Argentis Group: Office Location Proposal

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Argentis Group: Location Requirements

- 7 or 8 New Offices in Central Ohio
  - Top 100 highest net worth clients
  - Latitude and Longitude
- Minimize travel time to an agent office

Model Proposal: Cluster Analysis

- K-Means Clustering
  - Groups by the "K" number of clusters
  - Randomly assigns variables to clusters
  - Measures distance between variables
    - Euclidean distance
      - $d_{uv} = \sqrt{(u_1 - v_1)^2 + (u_2 - v_2)^2 + \cdots + (u_q - v_q)^2}$
    - Variables are arranged in groups, so they are the most "similar"
      - According to the Euclidean distance between variables
  - Repeats this process until either:
    - Reaches the maximum number of iterations
    - Finds the clusters with the least dissimilarity for the "k" number

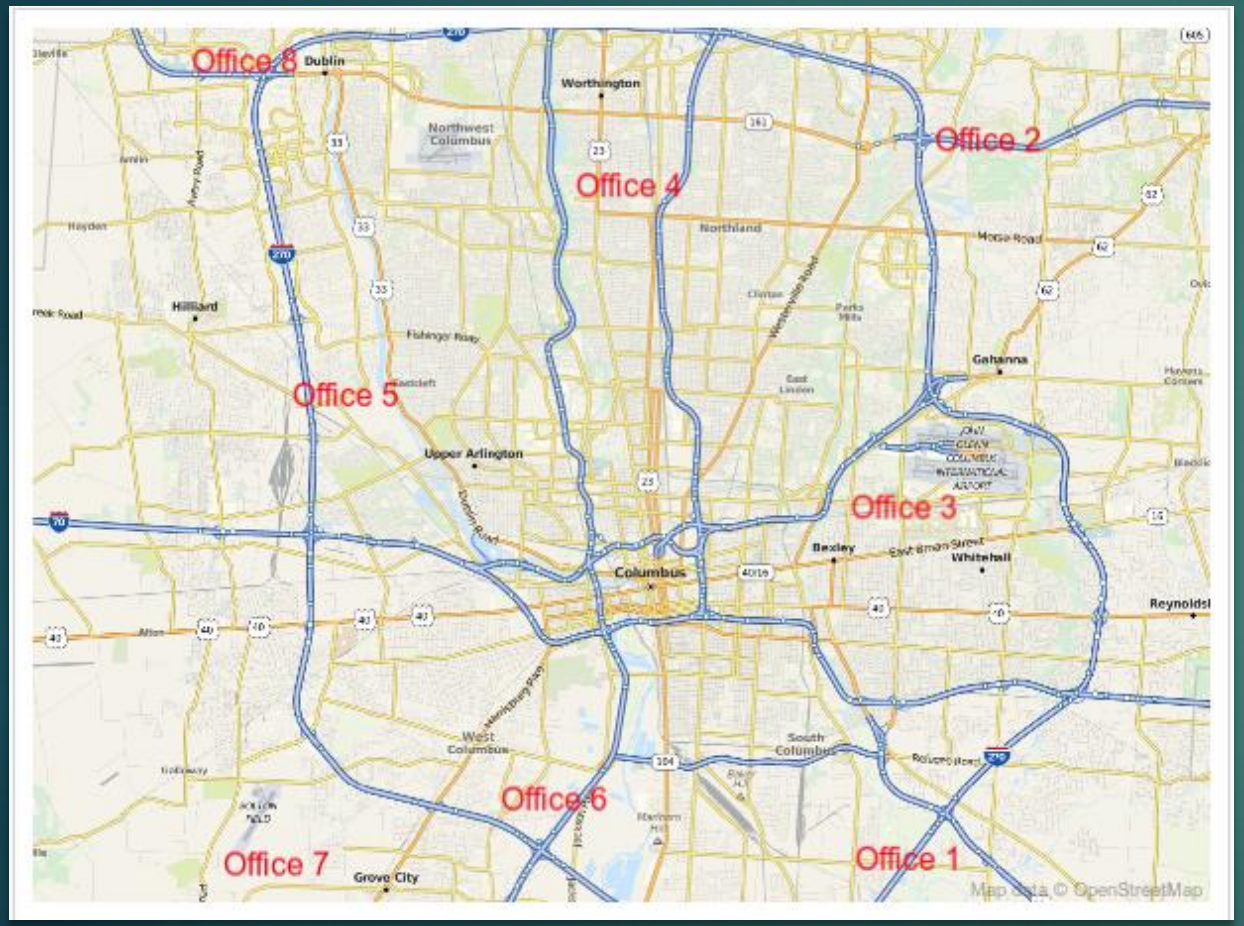
Argentis: 8 Cluster Model

- K=8
- Grouped by
  - Latitude
  - Longitude
- 10 Iterations
- SAS Studio

Cluster Summary

Cluster	Frequency	RMS Std Deviation	Maximum Distance from Seed to Observation	Nearest Cluster	Distance Between Cluster Centroids
1	13	0.0347	0.0719	3	0.0938
2	13	0.0308	0.0769	3	0.1022
3	12	0.0332	0.0724	1	0.0938
4	20	0.0365	0.0821	5	0.1134
5	10	0.0271	0.0655	8	0.0956
6	12	0.0327	0.0608	7	0.0983
7	9	0.0255	0.0557	6	0.0983
8	11	0.0257	0.0636	5	0.0956

Argentis:
Proposed 8 Office Locations



- Office 1 – Pickerington
- Office 2 – Westerville
- Office 3 – Bexley
- Office 4 – Worthington
- Office 5 – Upper Arlington
- Office 6 – Franklinton
- Office 7 – Grove City
- Office 8 – Dublin

Argentis:

8 Cluster Model Concerns

Advantages

- Cluster 1
  - Large proportion of married customers
  - Large proportion of high potential investment capital
- Cluster 4
  - Larger proportion of married and widowed customers
  - Evenly distributed potential investment capital

Disadvantages

- Cluster 3
  - Large proportion of single customers
  - No divorced customers
  - Large proportion of low potential investment capital

Argentis: 7 Cluster Model

- K=7
- Grouped by
  - Latitude
  - Longitude
- 10 Iterations
- SAS Studio

Cluster Summary

