Classifying universities neighborhoods

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1. Introduction: why analyze it?

In this report, I analyze universities' neighborhoods (from USA) using foursquare data. Therefore, we can classify universities based on its surrounds. This could help young people select a university with a neighborhood with the qualities that they prefer, and the universities by letting they know possible attractiveness points. With this information both future college students and university administrators could improve their decision making. And their a third public to this analysis: entrepreneurs seeking to invest in a business related with college audience. They could see the classes od university and explore possible demands.

2. Data

Data: This could be done by one data frame with a list of universities and its latitude and longitude. This website contains exactly what we need, however it doen't cover all US universities (only 49). We can import this table as a data frame trough web scraping in python. Here is the five first rows of the universities with location data:

	university	latitude	longitude
0	Utah Valley University, Orem, UT, USA	40.277779	-111.713890
1	Indiana University of Pennsylvania, Indiana, P...	40.617001	-79.160004
2	University of Illinois, Champign - Urbana, Ili...	40.110558	-88.228333
3	Massachusetts Institute of Technology, Cambrid...	42.360001	-71.092003
4	Stanford University, CA, USA	37.428230	-122.168861

Then, with the latitude foursquare API we can make a request to access data of local venues close to each university and its category of business. As example, here it's the first seven rows of the request data frame:

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	Brent Brown Ballpark	40.277071	-111.717555	Baseball Stadium
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	UVU Student Life & Wellness Center	40.279530	-111.715150	College Gym
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	Jamba Juice	40.279003	-111.716202	Juice Bar
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	Wendy's	40.274607	-111.715043	Fast Food Restaurant
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	UVU Fulton Library	40.281047	-111.716629	College Library
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	Redbox	40.274278	-111.712758	Video Store
Utah Valley University, Orem, UT, USA	40.277779	-111.71389	Taco Bell	40.279058	-111.716238	Fast Food Restaurant

3. Methodology and analyzes

With all data merged, we used K-Nearest Neighbors analyzes to identify the similar classes of universities based on their venues commercial/entertaining places. We also plot a map to visualize their distribution in space:
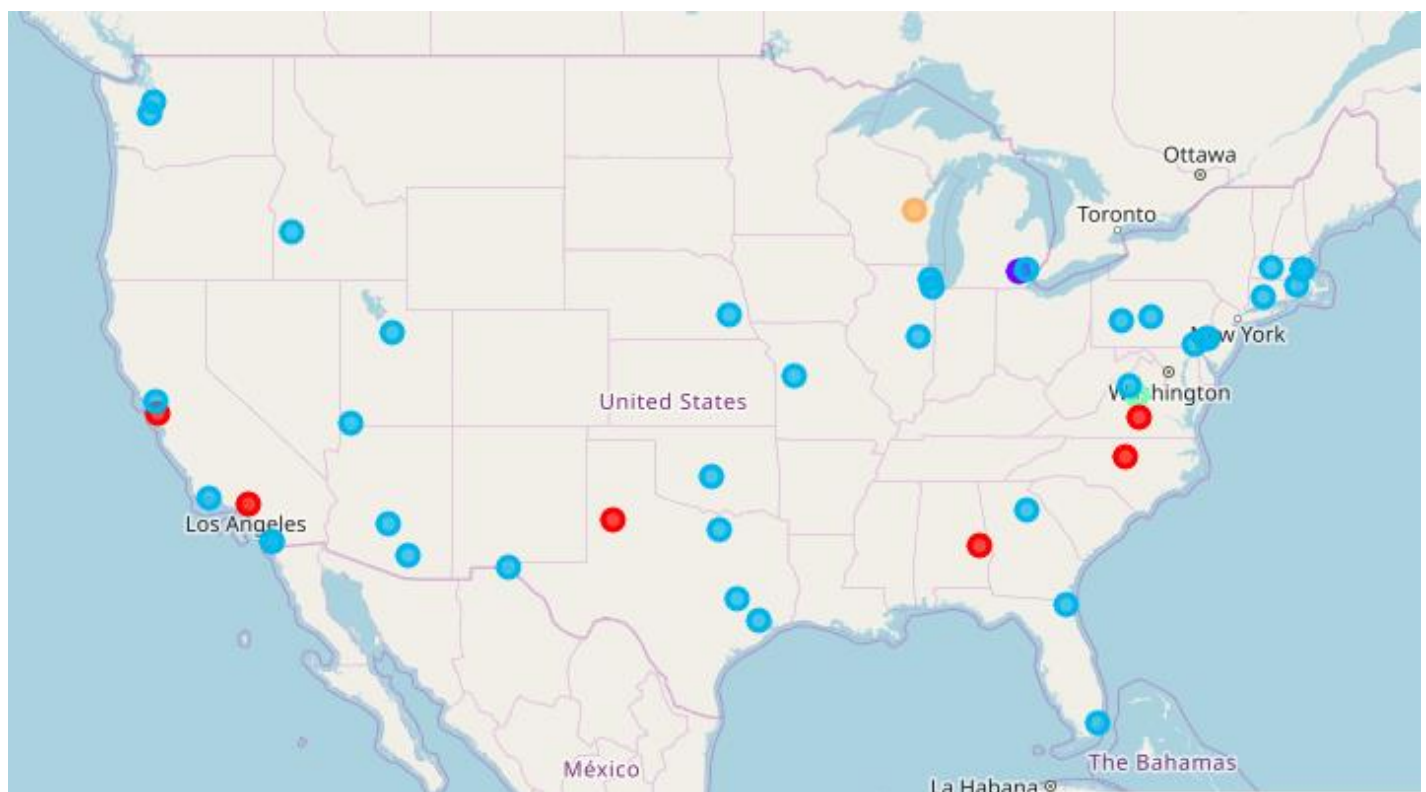
Based on the results of the KNN algorithm, we can see that most universities fall on the same class: with a lot of quick meals shops (pizza, coffee, bagel) and college

