CAPSTONE PROJECT: BATTLE OF THE NEIGHBORHOODS, JAKARTA

Jakarta Food Lover Recommendation

I. PURPOSE

This document provides the details of work of Capstone Project IBM Data Science Certified program.

II. BACKGROUND

Jakarta is capital on Indonesia with a population of 10,075,310 as of 2014. A population with mix of cultures – Arab, Chinese, Javanese, Malay, Indian and European – has influenced its architecture, language and cuisine. With more than 200 districts ("kecamatan") combine with regular traffic jam anywhere in the area, recommendation system would be beneficiary for visitor or traveler to save time during Jakarta visit.

The goal of this project to provide a data driven recommendation that can supplement many website and YouTube video. This report utilized data provided by Jakarta open data, geopy, FourSquate API venue.

Jakarta multi-cultural background providing variety of restaurant reflecting dishes from many provinces and international. For the food lover it would be ideal to have food recommendation system on each neighborhood.

III. DATA ACQUISITION

This report using data acquire and compile from following website:

- Jakarta Open Data, http://data.jakarta.go.id/
- Indonesia Province, district, subdistrict and postal code.
 - o https://github.com/edwin/database-kodepos-seluruh-indonesia
- Goeocoding Web service to extract the location of each subdistricts
 - o https://geopy.readthedocs.io/en/stable/
- Foursquare

IV. DATA PROCESSING

DKI Jakarta consists of 1 44 districts and 267 sub-districts. In 2017, the population is estimated to reach 10,333,926 people with a total area of 664.01 km²

Data Cleanup and Visualization

The retrieved contains some un-wanted value and needs some cleanup. In this step data was

- Check again missing values
- Translate column header to English

Data cleanup and grouped.

	Subdistricts	District	Regency	Province	PostalCode
0	GAMBIR	GAMBIR	JAKARTA	DKI JAKARTA	10110
			PUSAT		
1	KEBON KELAPA	GAMBIR	JAKARTA	DKI JAKARTA	10120
			PUSAT		
2	PETOJO UTARA	GAMBIR	JAKARTA	DKI JAKARTA	10130
			PUSAT		
3	DURI PULO	GAMBIR	JAKARTA	DKI JAKARTA	10140
			PUSAT		
4	CIDENG	GAMBIR	JAKARTA	DKI JAKARTA	10150
			PUSAT		

Area Location Retrieved

Coordinate of the area retrieve using geolocator function below:

```
rowIndex = jakarta df3.index[idx]
      print(rowIndex)
      print(alamat)
      print("====>", location)
      print("====>",(location.latitude, location.longitude))
      jakarta_df3.loc[rowIndex, 'Latitude'] = location.latitude
      jakarta_df3.loc[rowIndex, 'Longitude'] = location.longitude
      jakarta_df3.loc[rowIndex, 'Note'] = alamat
      time.sleep(1)
except:
      continue
Sample Api result:
0 GAMBIR, Jakarta, Indonesia
====> Gambir, JKT, Indonesia
===> (-6.1711625, 106.816743889205)
1 KEBON KELAPA, Jakarta, Indonesia
====> Kebon Kelapa, Gambir, JKT, 10120, Indonesia
===> (-6.1635065, 106.824465586586)
2 PETOJO UTARA, Jakarta, Indonesia
====> Petojo Utara, Gambir, JKT, Indonesia
===> (-6.1651065, 106.815410616044)
3 DURI PULO, Jakarta, Indonesia
====> Duri Pulo, Gambir, JKT, Indonesia
===> (-6.16165985, 106.808113962265)
4 CIDENG, Jakarta, Indonesia
```

location = geolocator.geocode(alamat)

===> Cideng, Tanah Sereal, Tambora, Jakarta Barat, JKT, 11120, Indonesia ===> (-6.1570734, 106.8109855)

5 PETOJO SELATAN, Jakarta, Indonesia

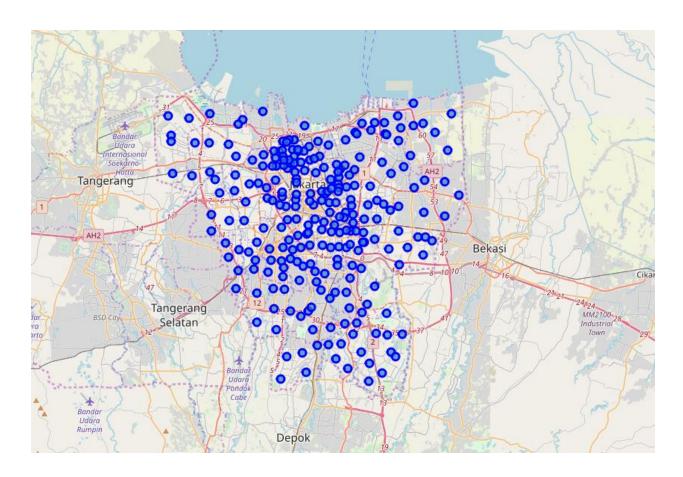
====> Petojo Selatan, Gambir, JKT, 10160, Indonesia

===> (-6.17480065, 106.816405449364)

	Sub-	District	Regency	Province	Postal	Latitude	Longitud	Note
	districts				Code		е	
0	GAMBIR	GAMBIR	JAKARTA	DKI	10110	-	106.8167	GAMBIR,
			PUSAT	JAKARTA		6.171163	44	Jakarta,
								Indonesi
								а
1	KEBON	GAMBIR	JAKARTA	DKI	10120	-	106.8244	KEBON
	KELAPA		PUSAT	JAKARTA		6.163507	66	KELAPA,
								Jakarta,
								Indonesi
								а
2	PETOJO	GAMBIR	JAKARTA	DKI	10130	-	106.8154	PETOJO
	UTARA		PUSAT	JAKARTA		6.165107	11	UTARA,
								Jakarta,
								Indonesi
								а
3	DURI	GAMBIR	JAKARTA	DKI	10140	-	106.8081	DURI
	PULO		PUSAT	JAKARTA		6.161660	14	PULO,
								Jakarta,
								Indonesi
								а
4	CIDENG	GAMBIR	JAKARTA	DKI	10150	-	106.8109	CIDENG,
			PUSAT	JAKARTA		6.157073	86	Jakarta,
								Indonesi
								а
5	PETOJO	GAMBIR	JAKARTA	DKI	10160	-	106.8164	PETOJO
	SELATAN		PUSAT	JAKARTA		6.174801	05	SELATAN,
								Jakarta,
								Indonesi
								а

Data Visualization

Cleaned Jakarta neighborhood data than merge with coordinate of each area. Geo location web service provided latitude and longitude of the area.



