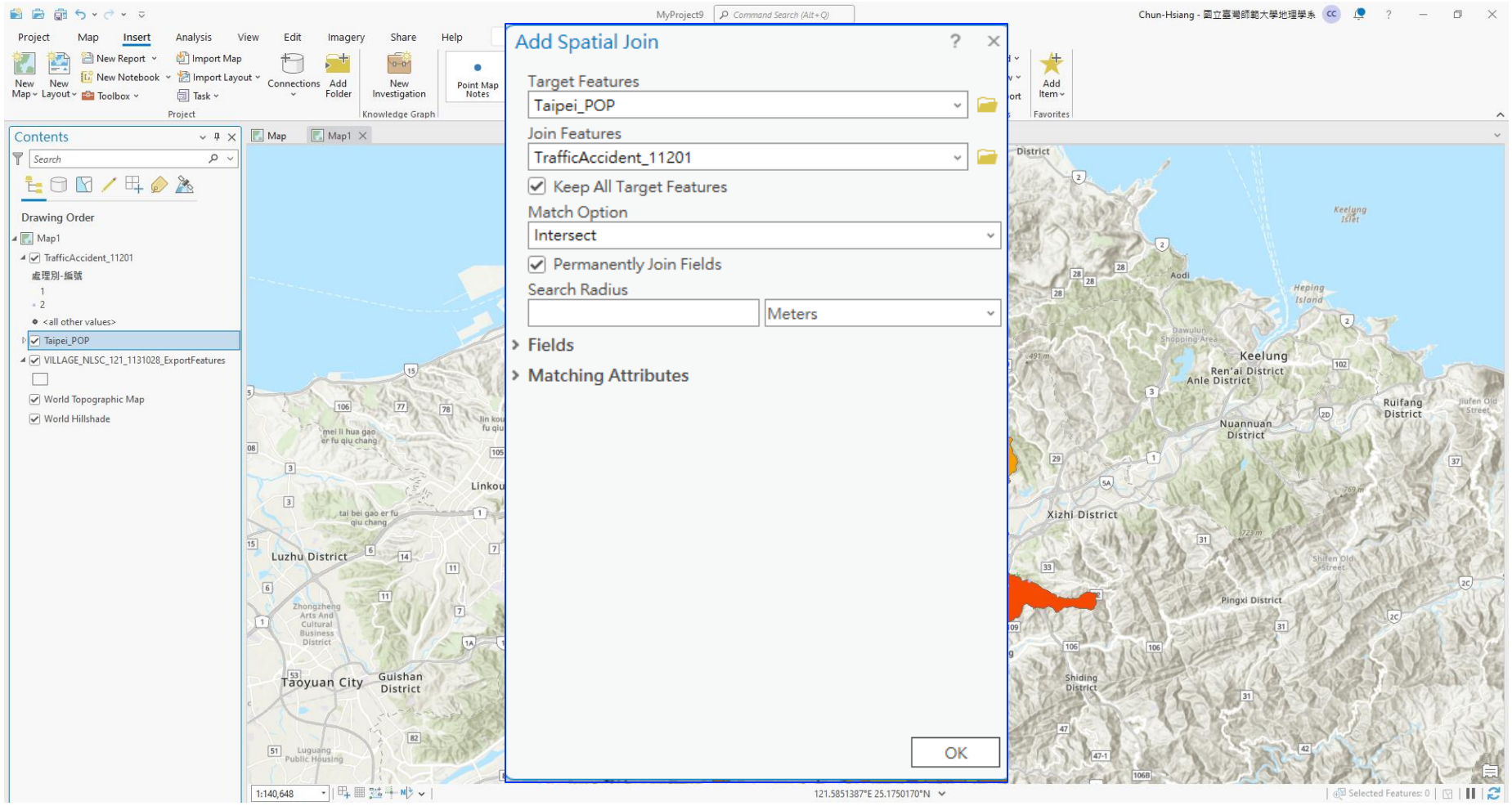
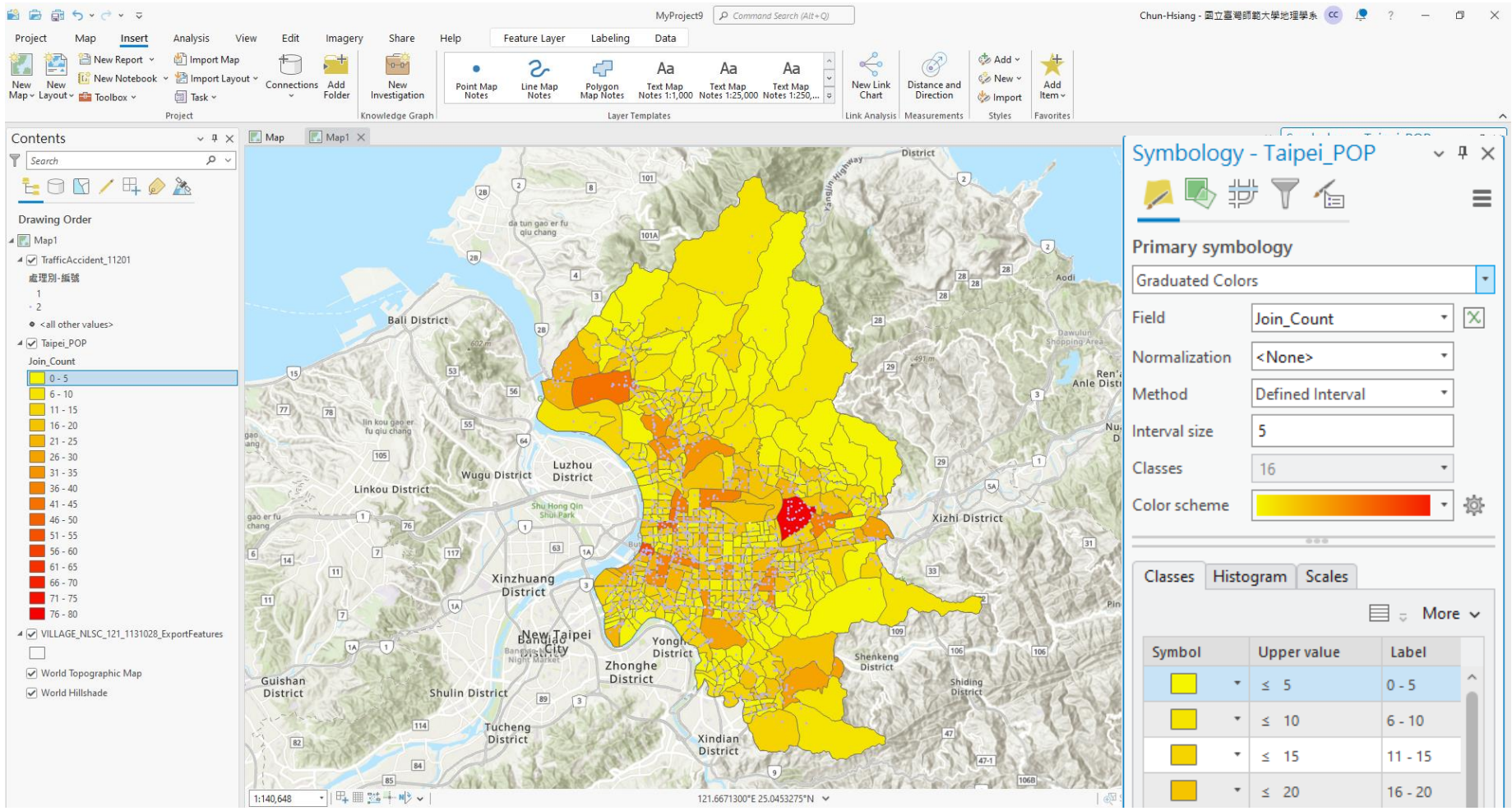


Spatial Join Traffic Accident Data into Village

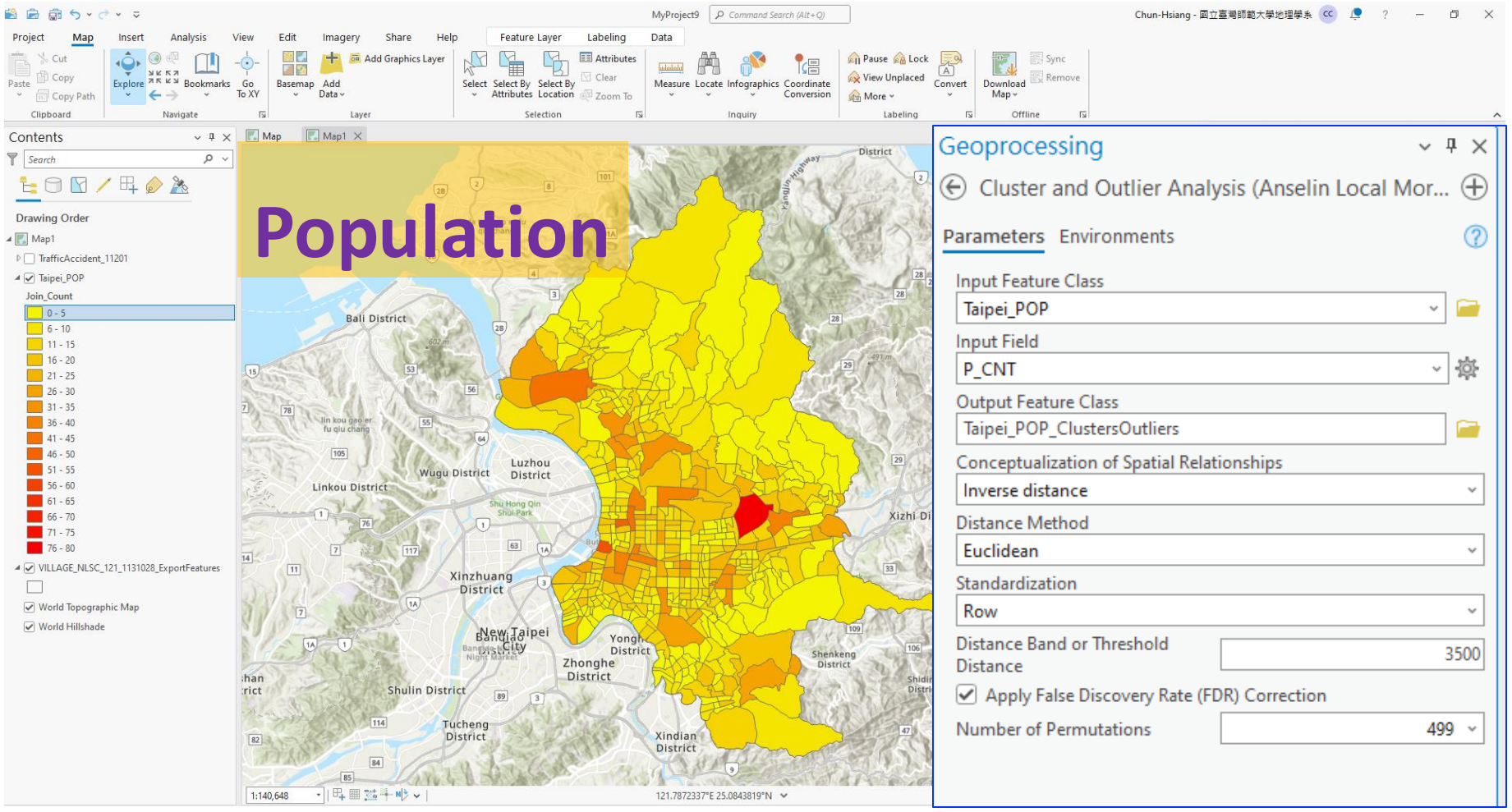


Spatial Statistical Analysis

Compute the following functions

1) Cluster and Outlier Analysis (Anselin Local Moran's I) (Population & Traffic Accident)
2) Hot Spot Analysis (Getis-Ord G*) (Population & Traffic Accident)
3) Spatial Outlier Detection (Traffic Accident)
4) Density-based Clustering (DBSCAN and OPTICS)
5) Multivariate Clustering (NumCluster: 5 and 10)

Cluster and Outlier Analysis (Anselin Local Moran's I)



