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ZAMONAVIY INNOVATSION TADQIQOTLARNING DOLZARB MUAMMOLARI VA RIVOJLANISH TENDENSIYALARI: YECHIMLAR VA ISTIQBOLLAR

mavzusidagi Respublika ilmiy-texnik anjuman materiallari to‘plami

(2024-yil 17-18-may)

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JIZZAX-2024

“Zamonaviy innovatsion tadqiqotlarning dolzarb muammolari va rivojlanish tendensiyalari: yechimlar va istiqbollar” mavzusidagi Respublika ilmiy-texnik anjuman materiallari to‘plami – Jizzax: O‘zMU Jizzax filiali, 2024-yil 17-18-may. 461-bet.

Respublika miqyosidagi ilmiy-texnik anjuman materiallarida zamonaviy innovatsion tadqiqotlarning dolzarb muammolari va rivojlanish tendensiyalari sohasidagi innovatsion tadqiqotlar aks etgan.

Globallashuv sharoitida davlatimizni yanada barqaror va jadal sur’atlar bilan rivojlantirish bo‘yicha amalga oshirilayotgan islohotlar samarasini yaxshilash sohasidagi ilmiy-tadqiqot ishlariga alohida e’tibor qaratilgan. Zero iqtisodiyotning, ijtimoiy sohalarni qamrab olgan modernizatsiya jarayonlari, hayotning barcha sohalarini liberallashtirishni talab qilmoqda.

Ushbu ilmiy ma’ruza tezislari to‘plamida mamlakatimiz va xorijlik turli yo‘nalishlarda faoliyat olib borayotgan mutaxassislar, olimlar, professor-o‘qituvchilar, ilmiy tadqiqot institutlari va markazlarining ilmiy xodimlari, tadqiqotchilari, magistr va talabalarning ilmiy-tadqiqot ishlari natijalari mujassamlashgan.

Mas’ul muharrirlar: DSc.prof. Turakulov O.X., PhD. O‘ralov A.I.

Tahrir hay’ati a’zolari: p.f.d.(DSc), prof. Turakulov O.X., b.f.f.d. (PhD) O‘ralov A.I., t.f.f.d.(PhD), dotsent Abdumalikov A.A., t.f.n., dots. Baboyev A.M., t.f.f.d.(PhD), dots. Abduraxmanov R.A., p.f.f.d.(PhD) Eshankulov B.S., p.f.n., dots. Alimov N.N., p.f.f.d.(PhD), dotsent Alibayev S.X., p.f.f.d. (PhD) Halimov O‘.H., p.f.f.d.(PhD), dotsent Karshiyev A.A., f.f.f.d.(PhD), dotsent Sindorov L.K., t.f.f.d. (PhD), dotsent Nasirov B.U., b.f.f.d. (PhD), dotsent Mustafaqulov M.A., f.f.f.d. (PhD) Alibekov D.A.., f-m.f.f.d. (PhD) Sharipov X.F., ps.f.f.d.(PhD) Norbekova B.Sh., i.f.n., dots. Tsoy M.P., Qayumov O.A., Jo‘rayev M.M.

Mazkur to‘plamga kiritilgan ma’ruza tezislarining mazmuni, undagi statistik ma’lumotlar va me’yoriy hujjatlarning to‘g‘riligi hamda tanqidiy fikr-mulohazalar, keltirilgan takliflarga mualliflarning o‘zlari mas’uldirlar.

Nizomiddin International Journal of Contemporary Scientific and Technical Research, 24-28

13. Choryorqulov G‘.H., & Qosimov N.S. (2023). ELEKTRON JADVAL MODELINING TAVSIFLANISHI. PEDAGOGS Jurnali, 30(3), 67–73.

14. Ta’lim tizimida baholash tizimini avtomatlashtirishni joriy etish jarayonlari va foydalanish metodlari Н Норматов, А Мамараимов Информатика и инженерные технологии 1 (2), 356-359

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UNSUPERVISED LEARNING CLUSTERING, K-MEANS ALGORITHM

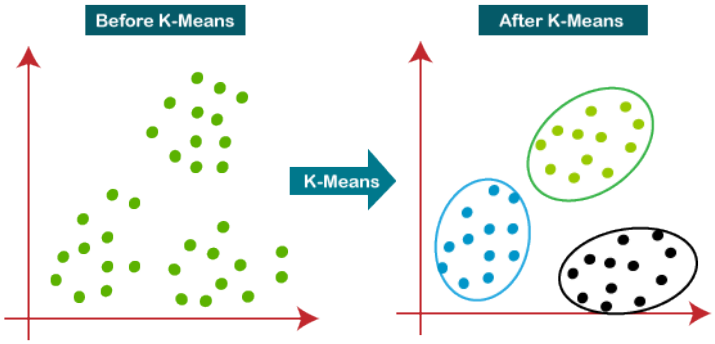
Salimov Jamshid Obid o‘g‘li,
Ro‘ziqulov Shoxrux Sherali o‘g‘li
Jizzakh branch of National University of Uzbekistan
jamshidsalimov8@gmail.com

Annotation: The k-Means algorithm, one of the Unsupervised Learning algorithms, which is one of the branches of Machine Learning, is widely used for clustering tasks in the construction of artificial intelligence programs. In the k-Means algorithm, k steroid points are selected, the distances from setroids to each point are measured and divided into k clusters, and steroids are moved to the center of the points, this process continues until the setroid points do not move. This makes it an intuitive and powerful tool for solving complex problems[3]. This paper creates a customer clustering model using the k-Means algorithm.

