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Crime clustering in Yogyakarta: Data analysis 2016-2020 and state responsibility in crime

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Abstract
Crime often occurs. The crime rate in an area will be different from that of other areas according to the characteristics of the area. The clustering carried out in this study is based on the number of reported crime rates. This study aims to cluster crime-prone areas in Yogyakarta City so that they can identify areas to seek to handle them more effectively. The method of this research is ex post facto, which is a quantitative exploratory descriptive. Data was collected through the crime documentation of Yogyakarta City, which has 15 regional units and with crime rates from 2016 to 2020. Clustering is carried out by cluster analysis *of the* average linkage *hierarchy method* because the variables are less than 100, so multi-storey clusters are more appropriately used and return to the goal, namely, to identify crime-prone areas. The research results on the crime rate in Yogyakarta City based on data in each reported police unit for five years, namely from 2016, 2017, 2018, 2019, and 2020, show that the unit area is divided into 3 clusters consisting of clusters 1, 2, and 3. Each cluster has members, namely Cluster 1, Yogyakarta City Resort. Cluster 2 consists of Gondomanan, Ngampilan, Gedongtengen, Jetis, Tegalrejo, Wirobrajan, Kraton, Mantrijeron, Mergangsan, Kotagede, Danurajan and Pakualam. Cluster 3 consists of Umbulharjo and Gondokusuman. So, cluster 1, according to the total number of 5 years, is indeed the most, but for clusters 2 and 3, it is different, so in this clustering, the underlying is the similarity between the variables owned. Crime in the city is often encountered due to the heterogeneity of the community from various fields, so practical efforts must be made to deal with it.

Keywords: clustering; crime; vulnerable areas; urban

Introduction

Yogyakarta is a province in Indonesia with five (5) regions: Kulonprogo Regency, Bantul Regency, Sleman Regency, Gunungkidul Regency and Yogyakarta City. The province had a

population of 3,668,719 people in 2020, with details such as Kulonprogo Regency with 436,395 people, Bantul Regency with 985,770 people, Sleman Regency with 1,125,804 people, Gunungkidul Regency with 747,161 people and Yogyakarta City with 373,589 people (BPS, 2021). An urban society is a society whose members consist of people of various layers/levels of life, education, culture and others. Most of the population lives in non-agrarian businesses (Mansyur, 2005).

The city of Yogyakarta, as the capital of the province, has the potential to be developed for the welfare of its people, including from the cultural and tourism sectors, as well as the existence of student city jargon for the province of Yogyakarta to make a positive contribution to the development of the city area. As the only municipality highly highlighted in its economic, social and cultural development, the city of Yogya has transformed into a modern urban area even though it is not too large like other districts in Yogyakarta (Adisasmita, 2015). The city has functions in various ways for the community, both those who live in and around the city area. The city can provide important services for those who are in the city or who live around the city, or those who travel and stay temporarily there. Physical activities in the city require attention and design according to their respective functions. Cities sometimes have multiple functions, including being the centre of population, trade, government, industry or cultural centre of a region (Jamaludin, 2015). Cities with heterogeneity certainly have problems in various social, cultural, economic, educational, political and legal fields. One of the interesting areas to continue to study in research is the social side, namely criminality.

According to Sypion-Dutkowska et al., (2021*)* the issue of the impact of metropolis on crime is the spatial aspect, namely suburbanisation and the context of rapid metropolisization on its social effects, including crime. Massa and Fondevila (2021) explain that criminal groups make decisions in carrying out their actions based on rational calculations of risks and benefits. They tend to choose locations with a greater chance of success and lower risk. According to Lopes and Nobre (2024), it has been found that homeless people in urban areas are more often targeted by victims of crime, both in the form of physical violence and victimisation by criminal groups. However, it was also found that some of these homeless people eventually decided to get involved in drug trafficking, theft and robbery. Research conducted by Júnior et al. (2024) highlights the importance of using historical data to predict hotspots or crime centres in the present and future, especially in urban areas. Community involvement in crime prevention efforts is very important. Programs encouraging citizens to participate in environmental surveillance and report suspicious activity can help reduce crime rates.