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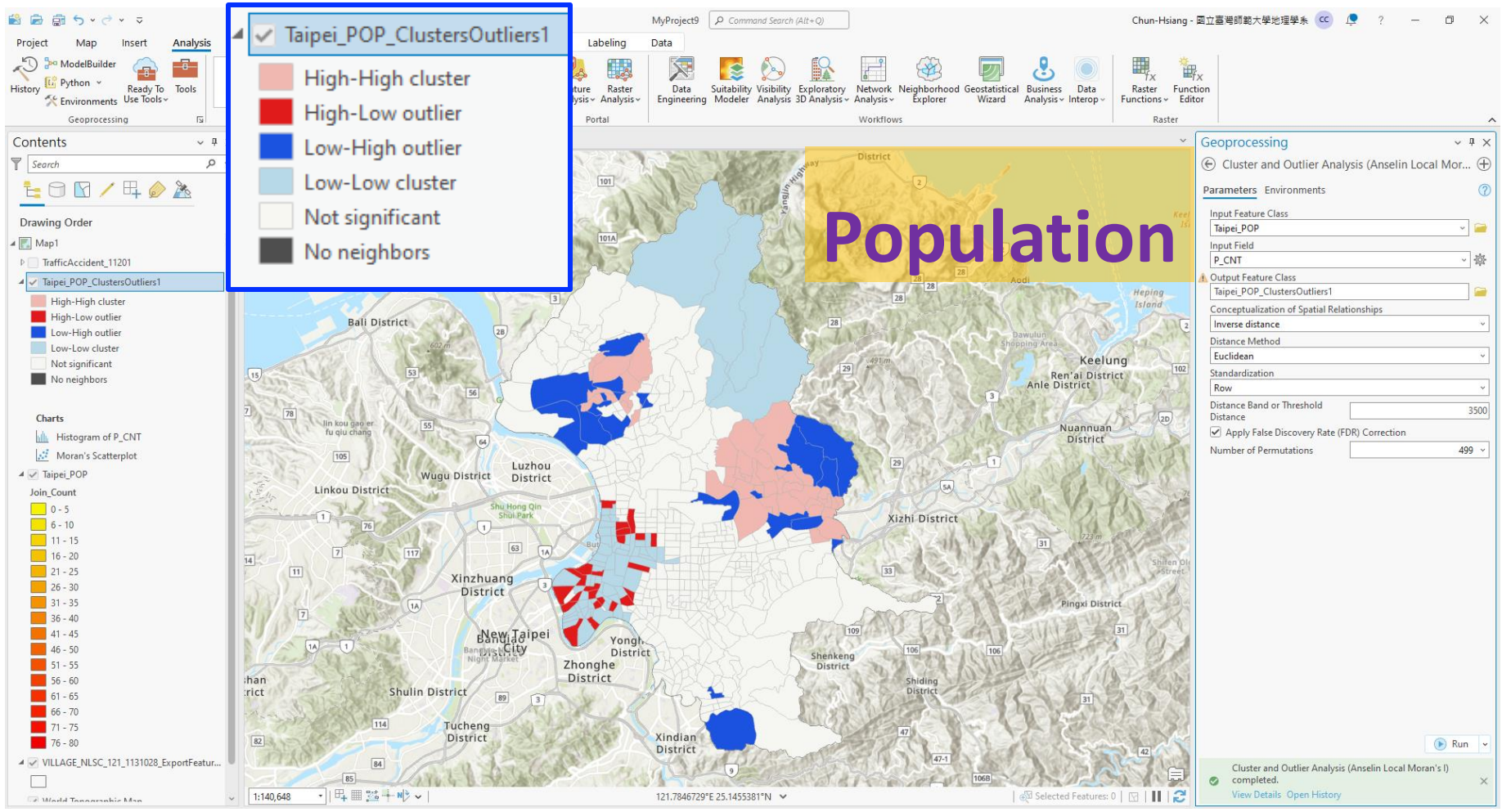
Cluster and Outlier Analysis (Anselin Local Moran's I)



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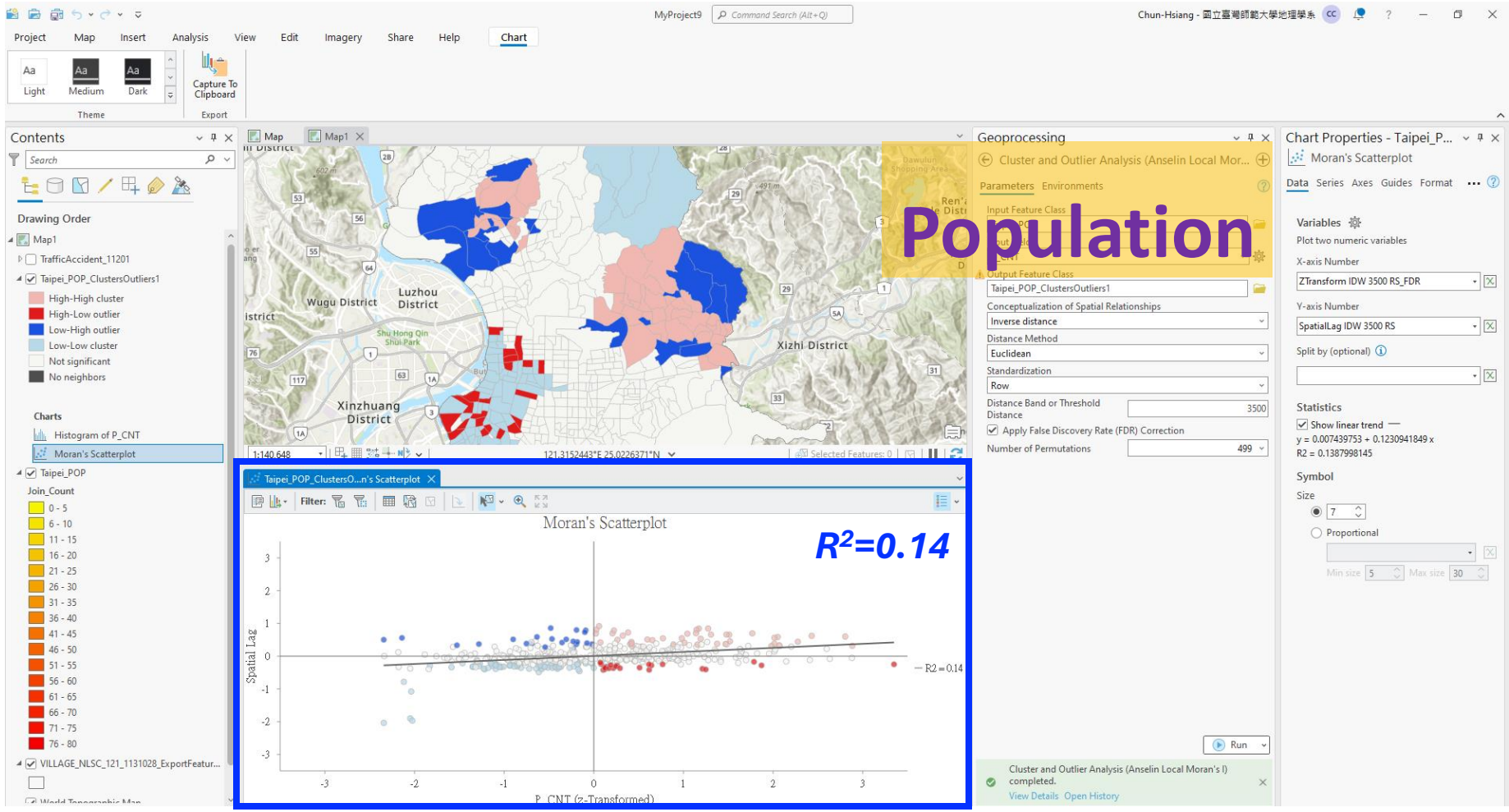

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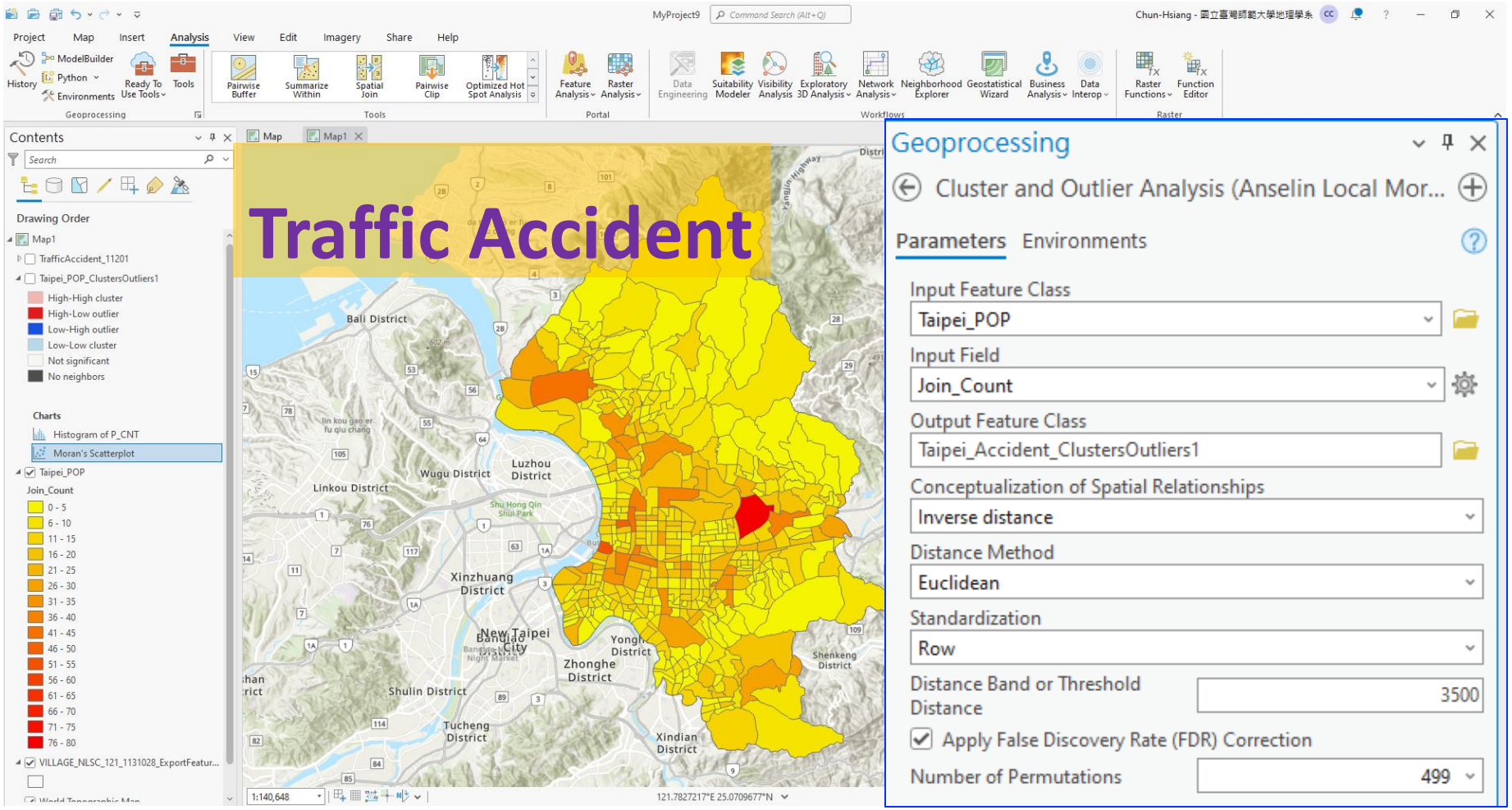

