

Knowledge Graph Schema Development

Alan Li, Wesley Schiller, Blake Crowther

Nodes

| Node Label | Properties |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business: Node to represent a single business. | business_id: Business unique identifier. business_name: Business name. business_type: Business type (grocery_store, fast_food, farmers_market, bakery). location: Business lat/lon. address: Business address. rating: avg. customer rating. price_level: rating for avg cost of goods. |
| BlockGroup: Node that represents a census block group. | blockgroup_id: Block group id. census_tract: Census tract the block group belongs to. |
| City: Node that represents a city (provided by “Administrative Topology”). | city_id: City unique identifier. city_name: City name. state_name: State city belongs to. county: County city belongs to. zipcodes: Zipcodes within the city. |
| Community: Node that represents a community (provided by “Administrative Topology”). | community_id: Community unique identifier. community_name: Community name. zipcodes: Zipcodes within community. |
| Neighborhood: Node that represents a neighborhood (provided by “Administrative Topology”). | neighborhood_id: Unique identifier for each neighborhood. neighborhood_name: name of the neighborhood. zipcodes: Zipcodes within neighborhood. |
| GeoProfile: A node containing any demographic, socioeconomic, | geoprofile_id: unique identifier. population: population |

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| and spending features associated with block groups. | <p>socioeconomic_index: a measure of occupational status based on income and education levels</p> <p>wealth_index: a measure of a household's cumulative living standard</p> |
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Edges

| Relationship Type | Properties | Source Node | Target Node |
|-------------------|---------------------------------|--------------------------------|------------------------------|
| HAS_NEIGHBOR | neighbor_type: City, Community. | City Community | City Community |
| HAS_NEARBY | nearby_type: City, Community. | City Community Community | City Community City |
| HAS_GEOPROFILE | | BlockGroup | GeoProfile |
| LOCATED_IN | | Business | BlockGroup |
| HAS_BLOCKGROUP | | Neighborhood | BlockGroup |
| HAS_NEIGHBORHOOD | | City Community | Neighborhood Neighborhood |
| HAS_COMMUNITY | | City | Community |

Competency Questions To Guide Schema Development

1. Where are food deserts in San Diego?
2. How do food deserts vary across income levels and demographic groups?
3. Which areas in San Diego exhibit both low-income levels and limited grocery store access?
4. What is the ratio of grocery stores and farmers markets to fast food outlets within various block groups?
5. How does spending behavior (e.g., alcohol and fast food spending) vary across regions with different socioeconomic groups?

6. What is the average distance or travel time from residential neighborhoods to the nearest grocery store, farmers' market, and fast food outlet?
7. Are farmers' markets located near public transportation routes or within walkable distances of low-income neighborhoods?
8. How do farmers markets differ from traditional grocery stores in terms of customer engagement and purchasing behavior?
9. How do various cultural backgrounds in San Diego influence traditional food practices and dishes?
10. What unique ingredients are commonly used in San Diego's food culture, and how are they sourced or influenced by local communities?
11. How do regional differences within San Diego affect the types of cuisines available, such as coast versus inland preferences?
12. What foods are traditionally associated with cultural celebrations in San Diego, and how do they reflect the community's diversity?
13. How do economic conditions within various cultural communities in San Diego influence food choices and accessibility?
14. What types of food are produced locally in San Diego, and how do they contribute to the region's food system?
15. How are locally produced foods distributed within San Diego, and what are the key distribution channels?
16. What barriers exist for local farmers in accessing markets in San Diego, and how do these barriers affect food availability?
17. What local policies and regulations impact food production, distribution, and consumption in San Diego.
18. What sustainable agricultural practices are being implemented in San Diego, and how do they affect the local food ontology?
19. Who are the main competitors in the grocery market in San Diego, and what unique offerings could differentiate a new grocery store?
20. What demographic factors (age, income, cultural background, etc) are most important and should be considered when developing a grocery store business in San Diego?
21. How can local sourcing of products enhance a grocery store's appeal to consumers in San Diego?
22. What technological advancements (e.g. online ordering, delivery services) can be leveraged to enhance customer experience in grocery retail?
23. What specific food product categories (organic, ethnic foods, health-focused items) are underserved in the San Diego grocery market?
24. What unique menu items could differentiate a fast food restaurant in San Diego from existing competitors?
25. How can fast food businesses incorporate healthier menu options to attract health-conscious consumers in San Diego?
26. How can sourcing local ingredients enhance the appeal of a fast-food business in San Diego?
27. What are the ideal locations for a fast food restaurant in San Diego based on foot traffic, visibility, and target demographics?

28. How does distribution or density of grocery store access affect obesity rates in San Diego?
29. Are there any transportation issues that prevent low-income residents from reaching grocery stores?
30. Does living near fast food restaurants influence health outcomes?
31. How do grocery prices vary across San Diego?
32. Where is healthy food less affordable in San Diego?
33. How does food access differ between urban and suburban areas in San Diego?
34. What are the current top-rated grocery stores in a particular community, and what makes them popular?
35. Which food categories (e.g., vegan, fast food, gourmet) have the highest ratings?
36. How does location impact grocery store ratings?