Based on some of these relevant studies, it can be said that urban areas are indeed synonymous with social problems, namely crime, which is not only highlighted as the cause of its occurrence but also efforts that can be made to minimize the occurrence of this. Basically, crime is a very anti-social act, which the state consciously opposes. From the formal definition, the challenge is in the form of punishment (Bonger, 1995). Criminal acts often make the community feel unsafe, as a social phenomenon, without considering the victims' social status, economic conditions, and the area (Nurhayati et al., 2021). Crime causes losses to others, so sanctions have been adjusted to the applicable regulations in a region. Seeing this, the values and norms that become rules must be firmly instilled in the community in various ways. In general, in every region there will be this crime problem with various factors causing and types, as well as for the city of Yogyakarta. It has been explained initially that Yogya City is an urban area with the potential for diverse social effects of crime. The variety of types of crime and the number reported to the local police institution also varied, so in this study, it is necessary to group areas that are prone to crime. According to data on the number of crimes nationally in 2020, there were 247,218 incidents. The number is detailed in 34 provinces, Yogyakarta Province ranks 12th with 7,721 crimes reported. In contrast, the province that occupies number one is North Sumatra, with a total of 32,990 crimes reported, and the last is North Maluku Province, with 850 (BPS, 2021). The number of crimes reported certainly has various types, namely crimes against life, crimes against physical/body, crimes against morality, crimes

against human freedom, crimes against rights/property with the use of force, crimes against rights/property without the use of violence, crimes related to narcotics, crimes related to embezzlement, fraud, and corruption (BPS, 2021). Criminal acts often cause insecurity in society as a social phenomenon that affects all levels, regardless of the victim's social status, economic conditions, or location (Nurhayati et al., 2021).

Sociologically, crimes can be distinguished into two types: white-collar and blue-collar. White-collar crimes require a position, and the perpetrator is in a high social status, while blue-collar crimes are blue-collar crimes committed by the lower middle class because of economic needs. The tendency to behave evil is not only a monopoly of the poor because of economic pressure (blue collar) but also carried out by white collars (Nassaruddin, 2016). Crime in cities occurs for various reasons, which are increasingly varied in type and variety of reasons. The rise of crime caused unrest in the lives of the people of Yogyakarta City. Spadon et al. (2017), stated that with the increasing crime rate in large cities, there is an urgent need to understand how crime spreads and interacts in social and physical networks in urban environments. Mapping the class of crime-prone areas in Yogyakarta City needs to be carried out to minimize the negative impact on the community.

Method

This research is an *expost facto* of the descriptive quantitative exploratory selected in this study. The ex post facto design explores possible causal relationships between variables the researcher cannot control. The data obtained is secondary data with documentation in the form of the level of crime reported to the Yogyakarta Police in 2021. The city of Yogyakarta was chosen as the location of the research, considering that the city of Yogyakarta is one of the big cities on the island of Java, the population dynamics are very flexible, and there are many immigrant residents (immigrants) both at the national and international levels for work, higher education, and tourism. The method used is hierarchical cluster analysis, which combines the two most similar variables and will recombine into a large whole again, agglomerative method and described with a dendrodgram as a feature in a hierarchical cluster. Cluster analysis is a class of techniques that classify objects or cases (respondents) into relatively homogeneous groups called clusters (Supranto, 2004). This study uses a procedure in conducting cluster analysis by Supranto (2004).

Formulating the problem is by defining the variables used as the basis for clustering. The variables used are the region and the year taken, namely the last five years, here is the description:

Table 1.
Objects in Research

Union Territory	Year
Resor Kota Yogyakarta	2016
Gondomanan	2017
Ngampilan	2018
Gedongtengen	2019
Jetis	2020
Tegalrejo	
Wirobrajan	
Kraton	
Mantrijeron	
Mergangsan	
Umbul Harjo	
Kota Gede	
Gondokusuman	
Danurejan	
Pakualaman	

Source: Yogyakarta Police, 2021.