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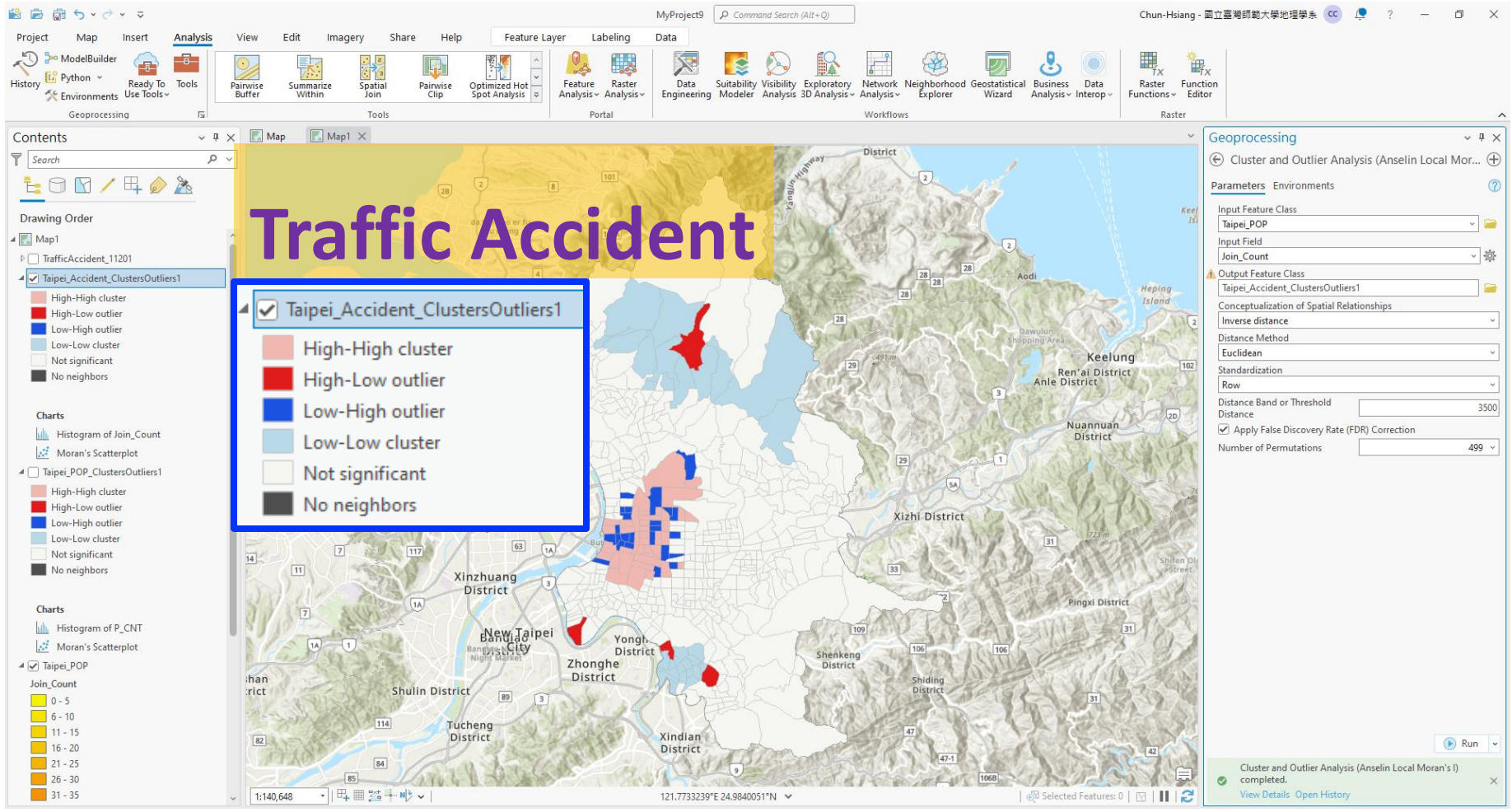

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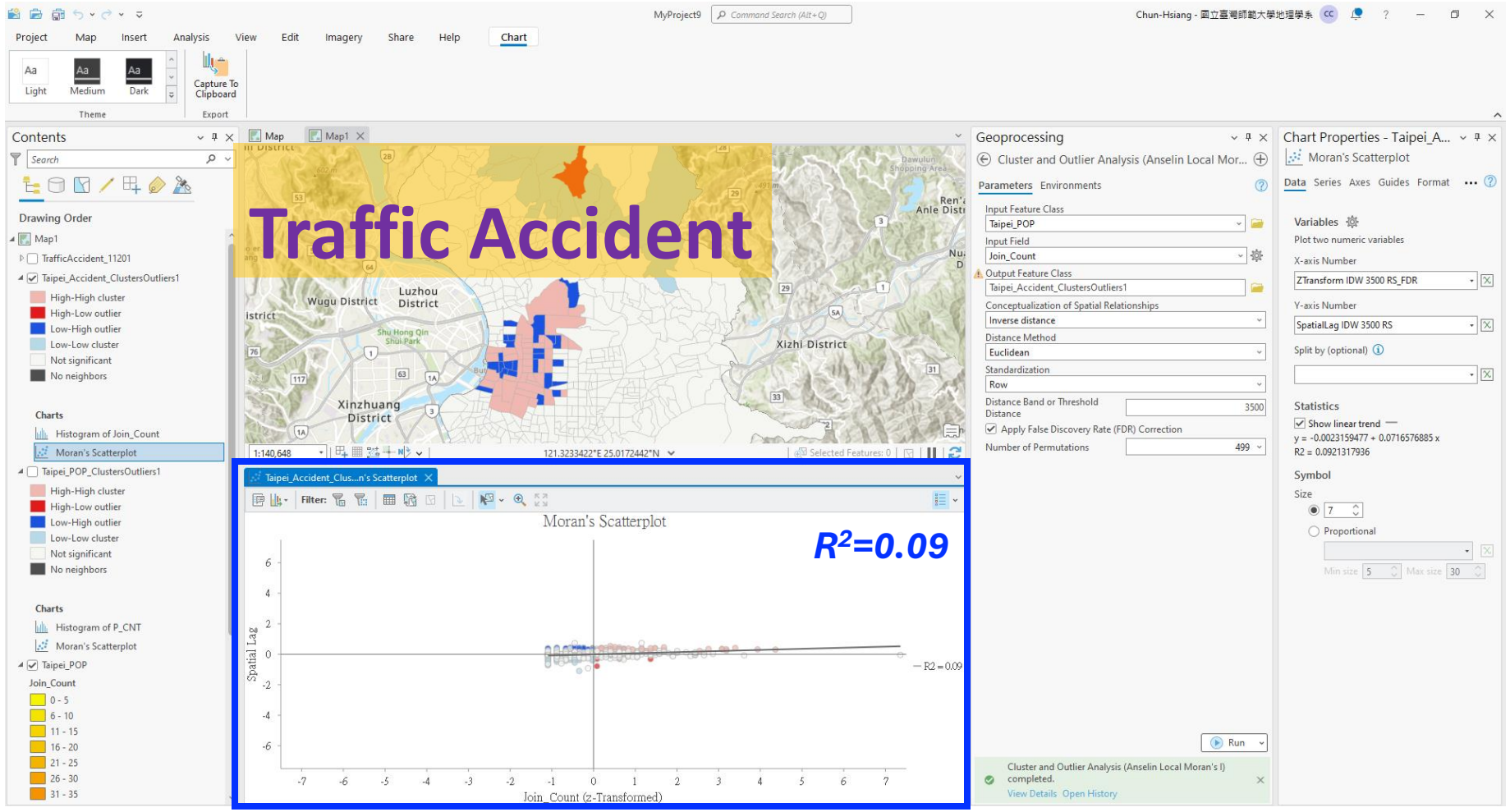
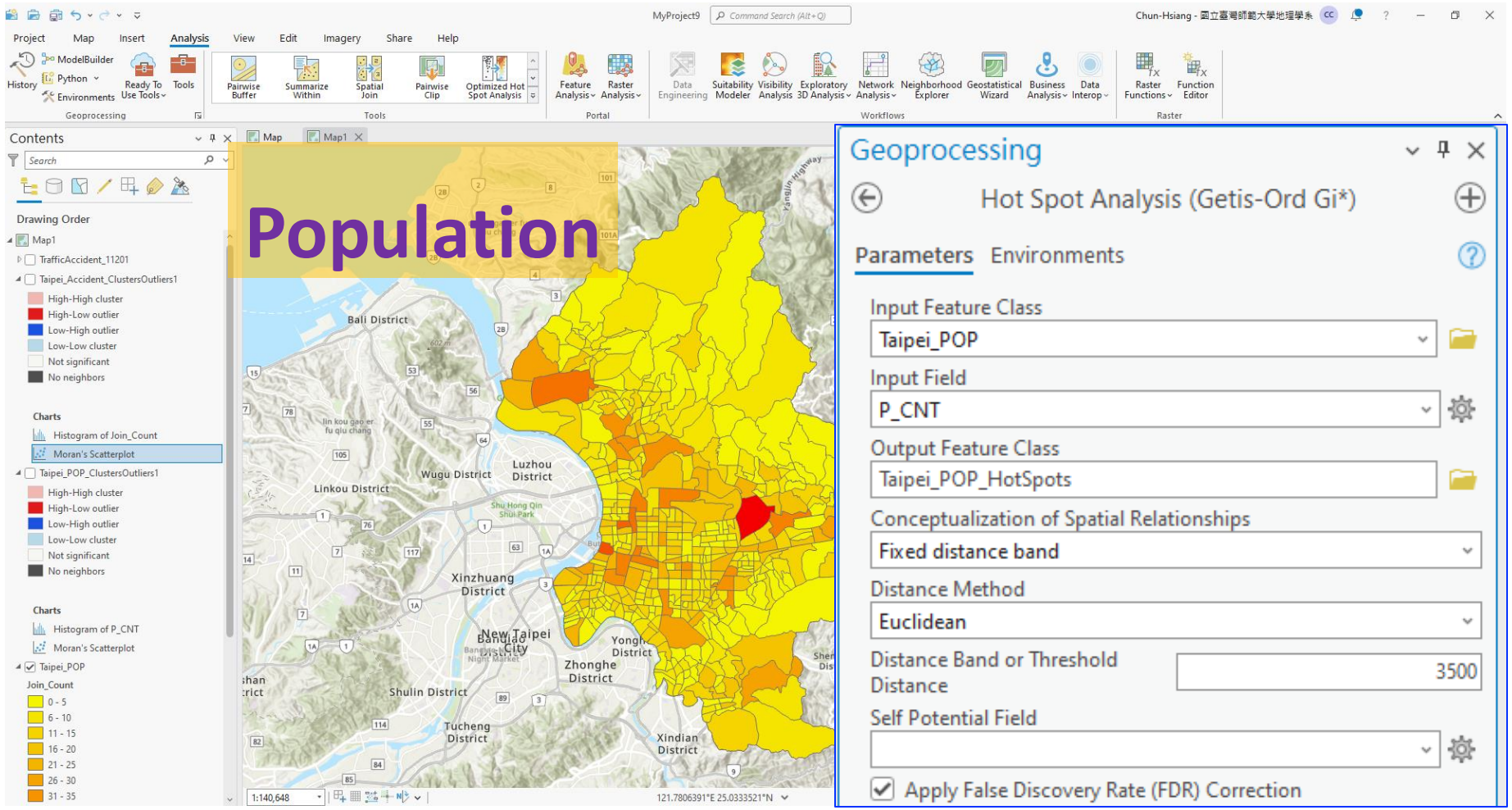


Hot Spot Analysis (Getis-Ord G*)



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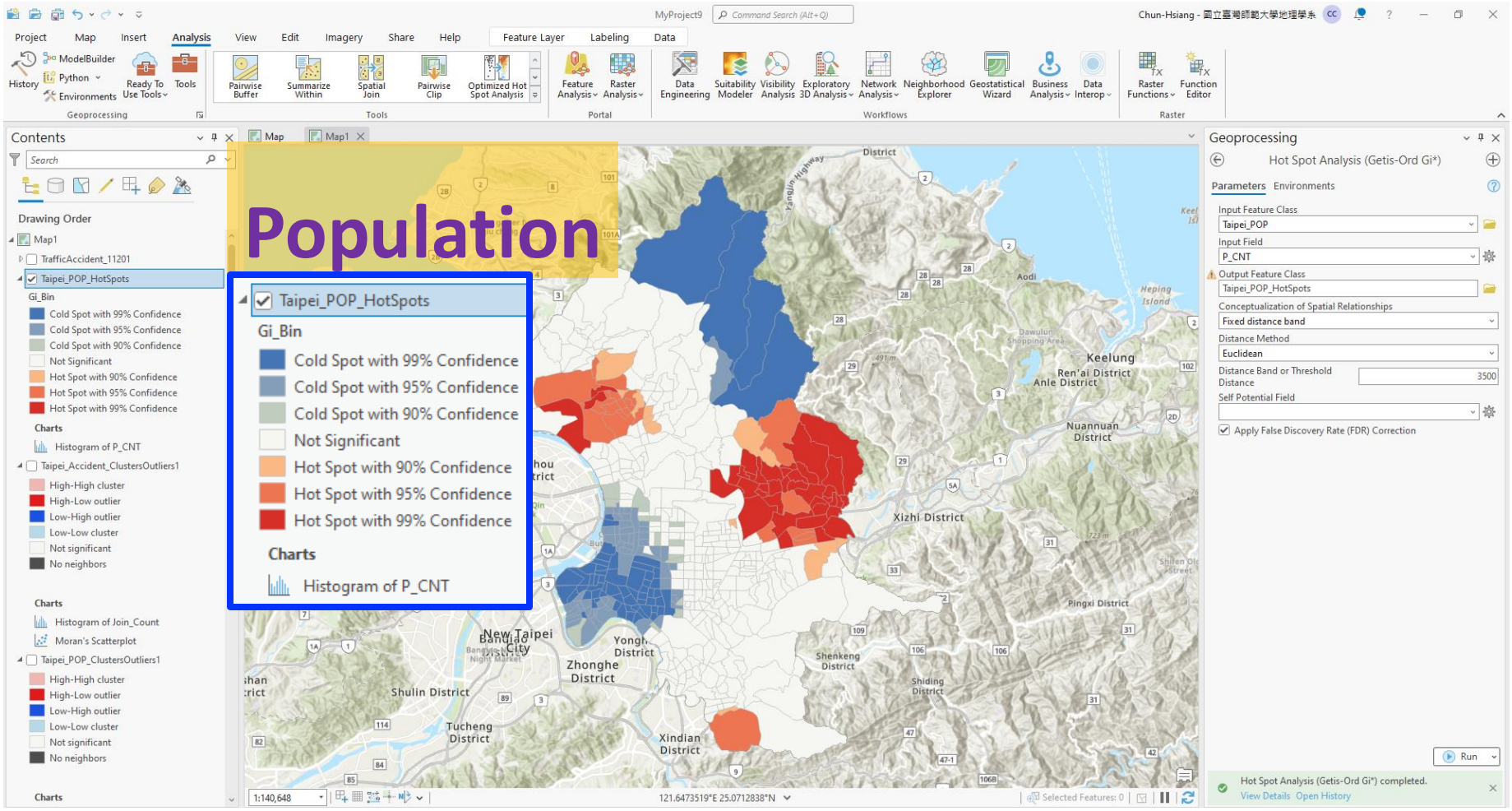