related entertainment. I.e., 77,5% of the colleges are similar. The next table shows all the most commons categories of the group with most universities:

University	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
Utah Valley University, Orem, UT, USA	Bus Station	Theater	Fast Food Restaurant	College Library	College Gym
University of Illinois, Champign - Urbana, Ili...	Coffee Shop	Chinese Restaurant	Sandwich Place	Korean Restaurant	Café
Massachusetts Institute of Technology, Cambrid...	Coffee Shop	Pizza Place	College Gym	Pub	Food Truck
Stanford University, CA, USA	Fountain	Coffee Shop	Café	Sculpture Garden	Park
Harvard University, Cambridge, MA, USA	Café	Pizza Place	Coffee Shop	Bookstore	Gastropub
University of Chicago, Chicago, IL, USA	Café	Coffee Shop	Bookstore	Sandwich Place	History Museum
Eastern University, St Davids, PA, USA	College Quad	Dance Studio	Disc Golf	Flower Shop	Field
University of Michigan, Ann Arbor, MI, USA	Coffee Shop	Pizza Place	Sandwich Place	Bar	Noodle House
The University of Massachusetts, Amherst, MA, USA	Coffee Shop	Bus Stop	Food Truck	Pub	Food & Drink Shop
Penn State University, State College, PA, USA	Sandwich Place	Bar	Clothing Store	Pizza Place	American Restaurant
Quinnipiac, QU School of Law, Hamden, CT, US	Forest	State / Provincial Park	Coffee Shop	College Cafeteria	Paper / Office Supplies Store
Towsley Center for Continuing Medical Educatio...	Park	Café	Pool	Bagel Shop	Sandwich Place
Villanova University, Villanova, PA, USA	College Cafeteria	Student Center	College Basketball Court	Coffee Shop	Yoga Studio
Boise State University, Boise, ID, US	Coffee Shop	Hotel	Juice Bar	Performing Arts Venue	Theater
University of Washington, Seattle, WA, USA	Coffee Shop	Trail	Pizza Place	Food Truck	Fountain
University of North Carolina at Chapel Hill, C...	Coffee Shop	Food Court	Fast Food Restaurant	Monument / Landmark	Volleyball Court
Madonna University, Livonia, MI, USA	Coffee Shop	Sandwich Place	Dessert Shop	Fast Food Restaurant	Farmers Market
University of California, Santa Barbara, CA, USA	Pizza Place	Sandwich Place	Coffee Shop	Juice Bar	Paper / Office Supplies Store
University of California, Berkeley, CA, USA	Café	Sandwich Place	Coffee Shop	Gift Shop	Indian Restaurant
Brown University, Providence, RI, USA	Café	Korean Restaurant	Coffee Shop	Pizza Place	American Restaurant
Arizona State University, Tempe, AZ, USA	Sushi Restaurant	Shipping Store	Pizza Place	Coffee Shop	Middle Eastern Restaurant
University of Arizona, Tucson, AZ, USA	Home Service	Fast Food Restaurant	Taco Place	Garden	Athletics & Sports
University of Nebraska, Lincoln, NE, USA	Sandwich Place	College Rec Center	Art Museum	Coffee Shop	Science Museum