The right size of distance must be chosen. The distance measure determines the similarity or dissimilarity of the objects to be grouped (included in the cluster). Objects with a shorter distance between them will be more similar than pairs with a longer distance. The measure used is *the Euclidean distance, or the square value, which* is the root of the sum of the squares of the difference/deviation in the value for each variable. With the formula:

$$d_{ij} = \sqrt{\sum_{k=1}^{p}(x_{ik} - x_{jk})^2}$$

This study uses hierarchical cluster classification with *an agglomerative* method, starting with each object, a separate cluster with *an average linkage*, namely using information on all distance pairs, not only the maximum or minimum distance. Each object is a separate cluster (i.e. n objects = n clusters) and progressively combines the clusters until a cluster containing all objects is formed (Balbi et al., 2024). Determining the number of clusters in this study that uses the hierarchical method to identify areas prone to crime is desired in a certain number, namely 2-4, using the minimum and maximum distances. It includes the study of centroids, namely the average value of objects contained in the cluster in each variable. The processed product is assisted by SPSS software version 23. It is interpreted by looking at the agglomerative results, the dendrogram obtained, and some data processing results from the research objectives. Centroid can be viewed by using the formula:

$$C = \frac{\sum x_{jk}}{n}$$

Result and Discussion

This study is based on the results of data processing using *cluster* analysis showing statistical data with minimum and maximum scores with the average listed in the following table:

Table 2.
Descriptive Statistic

	N	Minimum	Maximum	Mean	Std. Deviation
2016	15	10	155	43.4667	40.70252
2017	15	7	114	32.5333	31.60666
2018	15	2	147	25.2000	35.99047
2019	15	3	147	19.2667	35.79199
2020	15	7	282	41.4000	67.71453
Valid N (listwise)	15				

Source: Data processing results.

Based on the data above, the data was obtained from 15 unitary areas in the Yogyakarta Police from 2016 to 2020 for five years. The number of existing crimes also varies with different mean and standard deviations. The mean of the most crimes in 2016 was 43.4667 and fluctuated with the lowest data in 2019, namely 19.2667 cases reported for the Yogyakarta City area. However, the trend is rising again, with a 41.4000 mean obtained in 2020. In this case, the data obtained is descriptively different from each year. For that reason, clustering will be carried out based on the level of similarity with the hierarchy method so that vulnerable areas can also be identified by looking at the level of crime for five years.

According to the data that has been processed, 15 objects have been processed properly so that no data is lost or has not been processed by *the software* used. This is also obtained by looking at the distance between variables. The smaller the distance obtained with other variables, the more similar it is so that clusters can be formed. Likewise, in this study, the Euclidean distances were experienced at a short distance close to each other so they could be

collected into one group/cluster. Then, the results of this study show that by using the between-group linkage method, the distance between variables will be seen in the grouping in stages. The following is a data table explaining its agglomeration:

Table 3.
Agglomeration Schedule

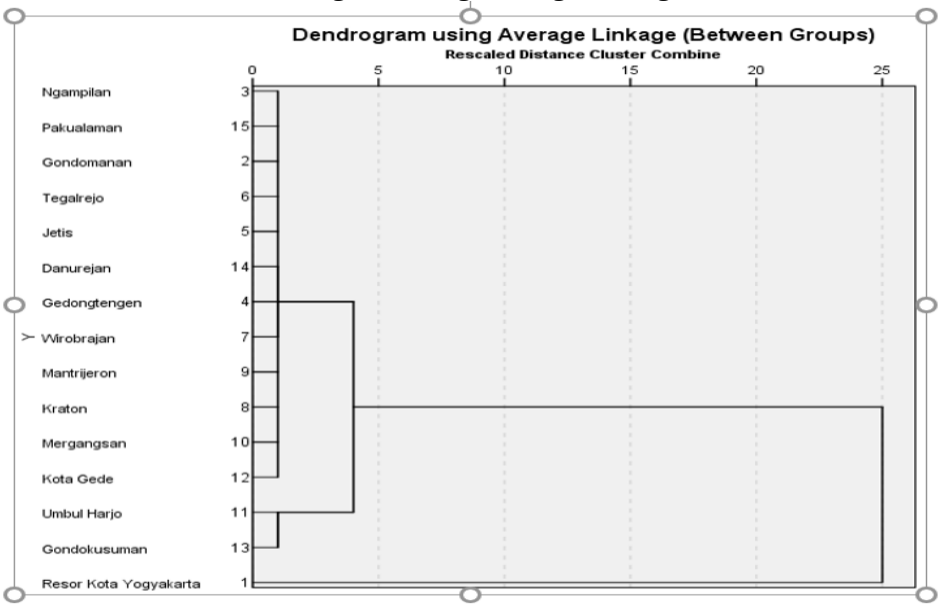
Stage	Cluster Combine		Coeficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	3	15	.035	0	0	6
2	2	6	.065	0	0	6
3	4	7	.084	0	0	7
4	5	14	.096	0	0	9
5	8	10	.107	0	0	8
6	2	3	.138	2	1	10
7	4	9	.163	3	0	9
8	8	12	.228	5	0	11
9	4	5	.282	7	4	10
10	2	4	.355	6	9	11
11	2	8	.732	10	8	13
12	11	13	1.717	0	0	13
13	2	11	7.647	11	12	14
14	1	2	59.607	0	13	0