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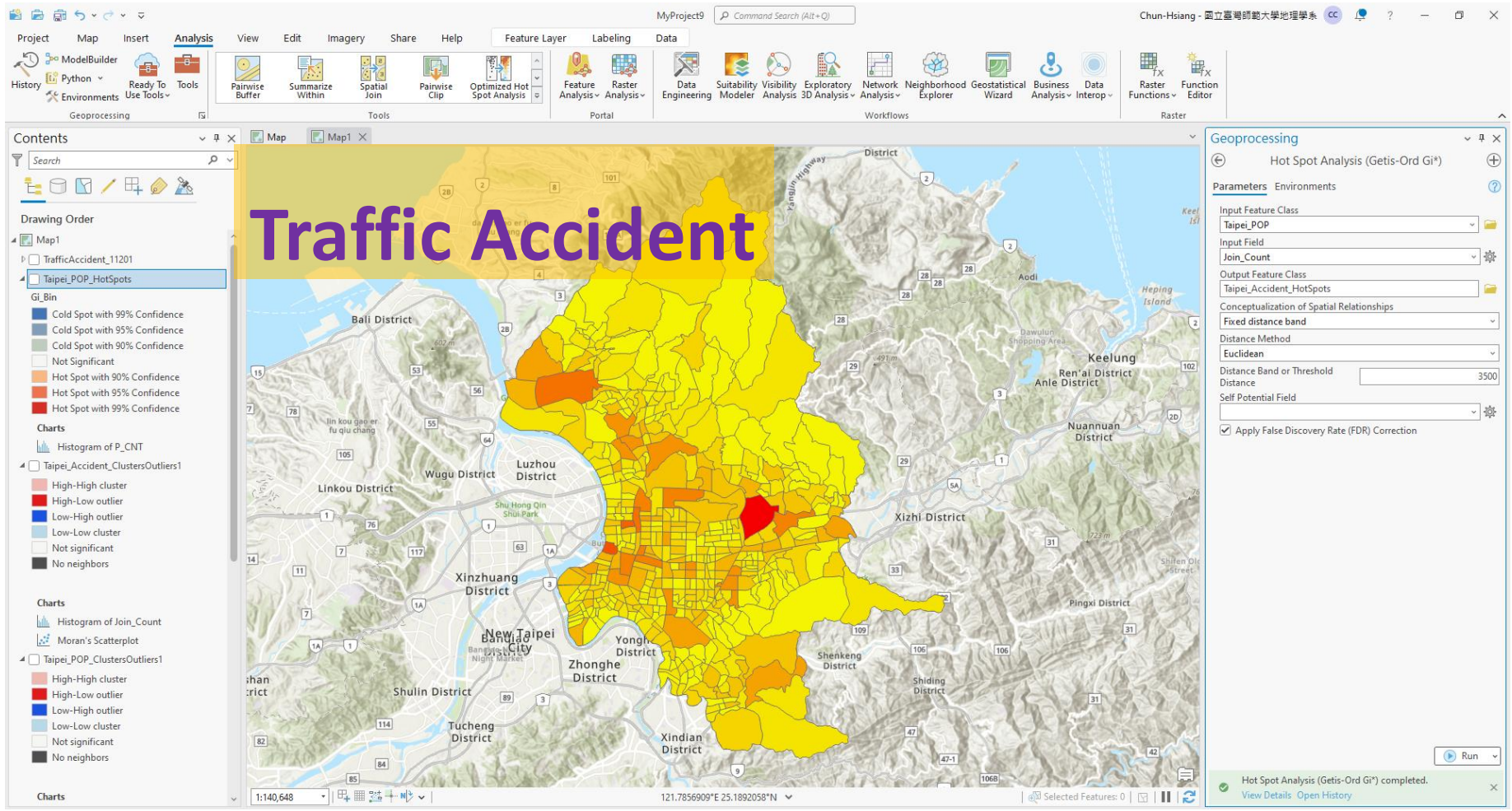

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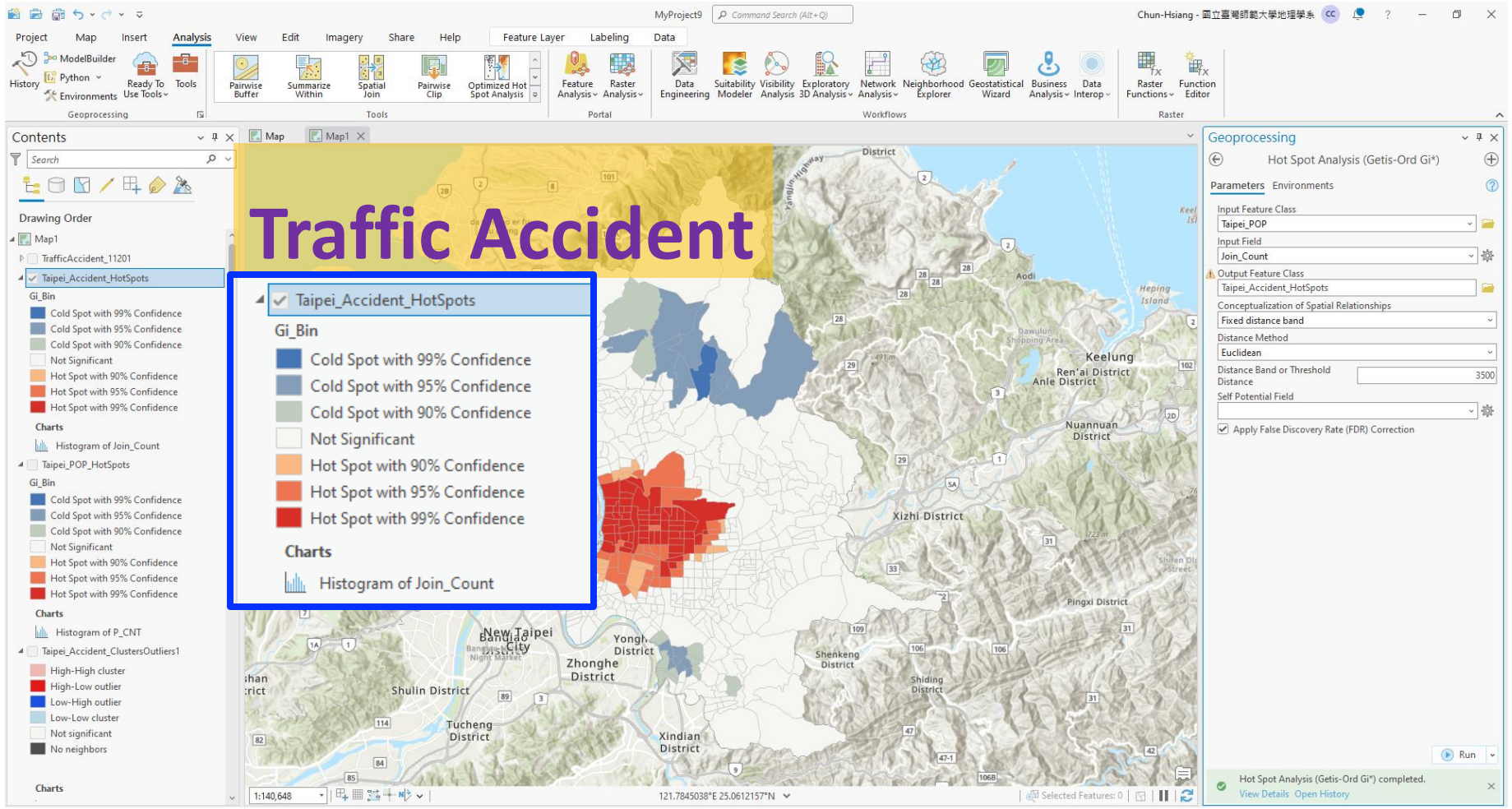
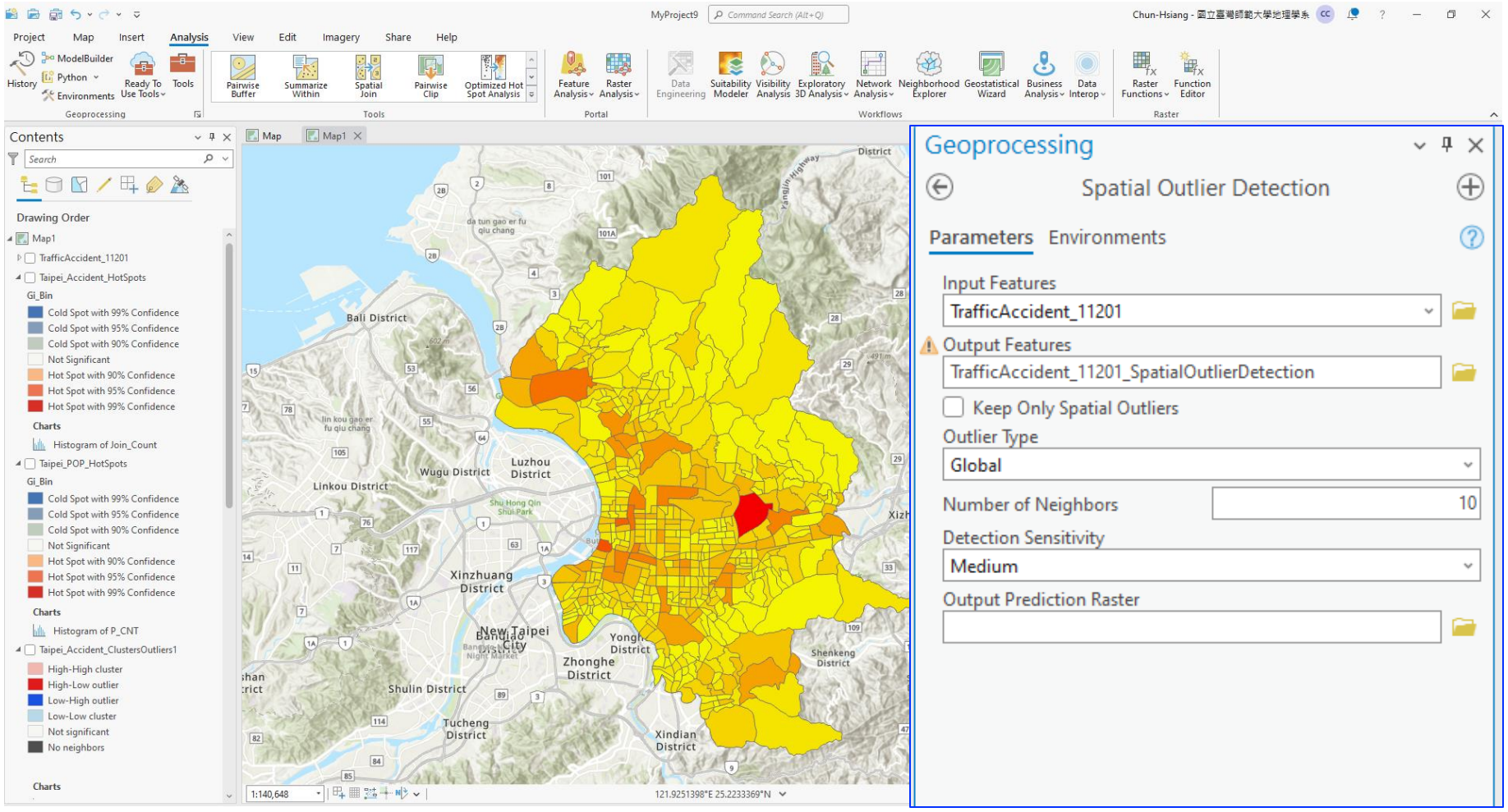