FourSquare Food Venue Rating

Foursquare API providing Score rating for each venue base on venue ID. Unfortunately, free version retrieved max 500 request per day only. Therefore, data was retrieved in span of days then combined. However, only 35% of Jakarta venue retrieved.

Sample of retrieved venue and score.

Unna	Neigh	Neigh	Neigh	Venu	Venu	Venu	Venu	Venu	Venu	Venu
med:	borho	borho	borho	eID	е	е	е	е	е	е
0	od	od	od			Latitu	Longit	CatID	Categ	Score
		Latitu	Longit			de	ude		ory	
		de	ude							

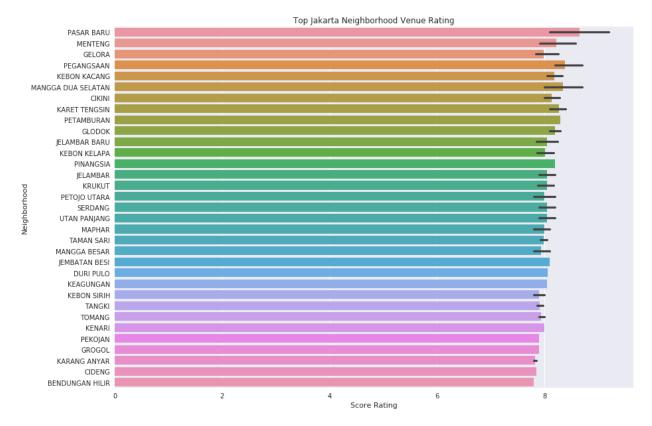
0	0	GAM	-	106.8	4e8a3	Natio	-	106.8	4bf58	Park	7.4
		BIR	6.175	26906	ffbd3	nal	6.175	27047	dd8d		
			811		e3304	Monu	331		48988		
					c8afc	ment			d1639		
					a029	Park			41735		
1	1	GAM	-	106.8	4fa48	Joggin	1	106.8	4bf58	Track	7.3
		BIR	6.175	26906	7c2e4	g	6.175	27134	dd8d		
			811		b0244	Track	537		48988		
					33604	MON			d1069		
					1fe7	AS			41735		
2	2	GAM	-	106.8	4b849	Muse	-	106.8	4bf58	Muse	8.3
		BIR	6.175	26906	44df9	um	6.176	22830	dd8d	um	
			811		64a52	Nasio	353		48988		
					0ac3c	nal			d1819		
					31e3	Indon			41735		
						esia					
3	3	GAM	-	106.8	4ed1a	Lapan	-	106.8	4bf58	Plaza	7.1
		BIR	6.175	26906	2a1f5	gan	6.177	26851	dd8d		
			811		b9832	Silang	649		48988		
					adbbc	Mona			d1649		
					ff90	S			41735		
4	4	GAM	-	106.8	4c68d	Tama	-	106.8	4bf58	Skate	6.9
		BIR	6.175	26906	f8fd7	n	6.175	27165	dd8d	Park	
			811		509c7	Mera	397		48988		
					4b7cf	h			d1679		
					faa2	Putih			41735		

Some of the venue is Not a food or restaurant related. To produced more food related data-frame, blacklist keyword applied. Word like "restaurant", "coffee shop", "noodle house" are used. More food related data-frame then produce as sample below.

	Unna med:	Unna med:	Neig hbor	Neig hbor	Neig hbor	Venu eID	Venu e	Venu e	Venu e	Venu e	Venu e_Ca	Venu e
	0	0.1	hood	hood	hood	CID	C	Latit	Longi	CatID	tegor	Score
				Latit	Longi			ude	tude		У	
				ude	tude							
5	5	5	GAM	-	106.8	5104	Starb	-	106.8	4bf5	Coffe	7.3
			BIR	6.175	2690	7707	ucks	6.177	3081	8dd8	е	
				811	6	e4b0		147	8	d489	Shop	
						059c				88d1		
						e06c				e093		
						2cf0				1735		
8	8	8	GAM	1	106.8	4e16	Sate	-	106.8	4dee	Indo	6.5
			BIR	6.175	2690	b2f1	Sena	6.176	2901	fc054	nesia	
				811	6	b0fb	yan	699	2	765f	n	

						42f9				0261	Docto	
										8361	Resta	
						8734				3cdb	urant	
						fc9d				a6f		
9	9	9	GAM	-	106.8	5599	Bakm	-	106.8	4bf5	Nood	6.9
			BIR	6.175	2690	1939	i GM	6.177	3101	8dd8	le	
				811	6	498e		536	7	d489	Hous	
						83c3				88d1	е	
						be4c				d194		
						3731				1735		
10	10	10	GAM	-	106.8	4be6	Ropit	-	106.8	4bf5	Food	6.6
			BIR	6.175	2690	da09	a	6.177	3095	8dd8	Truck	
				811	6	9100	Anek	792	4	d489		
						20a1	a			88d1		
						10ad	Rasa			cb94		
						d414				1735		
12	12	12	GAM	-	106.8	56c7	McD	-	106.8	4bf5	Fast	6.4
			BIR	6.175	2690	2378	onald	6.177	3089	8dd8	Food	
				811	6	cd10	's	294	0	d489	Resta	
						80d7				88d1	urant	
						a152				6e94		
						57d6				1735		

Top 100 rating venue per neighborhood produced by grouped data-frame neighborhood, category and venue score. Jakarta top neighborhood: Menteng, Pasar Baru, Gelora, Pengangsaan, Kebon Kacang are receiving score rating 8.7 and up.