Source: Data processing results.

The table above shows that stage 1 consists of objects 3 and 15 with a distance of 0.035 listed in the coefficients, which is taken with the two shortest or closest distances of the 15 objects in the data. The next stage is stage 6, which consists of objects number 2 and 3 with 0.138, and the next stage is stage 10. Then the stage consists of numbers 2 and 4 with coefficients of 0.355. Then the next stage is stage 11, which consists of numbers 2 and 8 with 0.732. Then the next page on stage 13 consists of objects numbers 2 and 11 with a distance of 7.647 at the coefficient then the next page is at stage 14 which assumes objects number 1 and 2 with a coefficient of 59.607. In this case, agglomeration is important in a hierarchical cluster because it will look cascading with several objects grouped according to similarity. A schedule that provides information about objects or cases to be combined (grouped into clusters) at each stage of a hierarchical clustering process (Supranto, 2004). Then, from looking at the agglomeration data, the next thing is to look at the side of cluster membership, which means that it is in the form of cluster membership under the purpose of this research by identifying the objects in the appropriate clusters.

The number of existing clusters can be explained in three types, including if: divided into 4 clusters consisting of clusters 1, 2, 3, and 4. Each cluster has different members from 15 unitary regions in Yogyakarta City. For cluster 1 consists of Yogyakarta City Resort, cluster 2 consists of Gondomanan, Ngampilan, Gedongtengen, Jetis, Tegalrejo, Wirobrajan, Kraton, Mantrijeron, Mergangsan, Kotagede, Danurajan and Pakualam. Cluster 3 consists of Umbulharjo and the 4th cluster is Gondokusuman. It is divided into 3 clusters consisting of clusters 1, 2, and 3. Each cluster has members, namely cluster 1 is Yogyakarta City Resort. Cluster 2 consists of Gondomanan, Ngampilan, Gedongtengen, Jetis, Tegalrejo, Wirobrajan, Kraton, Mantrijeron, Mergangsan, Kotagede, Danurajan and Pakualam. Cluster 3 consists of Umbulharjo and Gondokusuman. Divided into 2 clusters consisting of clusters 1 and 2 with member details for cluster 1 is Yogyakarta City Resort then cluster 2 consists of Gondomanan, Ngampilan, Gedongtengen, Jetis, Tegalrejo, Wirobrajan, Kraton, Mantrijeron, Mergangsan, Kotagede, Danurajan and Pakualam, Umbulharjo and Gondoksuman. the same cluster even though the number of clusters has changed. For more details, it will be visible on the dendogram diagram so that the members can be seen in the grouping. Here is a picture of the dendrogram:

Figure 1.
Dendogram using Average Linkage



Source: Data Processing Results

The crime in the people of Yogyakarta City can be interpreted quite a lot by the number in those five years, namely 2548 crimes reported. The city of Yogyakarta as an urban area has a crime problem with various contributing factors. One of these problems inherent in all cities of the world is crime. Police databases accumulate a large amount of data that could be analyzed to reduce crime rates (Ingilevich & Ivanov, 2018). The point is that all cities in various regions experience crime problems and data from the police will be able to help reduce the crime rate. By knowing the data correctly, efforts to minimize can be carried out significantly for areas prone to crime. The cluster analysis carried out resulted in three clusters that were not previously expected, namely cluster 1 remained occupied by the Yogyakarta City resort unit, it can be seen in the data that the case does have a fairly large number of reported crime rates compared to other regions for five consecutive years. Although it has decreased, it is still the most out of 14 units in Yogyakarta City. Next, for the second cluster, it can be said that there are many members, namely 12 unitary areas, which is indeed seen by the level of similarity to each other from the objects in the area. The changes between the 12 objects from the past five years have indeed experienced similarities. The last cluster, namely the third cluster, is two similar units: Umbulharjo and Gondokusuman. The two units have had different crime rates yearly for the previous five years. The grouping with these 3 clusters according to the results of data processing shows that the number of each year is not a characteristic in determining which cluster is in what group, but looking at the results of the similarity between existing objects so that from the 15 objects of the unitary area with a period of 5 years it produces different numbers, especially in the second cluster when the mean is made, it will be less than the third cluster so that this clustering can be seen based on the character of each The variable is not in the number of numbers each year.