Spatial Outlier Detection



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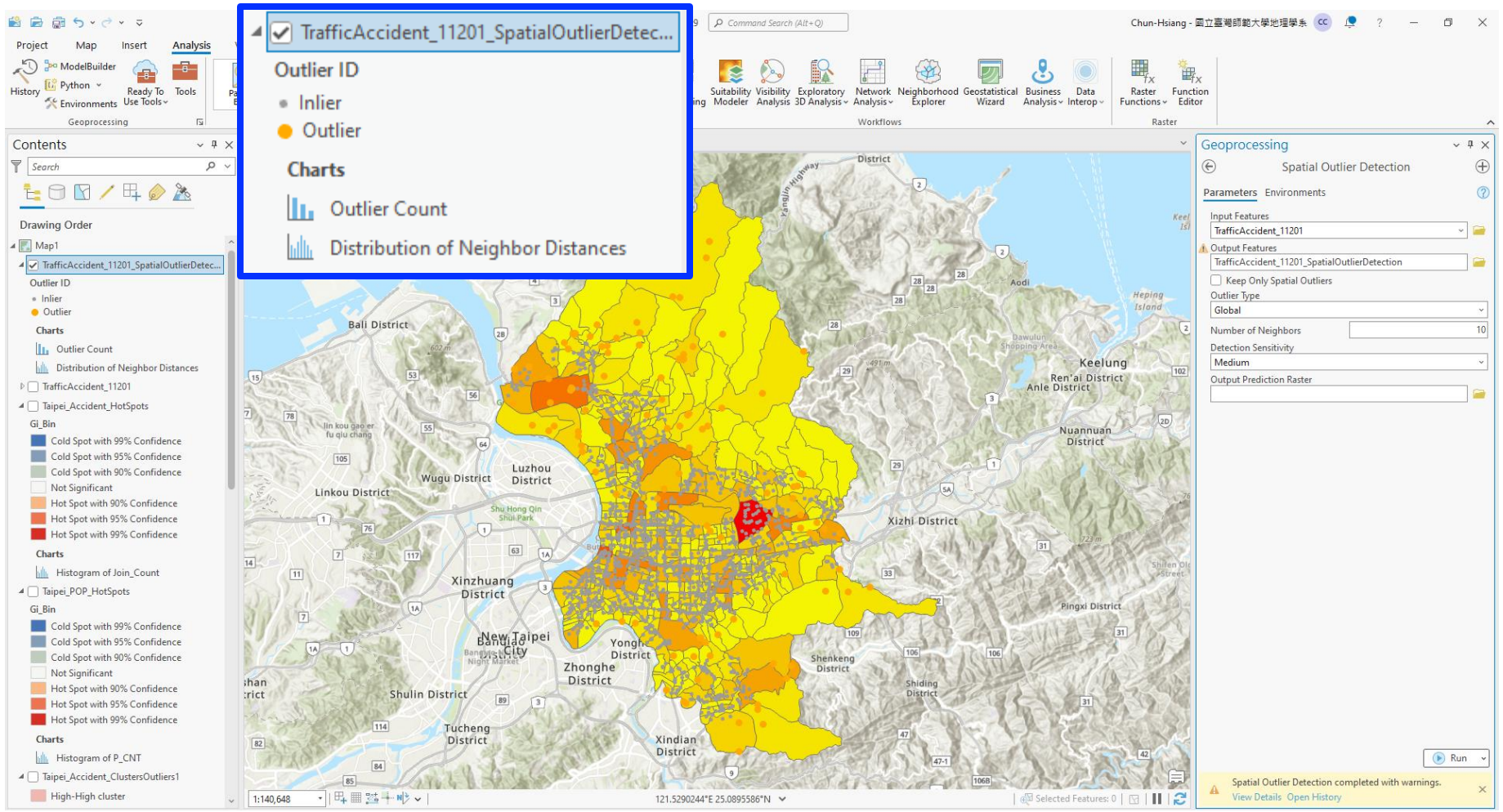
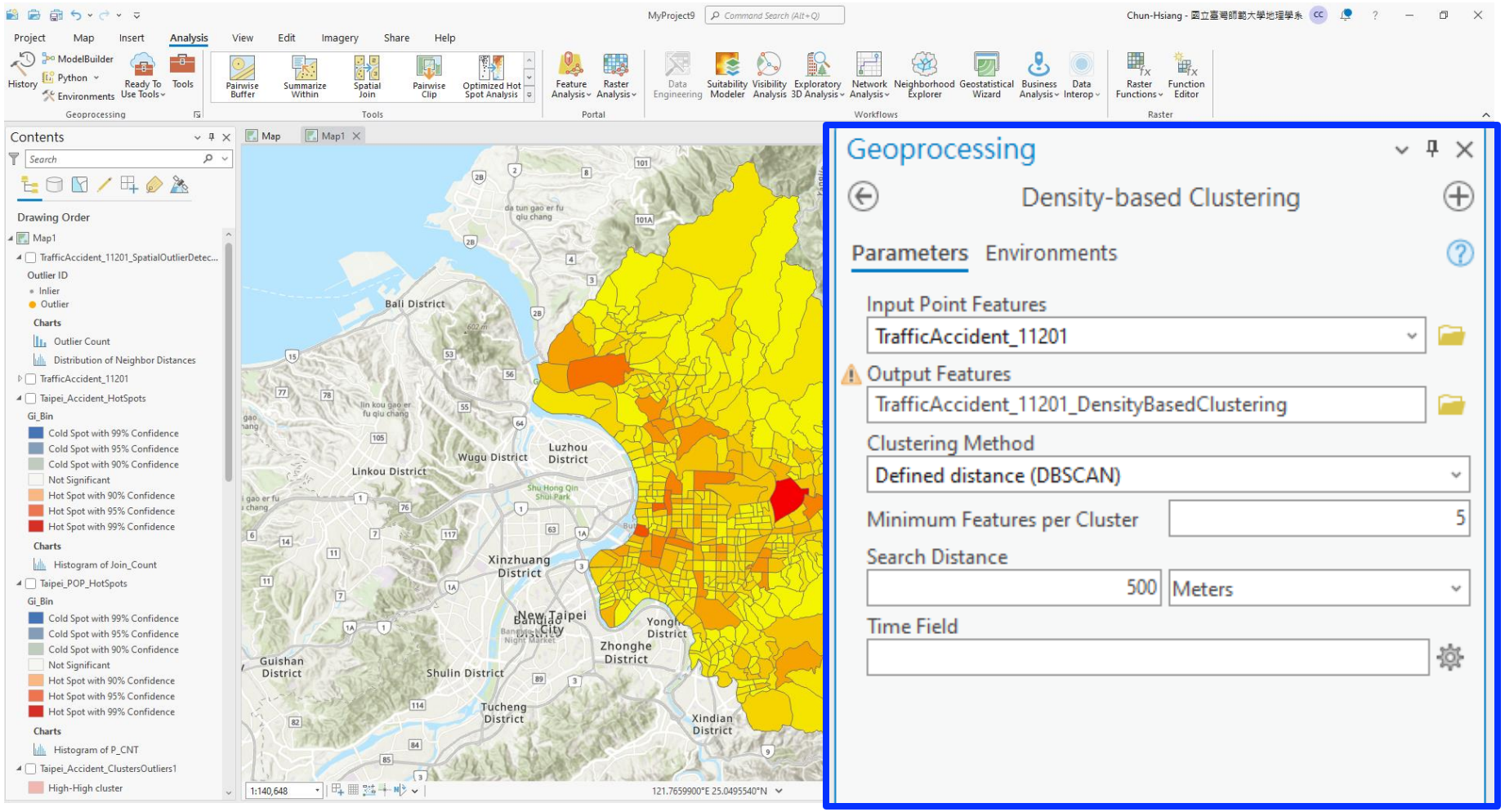
Spatial Outlier Detection



Density-based Clustering :: DBSCAN
MinPt: 5; SearchDist: 500



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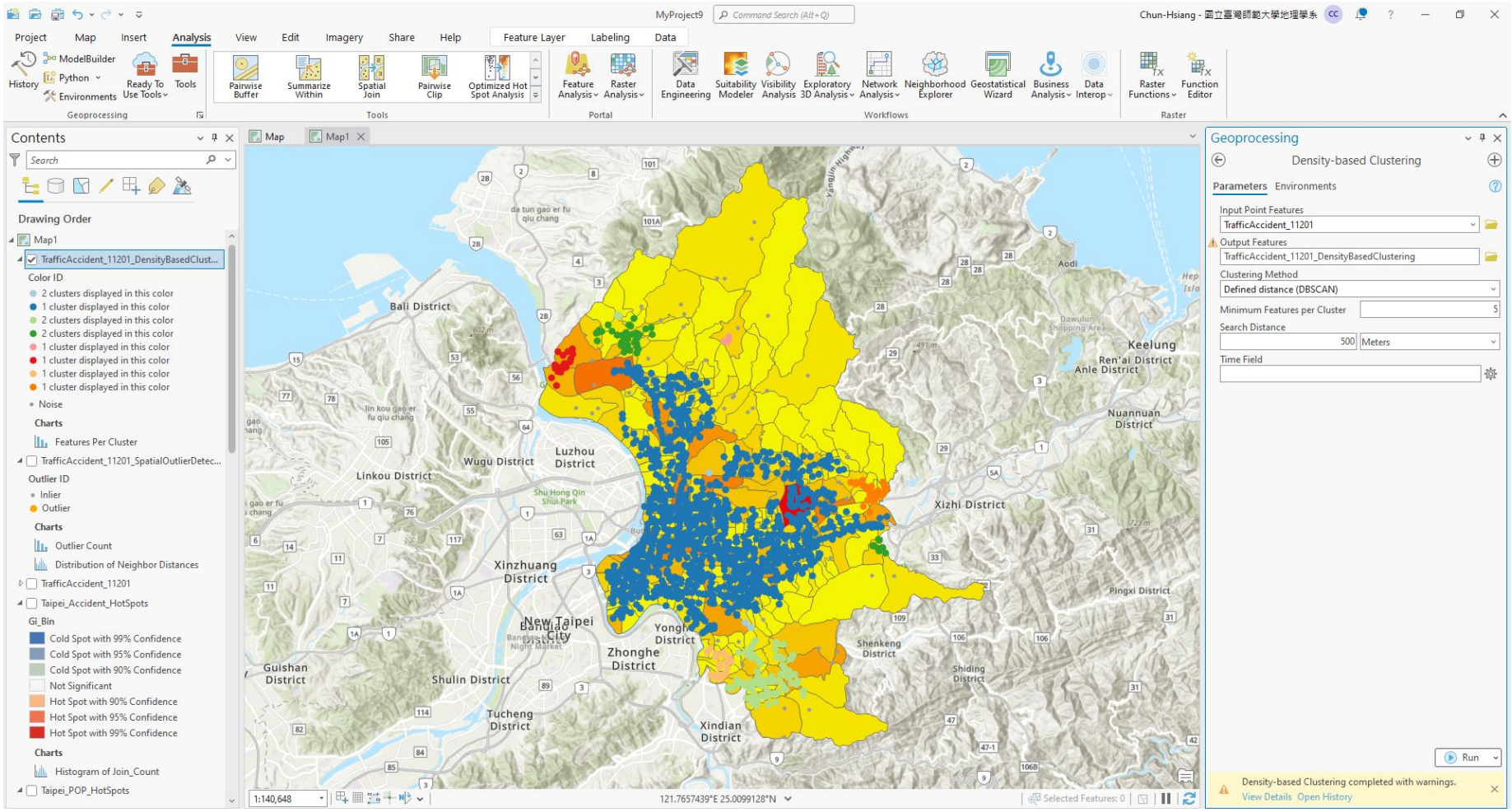
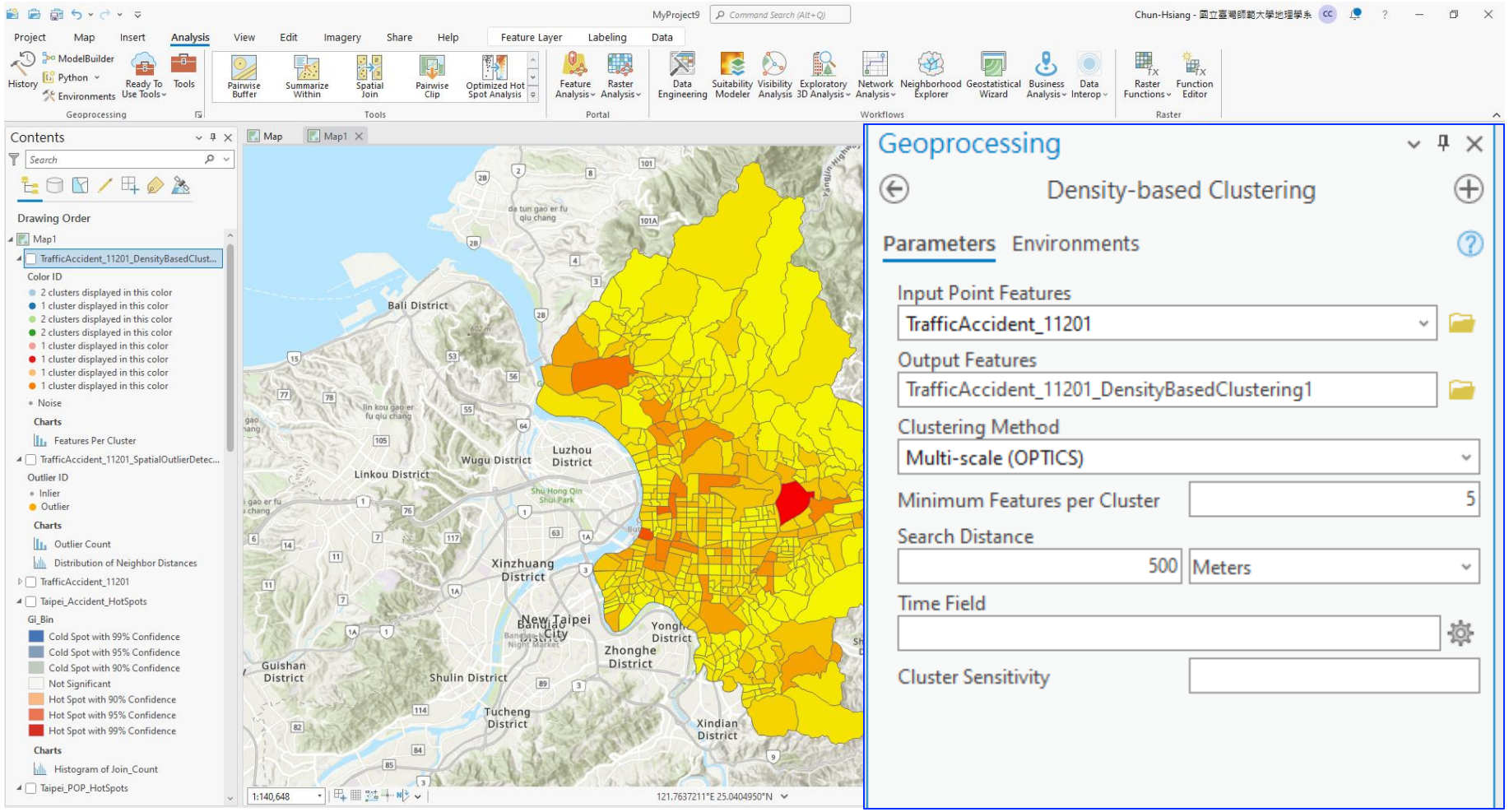