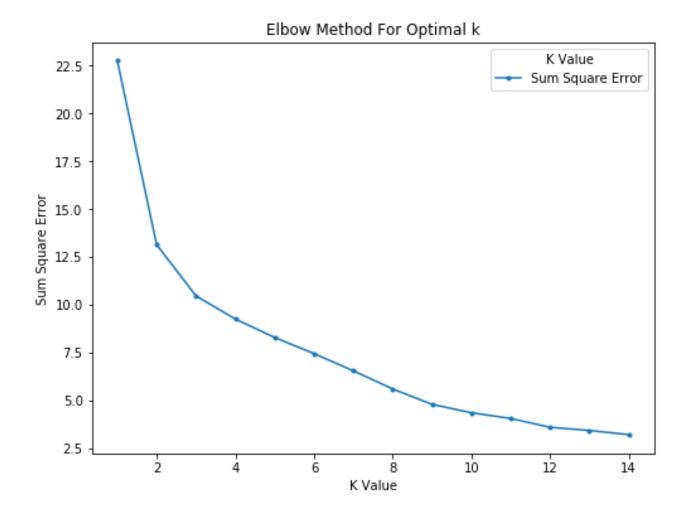
PASAR BARU	Coffee Shop	9.2
MENTENG	Restaurant	9.1
GELORA	American Restaurant	8.9
MENTENG	Steakhouse	8.9
PEGANGSAAN	Restaurant	8.7
KEBON KACANG	Dessert Shop	8.7
MANGGA DUA SELATAN	Food Truck	8.7
KEBON KACANG	Sushi Restaurant	8.65
KEBON KACANG	Vietnamese Restaurant	8.5
MENTENG	Chinese Restaurant	8.5
KEBON KACANG	Indian Restaurant	8.4
CIKINI	Restaurant	8.4
KARET TENGSIN	Steakhouse	8.4
KEBON KACANG	Coffee Shop	8.357142857142858
PETAMBURAN	Food Truck	8.3
GLODOK	Coffee Shop	8.3
KEBON KACANG	Snack Place	8.3
JELAMBAR BARU	Coffee Shop	8.3
KARET TENGSIN	Dim Sum Restaurant	8.3
KEBON KELAPA	Seafood Restaurant	8.233333333333334

Completed list of top venue score in Jakarta can be found on dataset directory.

V. JAKARTA AREA CLUSTERING

Using the Foursquare API to get the most common venue categories in each neighborhood. The data then group and cluster per most venue per neighborhood.

Simple K mean machine learning algorithm use to group neighborhood to number of clusters. Optimal k number use elbow method by calculating the sum of square error of each feature. K from 1 to 17 was scanned. Ideal K for this iteration would be 4.



Jakarta food venue divided to 4 clusters. Folium Map visualization below:



Cluster 1:

Post	Sub dist	Reg enc	1st Mos	2nd Mos	3rd Mos	4th Mos	5th Mos	6th Mos	7th Mos	8th Mos	9th Mos	10t h	Clus ter	
alCo	ricts	У	t	t	t	t	t	t	t	t	t	Mos	Lab	
de			Co	t	els									
			mm	Со										
			on	mm										
			Ven	on										
			ue	Ven										
												ue		
0	101	GA	JAK	Indo	Fast	Foo	Sou	Cup	Coff	Noo	Japa	Win	Chin	0
	10	MBI	ART	nesi	Foo	d	р	cake	ee	dle	nes	е	ese	
		R	Α	an	d	Truc	Plac	Sho	Sho	Hou	е	Bar	Rest	
			PUS	Rest	Rest	k	е	р	р	se	Rest		aura	
			AT	aura	aura						aura		nt	
				nt	nt						nt			
6	102	BEN	JAK	Indo	Pizz	Ace	Foo	Sou	Sna	Rest	Coff	Bistr	Café	0
	10	DU	ART	nesi	а	hne	d	р	ck	aura	ee	0		
		NG	Α	an	Plac	se	Truc	Plac	Plac	nt	Sho			
		AN	PUS	Rest	е	Rest	k	е	е		р			
		HILI	AT	aura		aura								
		R		nt		nt								

8	102	KEB	JAK	Sou	Indo	Indo	Win	Chin	Du	Don	Dim	Des	Cup	0
	30	ON	ART	р	nesi	nesi	e	ese	mpli	ut	Sum	sert	cake	U
	30	MEL	ANT	Plac	an	an	Bar	Rest	· ·	Sho	Rest	Sho	Sho	
		ATI	PUS	e	Mea	Rest	Dai		ng Rest	р	aura			
		AII	AT	-	tball	aura		aura nt		Р	nt	р	р	
			AI		Plac	nt		111	aura		111			
					e	110			nt					
10	102	KA	JAK	Indo	Café	Bed	Fast	Foo	Bet	Foo	Asia	Bee	Bak	0
10	50	MP	ART	nesi	Care	& &	Foo	d	awi	d				U
	30	UN				⊠ Bre	d	Truc			n Rest	r Car	ery	
		G	A	an				rruc k	nes	Cou		Gar		
			PUS	Rest		akfa	Rest	K	e	rt	aura	den		
		BALI	AT	aura		st	aura		Rest		nt			
				nt			nt		aura					
11	102	DET	1.0.1/	lua el e	ام: ما	Cett	la da	F	nt	Dale	C	D.,	Dan	0
11	102	PET	JAK	Indo	Mid	Coff	Indo	Foo	Asia	Bak	Cup	Du	Don	0
	60	AM	ART	nesi	dle	ee	nesi	d	n	ery	cake	mpli	ut	
		BUR	A	an	East	Sho	an	Truc	Rest		Sho	ng	Sho	
		AN	PUS	Rest	ern	р	Mea	k	aura		р	Rest	р	
			AT	aura	Rest		tball		nt			aura		
				nt	aura		Plac					nt		
	100				nt -	0 ((e				_			
14	103	PEG	JAK	Indo	Foo	Coff	Café	Fast	Don	Asia	Sna	Viet	Rest	0
	20	AN	ART	nesi	_ d	ee		Foo	ut	n	ck	nam	aura	
		GSA	Α	an	Truc	Sho		d	Sho	Rest	Plac	ese	nt	
		AN	PUS	Rest	k	р		Rest	р	aura	е	Rest		
			AT	aura				aura		nt		aura		
				nt				nt				nt		
19	104	KWI	JAK	Indo	Noo	Fast	Asia	BBQ	Du	Don	Dim	Am	Des	0
	20	TAN	ART	nesi	dle	Foo	n	Join	mpli	ut	Sum	eric	sert	
		G	A	an	Hou	d	Rest	t	ng	Sho	Rest	an	Sho	
			PUS	Rest	se	Rest	aura		Rest	р	aura	Rest	р	
			AT	aura		aura	nt		aura		nt	aura		
	404	1/5.4	1 4 17	nt		nt	6.57		nt	_	-	nt	Cl.:	
22	104	KRA	JAK	Indo	Noo	Don	Café	Du	Dim	Des	Cup	Coff	Chin	0
	50	MA	ART	nesi	dle	ut		mpli	Sum	sert	cake	ee	ese	
		Т	A	an	Hou	Sho		ng	Rest	Sho	Sho	Sho	Rest	
			PUS	Rest	se	р		Rest	aura	р	р	р	aura	
			AT	aura				aura	nt				nt	
	40-			nt	6 (<u> </u>	, ,	nt	61.			C :		
25	105	CE	JAK	Indo	Café	Stea	Indo	Bistr	Chin	Du	Don	Dim	Des	0
	20	MP	ART	nesi		kho	nesi	0	ese	mpli	ut	Sum	sert	
		AKA	A	an		use	an		Rest	ng	Sho	Rest	Sho	
		PUT	PUS	Rest			Mea		aura	Rest	р	aura	р	
		IH	AT	aura			tball		nt	aura		nt		
		BAR		nt			Plac			nt				
		AT					е							