Urban areas with characteristics that are indeed different from rural areas in terms of physical typology, natural resource potential, and social elements such as solidarity among the community. Various urban typologies, such as human resources, also make cities heterogeneous. External and internal factors can also cause crime opportunities. This opportunity is further exacerbated by information and communication technology advancement in the current modernisation era (Juliati et al., 2019). Even in terms of policies/regulations, values and norms that apply as well as from the elements of individual actors such as the urgency of economic needs, the psychological side and so on. Some explanations of crime focus on psychological aspects of the offenders, such as psychopathic personalities, unhealthy relationships with parents and mental illness. Other crime theories

focus on the role of biological variables such as central nervous system malfunctioning, stress hormones, vitamin or mineral deficiencies, chromosomal abnormalities and genetic predisposition toward aggression. Sociological theories of crime and violence emphasize the role of social factors in criminal behavior and societal response to it (Mooney et al., 2017). Socially, it also contributes to crime in society, so it needs to be understood by all parties, both the government, which has authority and the community. Sociologically, criminal acts a person commits result from social and cultural changes in society as a form of social deviation (violation of societal norms) (Burlian, 2016).

Based on the types of cases in Yogyakarta City based on the data obtained, among others, cases of theft with weight, theft of motor vehicles, theft with violence, fire, severe persecution, murder, rape/obscenity, juvenile delinquency/sharp weapons, counterfeit money and drugs. Street crime behaviour in Yogyakarta City is already very worrying and concerning, committed for personal and group reasons (Widyaningrum & Hartini, 2022). Ten types of crimes existed from 2016 to 2020. Based on the area used as a research site, it is indeed a characteristic of a city, but it is still thick with its cultural culture, namely Javanese culture, but cases of crime still occur. According to Widiatmaka (2016), the youth character crisis impacts the many criminal acts youth commit. Socio-cultural values have a significant effect on efforts to minimise crime. Consistent with Durkheim's emphasis on social solidarity, Hiraschi (1969) suggests that a strong social bond between individuals and the social order constrains some individuals from violating social norms. Hiraschi identified four elements of the social bond: attachment to significant others, commitment to conventional goals, involvement in conventional activities, and belief in the moral standards of society (Mooney, 2017).

Crime is one of the social problems often found in urban areas, one of which is the city of Yogyakarta; of course, this behaviour has violated the law and harmed others. Social problems are interpreted as conditions that most members of society do not desire. This is because these symptoms are conditions that are not following expectations or are not following applicable values, norms, and social standards. More than that, a condition is also considered a social problem because it causes various sufferings and losses, both physical and non-physical (Soetomo, 2015). Clustering following the existing crime data from this study explains the existence of 3 clusters with members of each unitary area in Yogyakarta City. Cluster analysis was chosen with the aim of this study being to group unitary areas that have the same similarities. Clustering of unitary areas and five years in use.

Junjing's research (2018) focuses on detecting criminal communities using a cluster analysis algorithm, especially in urban areas. Proving that cluster analysis can help defense and public safety officers to screen suspicious people quickly, narrow the scope, likelihood of criminal groups appearing, and improve the efficiency of detected criminal cases. The research of Pramanik et al. (2023) stated that clustering crime reports is very important to identify and prevent criminal activities that often occur in the community. Balocci et al. (2023) found that precision in determining the evolution of crime over time is an essential initial stride toward enhancing our comprehension of public safety in sprawling urban settings. Cities feature numerous physical and social divisions that can appear as spatial discontinuities in crime patterns. Maharrani et al. (2024) said that crime data analysis is crucial in reducing crime rates and providing insights into incidents, patterns, vulnerability levels, and the security status of an area. Analysing crime data monthly in each region can provide valuable insights into seasonal patterns and help identify potential factors contributing to crime fluctuations.