Density-based Clustering :: OPTICS
MinPt: 5; SearchDist: 500



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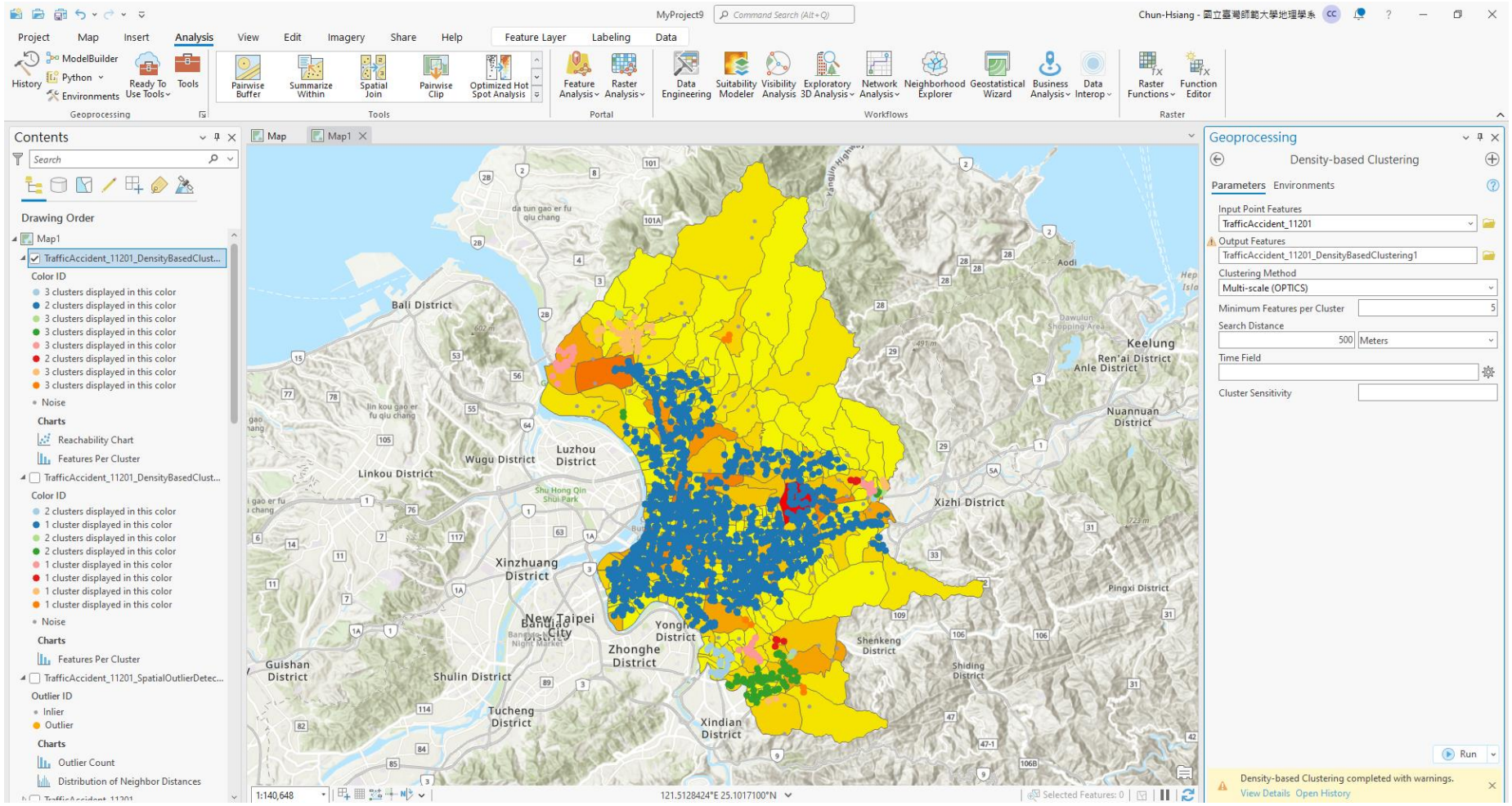
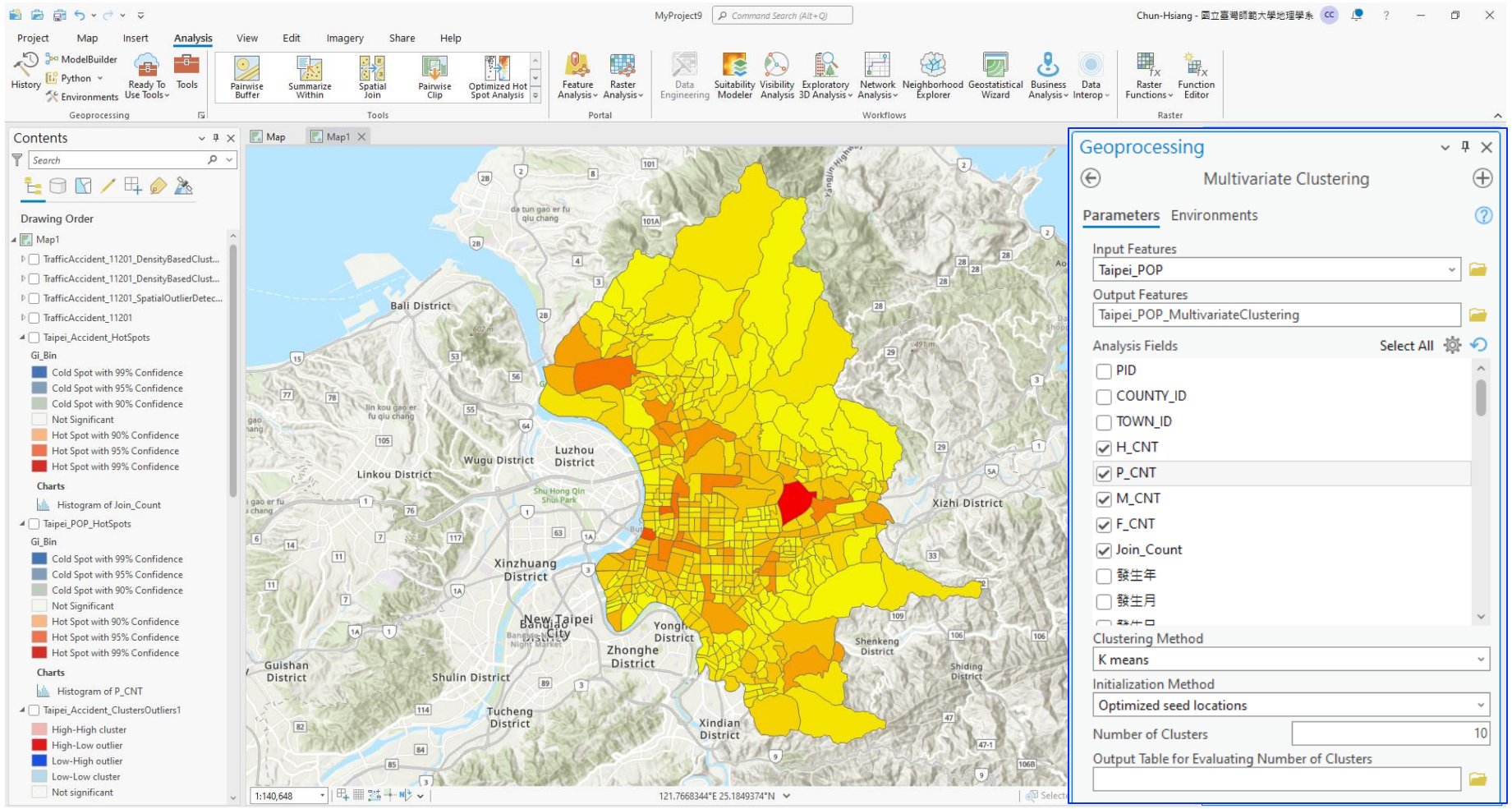
MinPt: 5; SearchDist: 500



Multivariate Clustering :: *k*-means
NumCluster: 10



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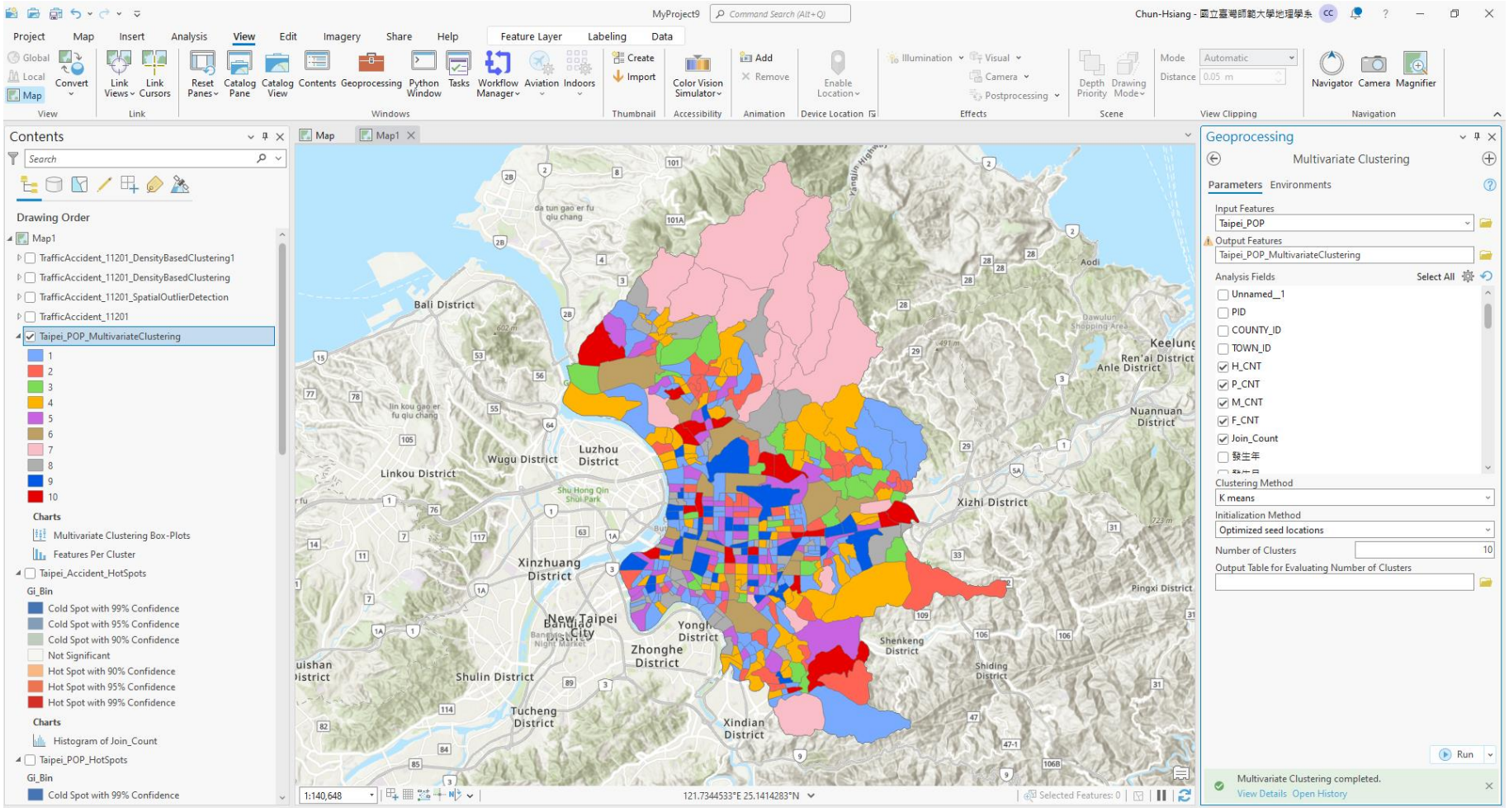