26	105	GAL	JAK	Indo	Café	Stea	Chin	Win	Du	Don	Dim	Des	Cup	0
	30	UR	ART	nesi		kho	ese	е	mpli	ut	Sum	sert	cake	
			Α	an		use	Rest	Bar	ng	Sho	Rest	Sho	Sho	
			PUS	Rest			aura		Rest	р	aura	р	р	
			AT	aura			nt		aura		nt			
				nt					nt					
27	105	TAN	JAK	Indo	Pizz	Noo	Café	Coff	Asia	Indo	Fast	Win	Don	0
	40	АН	ART	nesi	а	dle		ee	n	nesi	Foo	е	ut	
		TIN	Α	an	Plac	Hou		Sho	Rest	an	d	Bar	Sho	
		GGI	PUS	Rest	е	se		р	aura	Mea	Rest		р	
			AT	aura					nt	tball	aura			
				nt						Plac	nt			
										е				
29	105	JOH	JAK	Fast	Win	Foo	Du	Don	Dim	Des	Cup	Coff	Chin	0
	60	AR	ART	Foo	е	d	mpli	ut	Sum	sert	cake	ee	ese	
		BAR	Α	d	Bar	Truc	ng	Sho	Rest	Sho	Sho	Sho	Rest	
		U	PUS	Rest		k	Rest	р	aura	р	р	р	aura	
			AT	aura			aura		nt				nt	
				nt			nt							
31	106	GU	JAK	Indo	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	0
	10	NU	ART	nesi	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		NG	Α	an	Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		SAH	PUS	Rest		aura	Rest	Rest	р	aura	р	р	р	
		ARI	AT	aura		nt	aura	aura		nt				
		SEL		nt			nt	nt						
		ATA												
		N												
44	111	PIN	JAK	Café	Indo	Fast	Seaf	Coff	Chin	Du	Don	Dim	Des	0
	10	AN	ART		nesi	Foo	ood	ee	ese	mpli	ut	Sum	sert	
		GSI	Α		an	d	Rest	Sho	Rest	ng	Sho	Rest	Sho	
		Α	BAR		Rest	Rest	aura	р	aura	Rest	р	aura	р	
			AT		aura	aura	nt		nt	aura		nt		
					nt	nt				nt				

Cluster 2:

Post	Sub	Reg	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10t	Clus
alCo	dist	enc	Mos	h	ter								
de	ricts	у	t	t	t	t	t	t	t	t	t	Mos	Lab
			Co	t	els								
			mm	Co									
			on	mm									
			Ven	on									
			ue	Ven									
												ue	

17	103	GO	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
1/	50	NDA	ART				Foo					cake		
	50			ery	е	ese		mpli	ut	Sum	sert		ee	
		NG	A		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		DIA	PUS			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
	101	51.151	1.4.14	5.1		OI :	nt	nt	_	D :	-		O ((4
23	104	BUN	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	60	GUR	ART	ery	e	ese	Foo	mpli	ut	Sum	sert	cake	ee	
			Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			PUS			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						
28	105	KA	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	50	MP	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		UN	Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		G	PUS			aura	Rest	Rest	р	aura	р	р	р	
		RA	AT			nt	aura	aura		nt				
		WA					nt	nt						
52	112	TAN	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	10	AH	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		SER	Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		EAL	BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						
53	112	TA	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	20	MB	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		ORA	Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						
54	112	ROA	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	30	MAL	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		AKA	Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt			-	
							nt	nt						
58	112	DUR	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	70	1	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		SEL	Α	,	Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		ATA	BAR			aura	Rest	Rest	р	aura	р	р	р	
		Ν	AT			nt	aura	aura		nt	•			
							nt	nt						
59	112	DUR	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	70	1	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	_
		UTA	Α	J.,	Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
		RA	BAR		-31	aura	Rest	Rest	р	aura	р	р	р	
		,	AT			nt			۲	nt	۲	"	"	
			Λ1			110	<u> </u>			111		l	l	

							aura	aura						
							nt	nt						
60	113	KALI	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	10	ANY	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
		AR	Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						
62	113	AN	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	30	GKE	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
			Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						
63	114	SLIP	JAK	Bak	Win	Chin	Fast	Du	Don	Dim	Des	Cup	Coff	1
	10	- 1	ART	ery	е	ese	Foo	mpli	ut	Sum	sert	cake	ee	
			Α		Bar	Rest	d	ng	Sho	Rest	Sho	Sho	Sho	
			BAR			aura	Rest	Rest	р	aura	р	р	р	
			AT			nt	aura	aura		nt				
							nt	nt						

Cluster 3:

	Post	Sub	Reg	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10t	Clus
	alCo	dist	enc	Mos	Mos	Mos	Mos	Mos	Mos	Mos	Mos	Mos	h	ter
	de	ricts	у	t	t	t	t	t	t	t	t	t	Mos	Lab
				Co	Co	Co	Со	Co	Co	Co	Co	Со	t	els
				mm	mm	mm	mm	mm	mm	mm	mm	mm	Co	
				on	on	on	on	on	on	on	on	on	mm	
				Ven	Ven	Ven	Ven	Ven	Ven	Ven	Ven	Ven	on	
				ue	ue	ue	ue	ue	ue	ue	ue	ue	Ven	
													ue	
34	106	CE	JAK	Coff	Win	Foo	Fast	Du	Don	Dim	Des	Cup	Chin	2
	40	MP	ART	ee	е	d	Foo	mpli	ut	Sum	sert	cake	ese	
		AKA	Α	Sho	Bar	Truc	d	ng	Sho	Rest	Sho	Sho	Rest	
		BAR	PUS	р		k	Rest	Rest	р	aura	р	р	aura	
		U	AT				aura	aura		nt			nt	
							nt	nt						
35	106	HAR	JAK	Coff	Win	Foo	Fast	Du	Don	Dim	Des	Cup	Chin	2
	40	APA	ART	ee	е	d	Foo	mpli	ut	Sum	sert	cake	ese	
		N	Α	Sho	Bar	Truc	d	ng	Sho	Rest	Sho	Sho	Rest	
		MU	PUS	р		k	Rest	Rest	р	aura	р	р	aura	
		LYA	AT				aura	aura		nt			nt	
							nt	nt						

36	106	SU	JAK	Coff	Win	Foo	Fast	Du	Don	Dim	Des	Cup	Chin	2
	40	MU	ART	ee	е	d	Foo	mpli	ut	Sum	sert	cake	ese	
		R	Α	Sho	Bar	Truc	d	ng	Sho	Rest	Sho	Sho	Rest	
		BAT	PUS	р		k	Rest	Rest	р	aura	р	р	aura	
		U	AT				aura	aura		nt			nt	
							nt	nt						

CLuster 4:

	Post	Sub	Reg	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10t	Clus
	alCo	dist	enc	Mos	Mos	Mos	Mos	Mos	Mos	Mos	Mos	Mos	h	ter
	de	ricts	У	t	t	t	t	t	t	t	t	t	Mos	Lab
				Со	Со	Co	Со	Со	Со	Со	Со	Со	t	els
				mm	mm	mm	mm	mm	mm	mm	mm	mm	Co	
				on	on	on	on	on	on	on	on	on	mm	
				Ven	Ven	Ven	Ven	Ven	Ven	Ven	Ven	Ven	on	
				ue	ue	ue	ue	ue	ue	ue	ue	ue	Ven ue	
1	101	KEB	JAK	Chin	Seaf	Noo	Asia	Indo	Bee	Stea	Sna	BBQ	Des	3
	20	ON	ART	ese	ood	dle	n	nesi	r	kho	ck	Join	sert	
		KEL	Α	Rest	Rest	Hou	Rest	an	Gar	use	Plac	t	Sho	
		APA	PUS	aura	aura	se	aura	Mea	den		е		р	
			AT	nt	nt		nt	tball						
								Plac						
								е						
2	101	PET	JAK	Noo	Don	Fast	Rest	Asia	Coff	Indo	Japa	Chin	Bed	3
	30	OIO	ART	dle	ut	Foo	aura	n	ee	nesi	nes	ese	&	
		UTA	Α	Hou	Sho	d	nt	Rest	Sho	an	е	Rest	Bre	
		RA	PUS	se	р	Rest		aura	р	Rest	Rest	aura	akfa	
			AT			aura		nt		aura	aura	nt	st	
						nt				nt	nt			_
3	101	DUR	JAK	Sou	Indo	Café	Foo	Pizz	Noo	Chin	Don	Indi	Rest	3
	40	I	ART	р	nesi		_ d	a	dle	ese	ut	an	aura	
		PUL	A	Plac	an		Truc	Plac	Hou	Rest	Sho	Rest	nt	
		0	PUS	е	Rest		k	е	se	aura	р	aura		
			AT		aura					nt		nt		
	101	CID	1.4.1/	Nes	nt	Гол	Carr	D:==	Dar	Cofé	Coot	Dal:	Doot	2
4	101	CID	JAK	Noo	Indo	Foo	Sou	Pizz	Don	Café	Seaf	Bak	Rest	3
	50	ENG	ART	dle	nesi	d	p	a	ut		ood	ery	aura	
			A	Hou	an	Truc	Plac	Plac	Sho		Rest		nt	
			PUS	se	Rest	k	е	е	р		aura			
			AT		aura						nt			
					nt									