Key words: artificial intelligence, k-means, clustering, steroid unsupervised learning.

What is clastering?

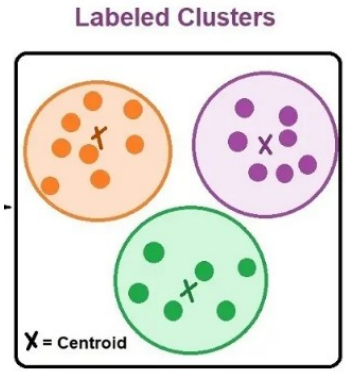
1. Unsupervised Machine Learning type[5]
2. A group of objects that are similar to other objects in a cluster and dissimilar to objects in other clusters.



There are three different clustering algorithms below

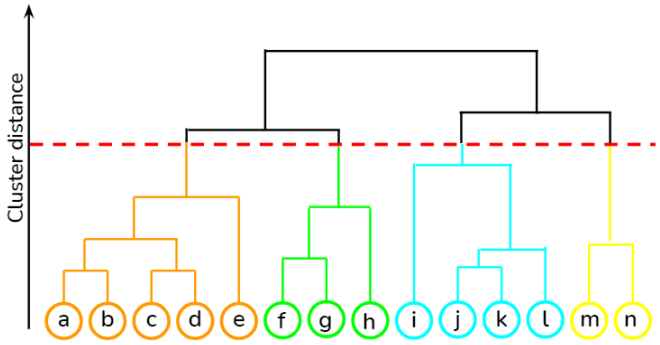
1. Partitioned-based clustering

- K-means, k-median, Fuzzy c-Means
- Recommended for medium and large datasets



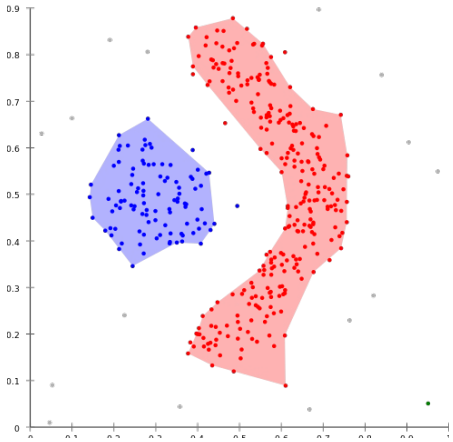
2. Hierarchical clustering

- Recommended for small datasets
- The result will be in tree view



3. Density-based clustering

- The result will be in the form of clusters of different sizes
- Errors are recommended for large datasets



k-means algorithm

- Divides data into non-overlapping sets (clusters)

- Clusters have no internal structure
- Points within a cluster are very similar
- Points outside the cluster are very different

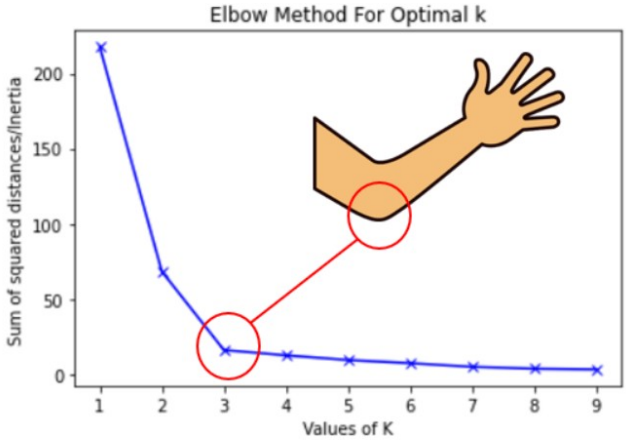
The goal of the k-means algorithm

- Minimization of intra-cluster distances
- Maximize the distance between clusters

The k-means algorithm is implemented in the following sequence.

1. Random selection of setroids for each cluster
2. Measure the distance from each point to the steroid
3. Attaching each point to the nearest steroid
4. Displacement of cetroids
5. Repeat steps 2-4 until the setroids stop moving

How to choose the number of clusters k in the k-means algorithm?



Line plot between K and inertia

Customer clustering using k-means algorithm on customer data.