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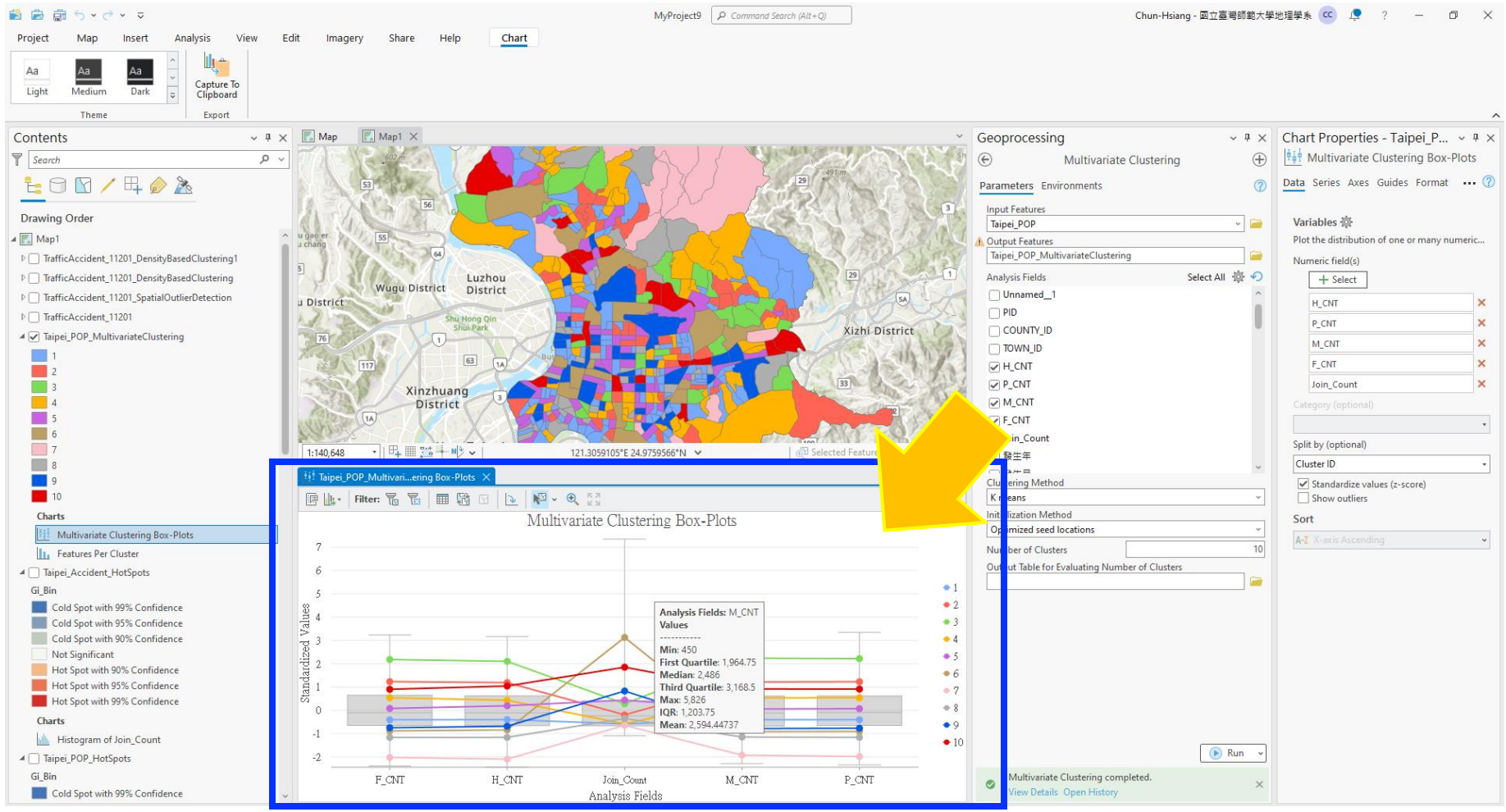

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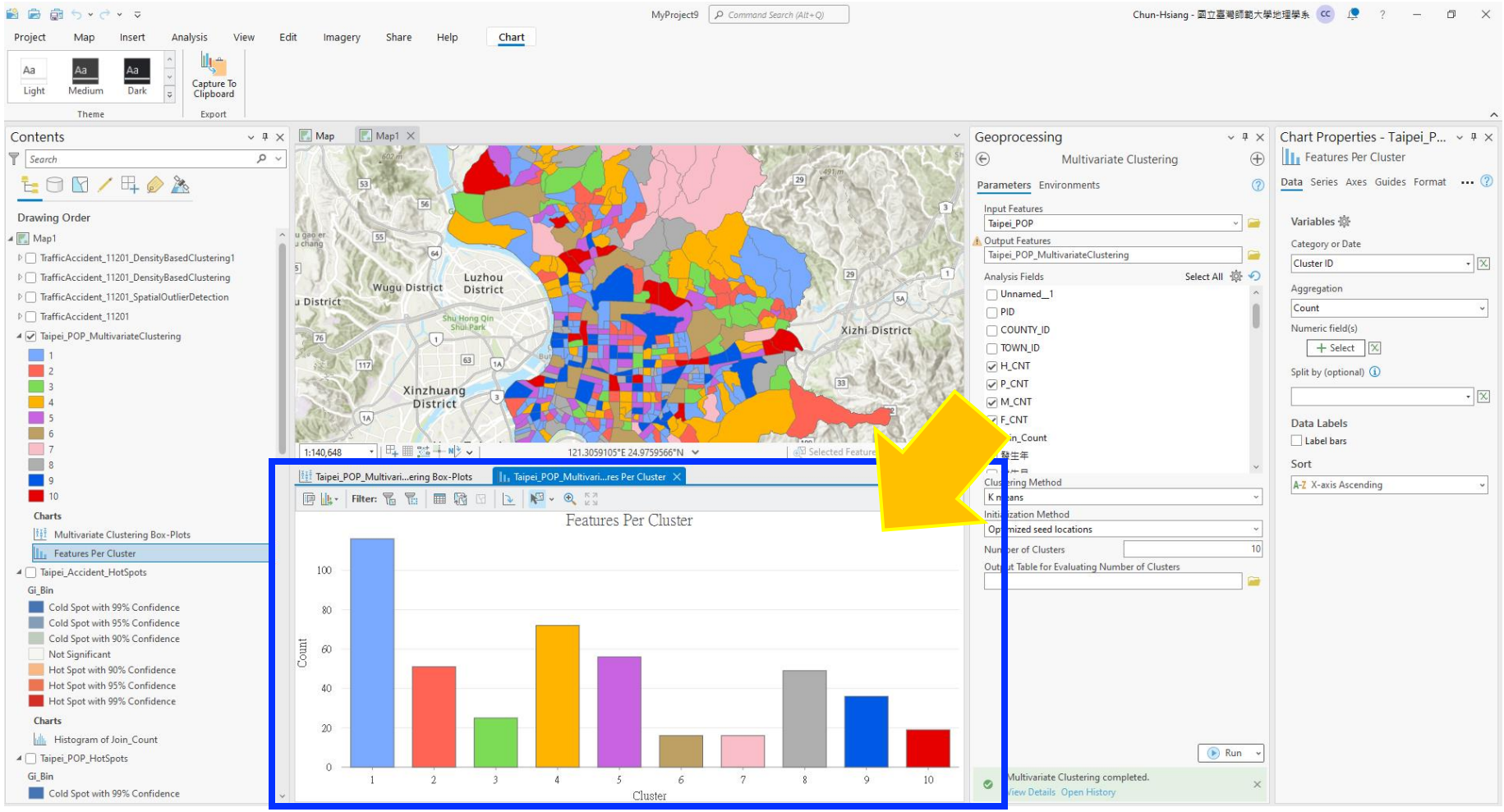

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Multivariate Clustering :: *k*-means

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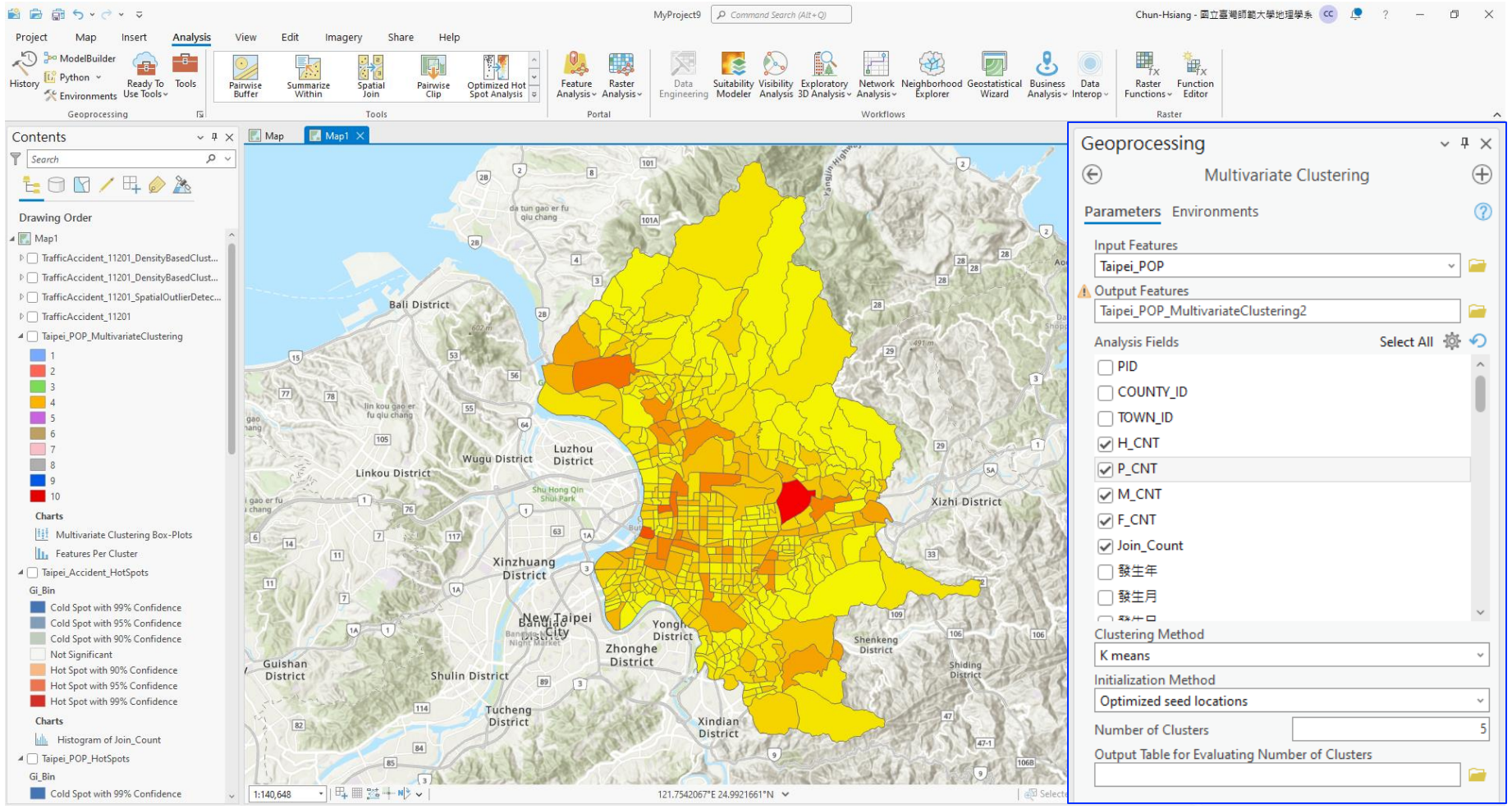