							1				_	1		
5	101	PET	JAK	Indo	Foo	Foo	BBQ	Rest	Noo	Coff	Chin	Du	Don	3
	60	OJO	ART	nesi	d	d	Join	aura	dle	ee	ese	mpli	ut	
		SEL	Α	an	Cou	Truc	t	nt	Hou	Sho	Rest	ng	Sho	
		ATA	PUS	Rest	rt	k						Rest		
					11	K			se	р	aura		р	
		N	AT	aura							nt	aura		
				nt								nt		
7	102	KAR	JAK	Japa	Coff	Indo	Asia	Rest	Win	Sus	Café	Pizz	BBQ	3
	20	ET	ART	nes	ee	nesi	n	aura	e	hi		а	Join	
	20													
		TEN	Α	е	Sho	an	Rest	nt	Bar	Rest		Plac	t	
		GSI	PUS	Rest	р	Rest	aura			aura		е		
		Ν	ΑT	aura		aura	nt			nt				
				nt		nt								
9	102	KEB	JAK	Coff	Chin	Japa	Rest	Asia	Sus	Stea	Café	Pizz	Des	3
	40	ON	ART			-			hi	kho	care		sert	
	40			ee	ese	nes	aura	n				a		
		KAC	Α	Sho	Rest	е	nt	Rest	Rest	use		Plac	Sho	
		AN	PUS	р	aura	Rest		aura	aura			е	р	
		G	AT		nt	aura		nt	nt					
						nt								
12	102	GEL	JAK	Café	Japa	Rest	Coff	Bak	Indo	Chin	Win	Sus	Am	3
	70	ORA	ART	00.10	nes	aura	ee	ery	nesi	ese	е	hi	eric	
	70	ONA						Ci y						
			Α		е	nt	Sho		an	Rest	Bar	Rest	an	
			PUS		Rest		р		Rest	aura		aura	Rest	
			AT		aura				aura	nt		nt	aura	
					nt				nt				nt	
13	103	ME	JAK	Coff	Stea	Bak	Rest	Indo	Itali	Fast	Café	Chin	Win	3
	10	NTE	ART	ee	kho	ery	aura	nesi	an	Foo		ese	е	
	10	NG				C. y								
		ING	A	Sho	use		nt	an	Rest	d		Rest	Bar	
			PUS	р				Rest	aura	Rest		aura		
			ΑT					aura	nt	aura		nt		
								nt		nt				
15	103	CIKI	JAK	Indo	Café	Bak	Coff	Noo	Bet	Japa	Mid	Asia	Des	3
	30	NI	ART	nesi		ery	ee	dle	awi	nes	dle	n	sert	
						J. ,	Sho				East	Rest	Sho	
			A	an				Hou	nes	е				
			PUS	Rest			р	se	e	Rest	ern	aura	р	
			AT	aura					Rest	aura	Rest	nt		
				nt					aura	nt	aura			
									nt		nt			
16	103	KEB	JAK	Indo	Coff	Japa	Café	Sna	Seaf	Asia	Bee	Don	Chin	3
	40	ON	ART	nesi	ee	nes		ck	ood	n	r	ut	ese	
	+0													
		SIRI	A	an	Sho	e		Plac	Rest	Rest	Gar	Sho	Rest	
		Н	PUS	Rest	р	Rest		е	aura	aura	den	р	aura	
			ΑT	aura		aura			nt	nt			nt	
				nt		nt								
18	104	SEN	JAK	Coff	Japa	Asia	Indo	Am	Sou	Itali	Seaf	Foo	Indo	3
	10	EN	ART	ee	nes		nesi	eric		an	ood	d	nesi	
	10	LIN				n			р					
			Α	Sho	е	Rest	an	an	Plac	Rest	Rest	Truc	an	
				р	Rest		Rest	Rest	е			k	Mea	

			PUS		aura	aura	aura	aura		aura	aura		tball	
			AT		nt	nt	nt	aura nt		nt	nt		Plac	
			/\\		110	1110	'''			110	110		е	
20	104	KEN	JAK	Frie	Rest	Fast	Don	Indo	Coff	Foo	Foo	Bee	Bet	3
	30	ARI	ART	d	aura	Foo	ut	nesi	ee	d	d	r	awi	
			Α	Chic	nt	d	Sho	an	Sho	Cou	Truc	Gar	nes	
			PUS	ken		Rest	р	Rest	р	rt	k	den	е	
			AT	Join		aura		aura					Rest	
				t		nt		nt					aura	
													nt	
21	104	PAS	JAK	Indo	Asia	Fast	Frie	Rest	Coff	Café	Noo	Foo	Stea	3
	40	EBA	ART	nesi	n	Foo	d	aura	ee		dle	d	kho	
		N	Α	an	Rest	d	Chic	nt	Sho		Hou	Cou	use	
			PUS	Rest	aura	Rest	ken		р		se	rt		
			ΑT	aura	nt	aura	Join							
				nt		nt	t							
24	105	CE	JAK	Fast	Asia	Rest	Indo	Coff	Café	Foo	Noo	Frie	Bet	3
	10	MP	ART	Foo	n	aura	nesi	ee		d	dle	d	awi	
		AKA	Α	d	Rest	nt	an	Sho		Cou	Hou	Chic	nes	
		PUT	PUS	Rest	aura		Rest	р		rt	se	ken	e	
		IH	AT	aura	nt		aura					Join	Rest	
		TIM		nt			nt					t	aura	
20	105	UR	1.4.1/	Гаа	Coof	Doot	D:	loala	N //: al	1/ - "	lana	\	nt	2
30	105	RA	JAK	Foo d	Seaf	Rest	Pizz	Indo	Mid	Kor	Japa	Win	Bistr	3
	70	WA SARI	ART		ood	aura	a Plac	nesi	dle	ean	nes	e Par	0	
		SAKI	A PUS	Truc k	Rest	nt		an Mea	East ern	Rest	e Rest	Bar		
			AT		aura nt		е	tball	Rest	aura nt	aura			
			AI		110			Plac	aura	110	nt			
								e	nt		110			
32	106	KE	JAK	Foo	Foo	Fast	Du	Don	Dim	Des	Cup	Coff	Chin	3
	20	MA	ART	d	d	Foo	mpli	ut	Sum	sert	cake	ee	ese	
		YOR	Α	Cou	Truc	d			Rest	Sho	Sho	Sho	Rest	
		AN	PUS	rt	k	Rest	Rest	р	aura	р	р	р	aura	
			AT			aura	aura		nt	·			nt	
						nt	nt							
33	106	KEB	JAK	Indo	Foo	Bak	Seaf	Cup	Foo	Coff	Fast	Du	Don	3
	30	ON	ART	nesi	d	ery	ood	cake	d	ee	Foo	mpli	ut	
		KOS	Α	an	Truc		Rest	Sho	Cou	Sho	d	ng	Sho	
		ON	PUS	Mea	k		aura	р	rt	р	Rest	Rest	р	
		G	AT	tball			nt				aura	aura		
				Plac							nt	nt		
	40-	6=-		e .										
37	106	SER	JAK	Pizz	Noo	Fast	Asia	BBQ	Du	Don	Dim	Des	Cup	3
	50	DAN	ART	a	dle	Foo	n	Join	mpli	ut	Sum	sert	cake	
		G	Α	Plac	Hou	d	Rest	t	ng	Sho	Rest	Sho	Sho	
				е	se	Rest			Rest	р		р	р	