Description: Breast cancer is the most common cancer among women in the world. It accounts for 25% of all cancer cases. Breast cancer begins when cells in the breast grow out of control. These cells are usually detected by analyzing tumors that can be seen on X-rays.

```
df.info()
df.drop('Address', axis=1, inplace=True)
df.head()
```

	Customer Id	Age	Edu	Years Employed	Income	Card Debt	Other Debt	Defaulted	DebtIncomeRatio
0	1	41	2	6	19	0.124	1.073	0.0	6.3
1	2	47	1	26	100	4.582	8.218	0.0	12.8
2	3	33	2	10	57	6.111	5.802	1.0	20.9
3	4	29	2	4	19	0.681	0.516	0.0	6.3
4	5	47	1	31	253	9.308	8.908	0.0	7.2

Normalization

All columns except the Customer Id column are normalized

```
from sklearn.preprocessing import StandardScaler
```

```
X = df.values[:,1:]
X = np.nan_to_num(X)
norm_data = StandardScaler().fit_transform(X)
```

Model

The dataset consists of information such as age, number of years of work, income, debt of various customers. Our goal is to use this information to segment customers into real clusters.

```
k = 3
k_means = KMeans(n_clusters = k) # init va n_init standart qiymatlarni qabul qiladi, biz faqat klasterlar sonini ko'rsatdik.
k_means.fit(norm_data)
print(k_means.labels_)
```

Clients were divided into clusters. This data is added to the Dataset as a new column.

```
df['cluster'] = k_means.labels_
df.head()
```

	Customer Id	Age	Edu	Years Employed	Income	Card Debt	Other Debt	Defaulted	DebtIncomeRatio	cluster
0	1	41	2	6	19	0.124	1.073	0.0	6.3	2
1	2	47	1	26	100	4.582	8.218	0.0	12.8	0
2	3	33	2	10	57	6.111	5.802	1.0	20.9	1
3	4	29	2	4	19	0.681	0.516	0.0	6.3	2
4	5	47	1	31	253	9.308	8.908	0.0	7.2	0

Information about clusters can be obtained by finding the centroid of each cluster. For this, groupby and mean functions are used.

```
df.groupby('cluster').mean()
```

cluster	Customer Id	Age	Edu	Years Employed	Income	Card Debt	Other Debt	Defaulted	DebtIncomeRatio
0	424.408163	43.000000	1.931973	17.197279	101.959184	4.220673	7.954483	0.162393	13.915646
1	424.451807	31.891566	1.861446	3.963855	31.789157	1.576675	2.843355	0.993939	13.994578
2	426.122905	33.817505	1.603352	7.625698	36.143389	0.853128	1.816855	0.000000	7.964991

What can be inferred about the customers in each cluster?

So each cluster can be defined as:

- **Cluster 0 -** Middle age, 7+ years of experience, low income customers.
- **Cluster 1 -** Young, less experienced and lower income customers.
- **Cluster 2 -** Clients who are very young, have a long experience, and earn a lot of money.

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NEYROKOMPYUTERLAR ARXITEKTURASI, NEYROKOMPYUTERLAR

Salimov Jamshid Obid o‘g‘li,
Sodiqov Diyorbek Sodiq o‘g‘li,
Norov Beksulton Botir o‘g‘li
O‘zbekiston Milliy universiteti Jizzax filiali
jamshidsalimov8@gmail.com

Annotatsiya: Neyrokompyuterlar nazariyasi bilan tanishib chiqish. Neyrokompyuterning inson-mashina interfeyslari va miya-kompyuter o‘zaro ta’siri bilan integratsiyalashuvi, ilg‘or neyroprostetikaning rivojlanishiga olib kelar ekan, neyron tomonidan boshqariladigan robot oyoq-qo‘llari va hatto miyadan miyaga bevosita aloqasi bor ekanligi. Neyrokompyuterning rivoji sog‘liqni saqlash, texnologiyalar va inson-kompyuter hamkorligi kabi sohalarga chuqur ta’sir ko‘rsatadi.

Kalit so‘zlar: neyrochiplar, neyrokompyuter, kuchaytirgich, kibernetika, neyrobionika.

Neyrokompyuter - bu tabiiy neyron tizimlarning ishlash tamoyillari asosida ma'lumotlarni qayta ishlash qurilmasi. Neyrokompyuterlarning muammosi haqiqiy jismoniy qurilmalarni qurishdan iborat bo'lib, bu nafaqat oddiy kompyuterda sun'iy neyron tarmoqlarini taqlid qilish, balki kompyuterning ishlash tamoyillarini o'zgartirish imkonini beradi, bu esa ular nazariyaga muvofiq ishlaydi. Neyrokibernetika, neyroinformatika, neyrokompyuterlar yaqinda - XX asrning 80-yillari o'rtalarida ilmiy foydalanishga kirgan. Biroq, elektron va biologik miyalar doimo hisoblash tarixi davomida taqqoslangan[1]. N. Wienerning mashhur "Kibernetika" kitobida (1948) "Hayvon va mashinada boshqaruv va aloqa" sarlavhasi mavjud. Birinchi neyrokompyuterlar Rosenblatt perseptronlari edi: Mark-1 (1958) va Tobermory (1961-1967) , shuningdek Adaline Widrow va Hoff (1960) tomonidan delta qoidasi (Widrow formula) asosida ishlab chiqilgan. Hozirgi vaqtda Adaline (Widrow formulasidan foydalangan holda moslashtiruvchi qo'shimchani o'rganish)