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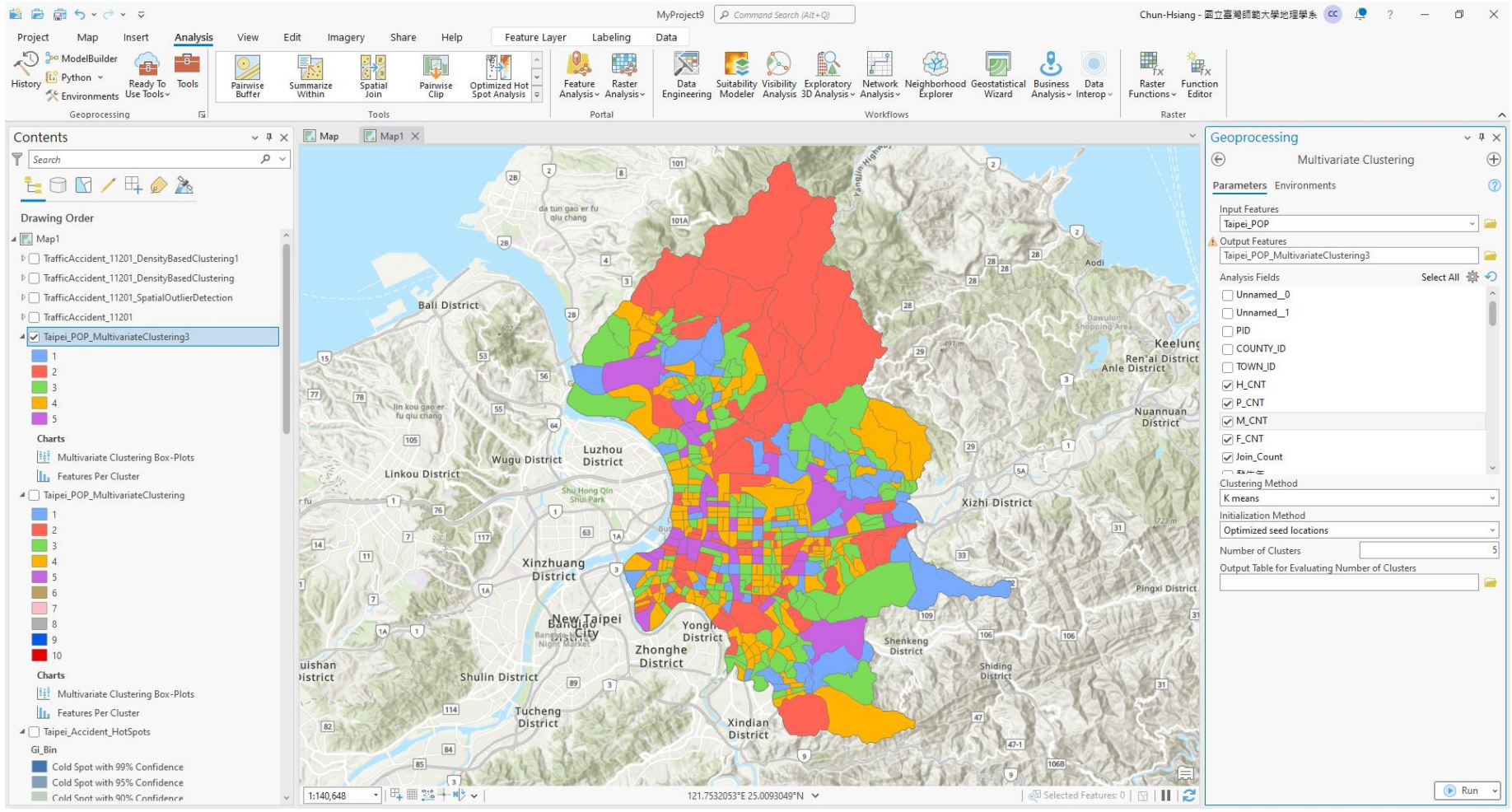

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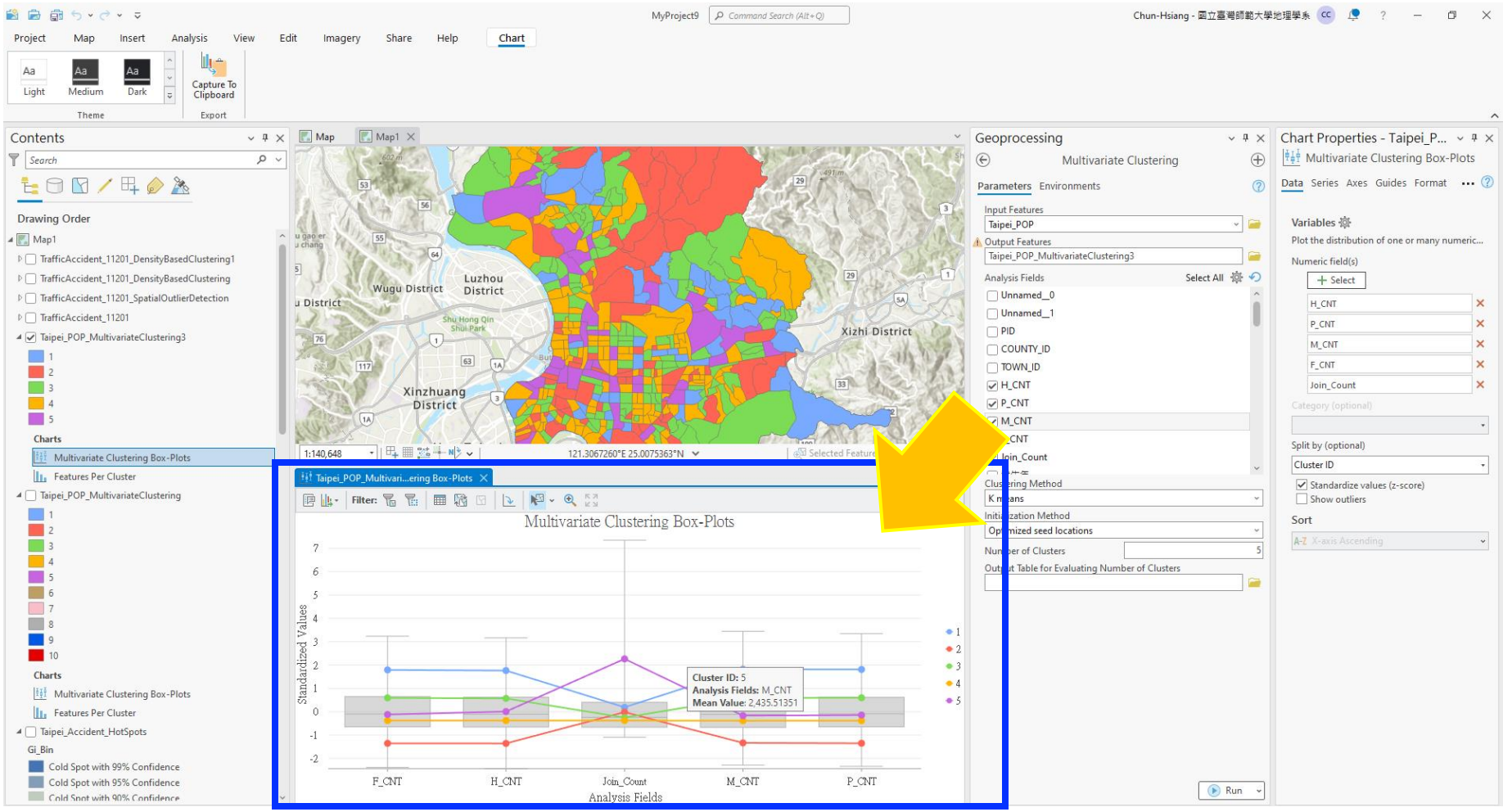

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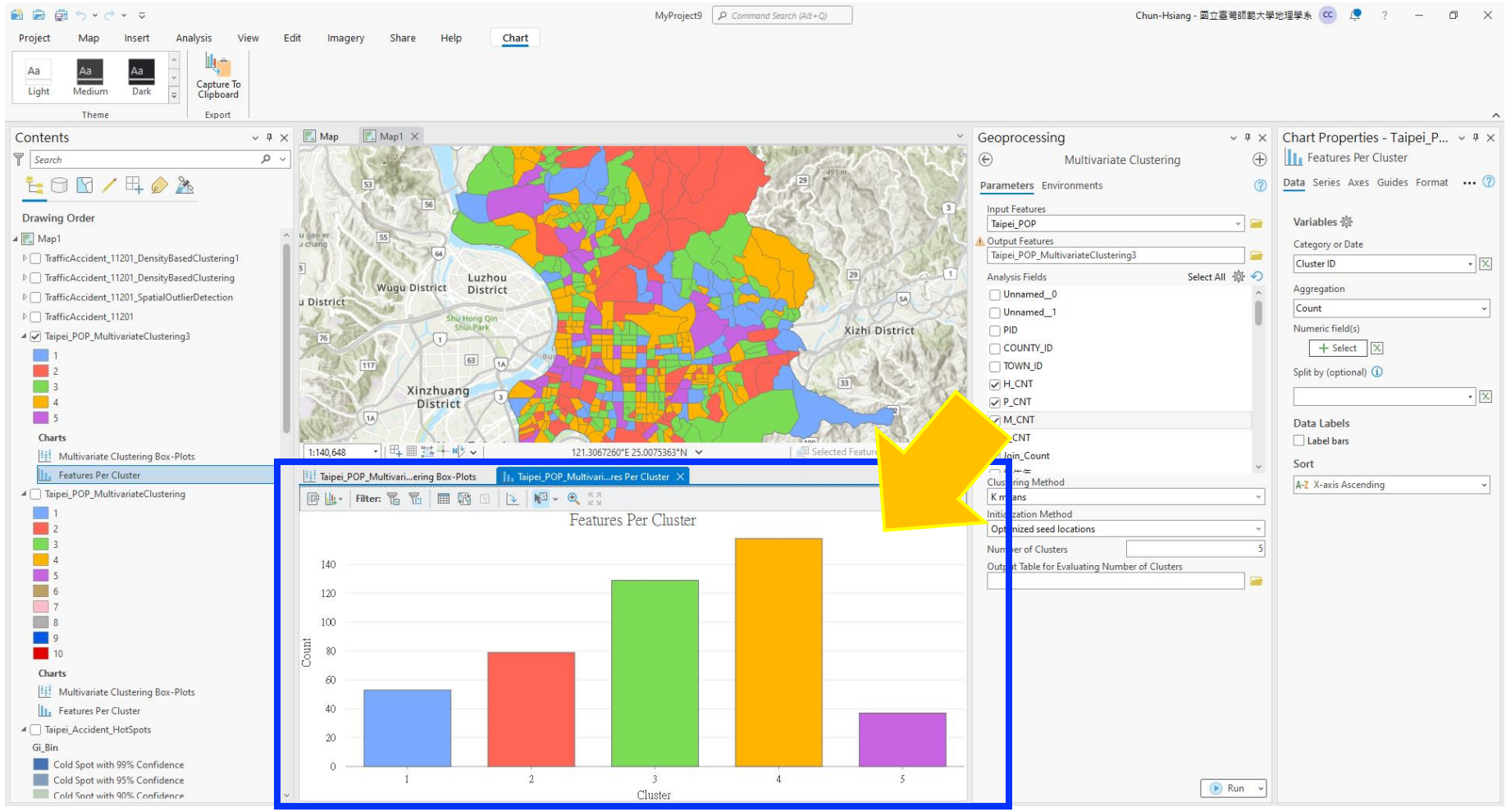

Notice

- You have to explain the meanings of the results point-by-point.
- For example...
  - We found that 🀦🀧🀩🀪 district exhibited a statisitically significant cold spot, whereas 🀿🀿🀿, 🂂🂂🂂, and 🀫🀫🀫 districts demonstrated statisitically significant hot spots. Because the population of 🀦🀧🀩🀪 was relatively low; however, the neighboring districts at least had an average population.
  - ...

The End

Thank you for your attention!

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