Texas Tech University Law Library, Texas Tech ...	Pool	College Cafeteria	Locksmith	Park	Sandwich Place
University of Central Missouri, Warrensburg, M...	Coffee Shop	Pizza Place	Fast Food Restaurant	Sandwich Place	Concert Hall
The University of Georgia, Athens, GA, USA	Coffee Shop	Hotel	American Restaurant	College Residence Hall	Pool
Texas A&M University, USA	Coffee Shop	Bar	Burger Joint	Bank	Plaza
San Diego State University, San Diego, CA, USA	Pizza Place	Sandwich Place	Grocery Store	Coffee Shop	Fast Food Restaurant
The University of Texas At El Paso, Texas, USA	BBQ Joint	Sandwich Place	Pizza Place	Bagel Shop	Music Venue
The University of Oklahoma, Norman, OK, USA	Food Court	College Academic Building	Café	Coffee Shop	Fast Food Restaurant
Dixie State University, St. George, UT, USA	Burger Joint	Sporting Goods Shop	Pizza Place	Beer Garden	Juice Bar
Auburn University, Auburn, AL, USA	Park	Coffee Shop	Farmers Market	Dessert Shop	Fast Food Restaurant
University of Houston-Downtown, Houston, TX, USA	Cocktail Bar	Bar	Café	Wine Bar	Coffee Shop
University of Puget Sound, Tacoma, WA, USA	Concert Hall	Pizza Place	Gym	Track	Café
Lincoln University, PA, USA	Theater	Yoga Studio	Food & Drink Shop	Field	Fast Food Restaurant
Jacksonville University, Jacksonville, FL, USA	Wings Joint	Fast Food Restaurant	Harbor / Marina	Pizza Place	Bar
Texas Woman's University, Denton, TX, USA	College Library	Fast Food Restaurant	Lingerie Store	Coffee Shop	Yoga Studio
James Madison University, Harrisonburg, VA, USA	Coffee Shop	Movie Theater	Fast Food Restaurant	Bus Station	Donut Shop
Longwood University, VA, USA	Café	Mexican Restaurant	Sandwich Place	Fast Food Restaurant	Coffee Shop
University of Miami, Coral Gables, Florida, USA	Pharmacy	Coffee Shop	Fast Food Restaurant	Juice Bar	Sushi Restaurant
University of Hawaii at Hilo, HI, USA	Theater	Pharmacy	Yoga Studio	Field	Fast Food Restaurant
SDSU: Confucius Institute, San Diego, CA, the US	Hot Dog Joint	College Basketball Court	Farmers Market	College Theater	Chinese Restaurant
Northwestern University, Evanston, Illinois, USA	Tennis Court	ATM	Gym	Sandwich Place	Juice Bar

This number (77%) is considerable high, means that universities could favorable certain business. Therefore, the other categories might need business or could be a unique factor to differentiate the university from others.

4. Conclusion

The fact that most university neighborhoods are similar may mean that profiles that do not fit may present a business opportunity or be a differential factor for certain student profiles.