			PUS			aura	aura		aura		aura			
			AT			nt	nt		nt		nt			
38	106	UTA	JAK	Pizz	Noo	Fast	Asia	BBQ	Du	Don	Dim	Des	Cup	3
	50	N	ART	a	dle	Foo	n	Join	mpli	ut	Sum	sert	cake	
		PAN	Α	Plac	Hou	d	Rest	t	ng	Sho	Rest	Sho	Sho	
		JAN	PUS	е	se	Rest	aura		Rest	р	aura	р	р	
		G	AT			aura	nt		aura		nt			
						nt			nt					
39	107	PAS	JAK	Win	Coff	Don	Indo	Itali	Japa	Chin	Bak	Bee	Bet	3
	10	AR	ART	е	ee	ut	nesi	an	nes	ese	ery	r	awi	
		BAR	Α	Bar	Sho	Sho	an	Rest	е	Rest		Gar	nes	
		U	PUS		р	р	Rest	aura	Rest	aura		den	е	
			ΑT				aura	nt	aura	nt			Rest	
							nt		nt				aura	
													nt	
40	107	GU	JAK	Rest	Coff	Chin	Win	Café	Fast	Du	Don	Dim	Des	3
	20	NU	ART	aura	ee	ese	e		Foo	mpli	ut	Sum	sert	
		NG	A	nt	Sho	Rest	Bar		d	ng	Sho	Rest	Sho	
		SAH	PUS		р	aura			Rest	Rest	р	aura	р	
		ARI	AT			nt			aura	aura		nt		
		UTA							nt	nt				
41	107	RA MA	JAK	Chin	Des	Noo	Fast	Asia	BBQ	Don	Foo	Café	Coff	3
41	30	NG	ART	ese	sert	dle	Foo	Asia	Join	ut	d	Cale	ee	3
	30	GA	A	Rest	Sho	Hou	d	Rest	t	Sho	Truc		Sho	
		DUA	PUS	aura	р	se	Rest	aura		р	k		р	
		SEL	AT	nt	P	30	aura	nt		P	, K		۲	
		ATA					nt							
		N												
42	107	KAR	JAK	Asia	BBQ	Indo	Foo	Sala	Rest	Noo	Win	Chin	Don	3
	40	AN	ART	n	Join	nesi	d	d	aura	dle	е	ese	ut	
		G	Α	Rest	t	an	Truc	Plac	nt	Hou	Bar	Rest	Sho	
		ANY	PUS	aura		Rest	k	е		se		aura	р	
		AR	AT	nt		aura						nt		
						nt								
43	107	KAR	JAK	Café	Chin	Cup	Foo	Fast	Du	Don	Dim	Des	Coff	3
	50	TINI	ART		ese	cake	d	Foo	mpli	ut	Sum	sert	ee	
			Α		Rest	Sho	Truc	d	ng	Sho	Rest	Sho	Sho	
			PUS		aura	р	k	Rest	Rest	р	aura	р	р	
			AT		nt			aura	aura		nt			
	441	61.5			61.		_	nt	nt			_		
45	111	GLO	JAK	Noo	Chin	Indo	Foo	Coff	Asia	Du	Des	Foo	Fast	3
	20	DOK	ART	dle	ese	nesi	d	ee	n	mpli	sert	d	Foo	
			A	Hou	Rest	an	Truc	Sho	Rest	ng	Sho	Cou	d	
			BAR	se	aura	Rest	k	р	aura	Rest	р	rt	Rest	
			AT		nt	aura			nt	aura			aura	
						nt				nt			nt	

46		KEA	JAK	Chin	Asia	Noo	Coff	Stea	Sou	Bak	Rest	Fast	Foo	3
	111 30	GU	ART	ese	n	dle	ee	kho	р	ery	aura	Foo	d	J
		NG	Α	Rest	Rest	Hou	Sho	use	Plac	J. 7	nt	d	Truc	
		AN	BAR	aura	aura	se	р	0.00	е			Rest	k	
			AT	nt	nt		,					aura		
												nt		
47	111	KRU	JAK	Chin	Noo	Foo	Asia	Bak	Fast	Indo	Don	Stea	Bistr	3
	40	KUT	ART	ese	dle	d	n	ery	Foo	nesi	ut	kho	О	
			Α	Rest	Hou	Truc	Rest	_	d	an	Sho	use		
			BAR	aura	se	k	aura		Rest	Rest	р			
			AT	nt			nt		aura	aura				
									nt	nt				
48	111	TA	JAK	Chin	Noo	Asia	Foo	Coff	Sou	Don	Des	Indo	Fast	3
	50	MA	ART	ese	dle	n	d	ee	р	ut	sert	nesi	Foo	
		Ν	Α	Rest	Hou	Rest	Truc	Sho	Plac	Sho	Sho	an	d	
		SARI	BAR	aura	se	aura	k	р	е	р	р	Rest	Rest	
			AT	nt		nt						aura	aura	
												nt	nt	
49	111	MA	JAK	Chin	Noo	Foo	Asia	Bak	Bistr	Indo	Japa	Kor	Fast	3
	60	PHA	ART	ese	dle	d	n	ery	0	nesi	nes	ean	Foo	
		R	Α	Rest	Hou	Truc	Rest			an	е	Rest	d	
			BAR	aura	se	k	aura			Rest	Rest	aura	Rest	
			ΑT	nt			nt			aura	aura	nt	aura	
								_		nt	nt		nt	
50	111	TAN	JAK	Noo	Foo	Asia	BBQ	Chin	Indo	Don	Des	Rest	Fast	3
	70	GKI	ART	dle	_ d	n	Join	ese	nesi	ut	sert	aura	Foo	
			A	Hou	Truc	Rest	t	Rest	an	Sho	Sho	nt	d	
			BAR	se	k	aura		aura	Rest	р	р		Rest	
			AT			nt		nt	aura				aura	
F1	111	Ν.4.Δ	1.0.1/	Noo	Chin	Гоо	Asia	Inda	nt	Dak	Dim	Foot	nt	2
51	111 80	MA NG	JAK ART	Noo dle	Chin	Foo d	Asia	Indo	Sou	Bak	Dim	Fast	Café	3
	80		_	Hou	ese Rest			nesi	p Plac	ery	Sum	Foo d		
		GA BES	A BAR			l luc k	Rest	an Rest			Rest	Rest		
		AR	AT	se	aura nt	K	aura nt		е		aura nt	aura		
		ΔI	Λ1		111		110	aura nt			111	nt		
55	112	PEK	JAK	Chin	Noo	Foo	Stea	Asia	Don	Japa	Du	Dim	Des	3
	40	OJA	ART	ese	dle	d	kho	n	ut	nes	mpli	Sum	sert	
		N	Α	Rest	Hou	Truc	use	Rest	Sho	e	ng	Rest	Sho	
			BAR	aura	se	k		aura	р	Rest	Rest	aura	р	
			AT	nt				nt	"	aura	aura	nt		
										nt	nt			
56	112	JEM	JAK	Foo	Win	Fast	Du	Don	Dim	Des	Cup	Coff	Chin	3
	50	BAT	ART	d	е	Foo	mpli	ut	Sum	sert	cake	ee	ese	
		AN	Α	Truc	Bar	d	ng	Sho	Rest	Sho	Sho	Sho	Rest	
		LIM	BAR	k		Rest	Rest	р	aura	р	р	р	aura	
		Α	AT						nt		•		nt	