Cluster	Frequency	RMS Std Deviation	Maximum Distance from Seed to Observation	Nearest Cluster	Distance Between Cluster Centroids
1	17	0.0423	0.0927	3	0.1006
2	12	0.0273	0.0608	3	0.0977
3	14	0.0353	0.078	2	0.0977
4	17	0.0323	0.0744	5	0.1231
5	15	0.0377	0.0724	7	0.1082
6	13	0.0294	0.0584	5	0.1239
7	12	0.034	0.0709	5	0.1082

Argentis:
Proposed 7 Office Locations

- Office 1 – Pickerington
- Office 2 – Westerville
- Office 3 – Bexley
- Office 4 – Worthington
- Office 5 – Upper Arlington
- Office 6 – Dublin
- Office 7 – Grove City

Argentis:

7 Cluster Model Concerns

Advantages

- Cluster 1
  - Even distribution of potential investment capital
  - Even distribution of customers
- Clusters 4 and 5
  - Large proportion of high potential investment capital

Disadvantages

- Clusters 2 and 7
  - Large proportion of single customers
  - Large proportion of low potential investment capital

Comparison: 8 Cluster Model

Cluster Summary					
Cluster	Frequency	RMS Std Deviation	Maximum Distance from Seed to Observation	Nearest Cluster	Distance Between Cluster Centroids
1	13	0.0347	0.0719	3	0.0938
2	13	0.0308	0.0769	3	0.1022
3	12	0.0332	0.0724	1	0.0938
4	20	0.0365	0.0821	5	0.1134
5	10	0.0271	0.0655	8	0.0956
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7	9	0.0255	0.0557	6	0.0983
8	11	0.0257	0.0636	5	0.0956

Statistics for Variables (8 Clusters)				
Variable	Total STD	Within STD	R-Square	RSQ/(1-RSQ)
Latitude	0.08766	0.02965	0.893658	8.403614
Longitude	0.09947	0.03393	0.891838	8.24538
OVER-ALL	0.09375	0.03187	0.892634	8.313894
Pseudo F Statistic =	109.27			

Comparison: 7 Cluster Model

Cluster Summary					
Cluster	Frequency	RMS Std Deviation	Maximum Distance from Seed to Observation	Nearest Cluster	Distance Between Cluster Centroids
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Statistics for Variables (7 Clusters)				
Variable	Total STD	Within STD	R-Square	RSQ/(1-RSQ)
Latitude	0.08766	0.0266	0.913498	10.56037
Longitude	0.09947	0.04142	0.837112	5.139195
OVER-ALL	0.09375	0.03481	0.870505	6.722303
Pseudo F Statistic =	104.2			

Conclusions

- Argentis should proceed with 8 Office Locations
  - Provides an even distribution of:
    - High and low potential investment capital
    - Customer demographics
    - Location
  - Consistent Model Performance