						aura	aura							
						aura nt	aura nt							
57	112	KRE	JAK	Indo	Bee	Win	Chin	Fast	Du	Don	Dim	Des	Cup	3
	60	NDA	ART	nesi	r	е	ese	Foo	mpli	ut	Sum	sert	cake	
		NG	Α	an	Gar	Bar	Rest	d	ng	Sho	Rest	Sho	Sho	
			BAR	Mea	den		aura	Rest	Rest	р	aura	р	р	
			AT	tball			nt	aura	aura		nt			
				Plac				nt	nt					
				е										
61	113	JEM	JAK	Fast	Chin	Asia	Seaf	Indo	Coff	Du	Don	Dim	Des	3
	20	BAT	ART	Foo	ese	n	ood	nesi	ee	mpli	ut	Sum	sert	
		AN	Α	d	Rest	Rest	Rest	an	Sho	ng	Sho	Rest	Sho	
		BESI	BAR	Rest	aura	aura	aura	Rest	р	Rest	р	aura	р	
			AT	aura	nt	nt	nt	aura		aura		nt		
				nt			_	nt		nt			_	_
64	114	KOT	JAK	Pizz	Foo	Asia	Don	Indo	Noo	Chin	Du	Dim	Des	3
	20	A	ART	a	_ d	n	ut	nesi	dle	ese	mpli	Sum	sert	
		BA	A	Plac	Truc	Rest	Sho	an	Hou	Rest	ng	Rest	Sho	
		MB	BAR	е	k	aura	р	Mea	se	aura	Rest	aura	р	
		U	AT			nt		tball		nt	aura	nt		
		SEL ATA						Plac			nt			
		N						е						
65	114	KOT	JAK	Pizz	Foo	Asia	Don	Indo	Noo	Chin	Du	Dim	Des	3
05	20	A	ART	a	d	n	ut	nesi	dle	ese	mpli	Sum	sert	3
	20	BA	A	Plac	Truc	Rest	Sho	an	Hou	Rest	ng	Rest	Sho	
		MB	BAR	е	k	aura	р	Mea	se	aura	Rest	aura	р	
		U	АТ			nt		tball		nt	aura	nt		
		UTA						Plac			nt			
		RA						е						
66	114	JATI	JAK	Don	Indo	Itali	Win	Chin	Du	Dim	Des	Cup	Coff	3
	30	PUL	ART	ut	nesi	an	е	ese	mpli	Sum	sert	cake	ee	
		0	Α	Sho	an	Rest	Bar	Rest	ng	Rest	Sho	Sho	Sho	
			BAR	р	Mea	aura		aura	Rest	aura	р	р	р	
			AT		tball	nt		nt	aura	nt				
					Plac				nt					
					е				_					
67	114	TO	JAK	Coff	Indo	Chin	Des	Noo	Am	Foo	Sou	Sna	Itali	3
	40	MA	ART	ee	nesi	ese	sert	dle	eric	_ d	р	ck	an	
		NG	A	Sho	an	Rest	Sho	Hou	an	Truc	Plac	Plac	Rest	
			BAR	р	Rest	aura	р	se	Rest	k	е	е	aura	
			AT		aura	nt			aura				nt	
60	111	CDO	1 / 1 /	Non	nt	Doct	F∞i ≏	Chi-	nt	۸۵:-	C	Das	Ind-	
68	114 50	GRO GOL	JAK ART	Noo dle	Foo	Rest	Frie	Chin	Stea kho	Asia	Sna ck	Des	Indo	3
	30	GOL		Hou	d	aura nt	d Chic	ese Rost	use	n Rost	Plac	sert Sho	nesi	
			Α	se	Cou rt	111	ken	Rest	use	Rest			an Mea	
				se	ΙL		Ken				е	р	ivied	

			BAR				Join	aura		aura			tball	
			AT				t	nt		nt			Plac	
													е	
69	114	JELA	JAK	Chin	Noo	Pizz	Indo	Coff	Indo	Japa	Dim	Frie	Foo	3
	60	MB	ART	ese	dle	а	nesi	ee	nesi	nes	Sum	d	d	
		AR	Α	Rest	Hou	Plac	an	Sho	an	е	Rest	Chic	Truc	
			BAR	aura	se	е	Rest	р	Mea	Rest	aura	ken	k	
			AT	nt			aura		tball	aura	nt	Join		
							nt		Plac	nt		t		
									е					
70	114	JELA	JAK	Chin	Noo	Indo	Sna	Seaf	Bak	Coff	Pizz	Indo	Win	3
	60	MB	ART	ese	dle	nesi	ck	ood	ery	ee	a	nesi	е	
		AR	Α	Rest	Hou	an	Plac	Rest		Sho	Plac	an	Bar	
		BAR	BAR	aura	se	Rest	е	aura		р	е	Mea		
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VI. CONCLUSION

Recommendation based on top 100 food venue in Jakarta has been presented above. Jakarta multi-cultural background population would be perfect for food lover who want to experience many types of food.

Jakarta neighborhood segmented to 4 cluster based on recommendation of machine learning algorithm. On cluster 1, Indonesian restaurant dominate top venue, bakery for cluster 2, coffee shop for cluster 3, and chinese-japanese-noodle house on cluster 4.

Top rating venue like Menteng Steakhouse and Gelora American Restaurant included in Cluster 4. All of this venue received score 8.9 and up.

I have collected around 35% top ranking food venue in Jakarta due to limitation of free version of Foursquare API. The result might significantly different from presented above.

Thank you,

M. Rahim