Conclusion

Based on the results of research on clustering crime-prone areas in Yogyakarta City, several things show that there is clustering in a unitary area of 15 with a period of 5 years from 2016 to 2020 by dividing it into three clusters, namely cluster 1 consisting of Yogayakarata City resorts, cluster 2 consisting of Gondomanan, Ngampilan, Gedongtengen, Jetis, Tegalrejo, Wirobrajan, Kraton, Mantrijeron, Mergangsan, Kotagede, Danurajan and Pakualam. Cluster 3

consists of Umbulharjo and Gondokusuman. The three clusters result from the use of the hierarchical cluster method with averages. Crime in urban areas is indeed one of the social problems that must be reduced to ensure the situation is always safe and comfortable. In addition, Yogayakarta City is a city full of social, cultural and all fields because it is an urban area full of people. The clustering is carried out to identify current areas that require more complex handling, of course, with the characteristics of their respective regions.

References

Adisasmita, R. (2015). *Teori pertumbuhan kota.* Graha Ilmu.

Balbi, E., Cianfarra, P., Crispini, L., Tosi, S., & Ferretti, G. (2024). Hierarchical-agglomerative clustering analysis of geomorphic features applied to tectonic investigation of terrestrial planets: An example from Claritas Fossae, Mars. *Icarus, 420*, 1-15. https://doi.org/10.1016/j.icarus.2024.116197

Balocchi, C., Deshpande, S.K., George, E.I., & Jensen, S.T. (2023). Crime in Philadelphia: Bayesian Clustering with particle optimization. Journal of the *American Statistical Association, 118*(542), 818-829. https://doi.org/10.1080/01621459.2022.2156348

Bonger, A.W. (1995). *Pengantar tentang kriminologi*. PT. Pembangunan

BPS. (2021). *Hasil Sensus Penduduk (SP2020) pada September 2020 mencatat jumlah penduduk sebesar 270,20 juta jiwa.* Berita Resmi Statistik. https://www.bps.go.id/id/pressrelease/2021/01/21/1854/hasil-sensus-penduduk--sp2020--pada-september-2020-mencatat-jumlah-penduduk-sebesar-270-20-juta-jiwa-.html

BPS. (2021). *Statistik kriminal 2021*. Publikasi. https://www.bps.go.id/id/publication/2021/12/15/8d1bc84d2055e99feed39986/statistik-kriminal-2021.html

Burlian, P. (2016). *Patologi sosial*. Bumi Aksara

Hirschi, T. (1969). *Causes of delinquency.* University of California Press

Ingilevich, V., & Ivanov, S. (2018). Crime rate prediction in the urban environment using social factors. *Procedia Computer Science, 136*, 472-478. https://doi.org/10.1016/j.procs.2018.08.261

Jamaludin, N.A. (2017). *Sosiologi perkotaan memahami masyarakat kota dan problematikanya.* Pustaka Setia.

Juliati, Hermawan, W., & Firman, M. (2019). Pendidikan kewarganegaraan sebagai wahana untuk meningkatkan kesadaran hidup yang lebih baik di era global. *Jurnal Civics: Media Kajian Kewarganegaraan, 16*(1), 29-38. http://dx.doi.org/10.21831/jc.v16i1.23340

Júnior, R.V.S., Coelho, J.V.V., Cacho, N.A.A., & Araújo, D.S.A. (2024). A criminal macrocause classification model: An enhancement for violent crime analysis considering an unbalanced dataset. *Expert Systems With Applications, 238*, 1-22. https://doi.org/10.1016/j.eswa.2023.121702

Junjing, T. (2018). Research on the application of cluster analysis in criminal community detection. *Journal of Physics: Conference Series, 1060,* 1-7. https://iopscience.iop.org/article/10.1088/1742-6596/1060/1/012052

Lopes, A.B., & Nobre, M.J. (2024). Drugs, crime, and racial disparities in the homeless population gathered from a sample of police reports: Evidence from Brazil. *Forensic Science International, 361*, 1-7. https://doi.org/10.1016/j.forsciint.2024.112123

Maharrani, R. H., Abda'u, P.D., & Faiz, M.N. (2024). Clustering method for criminal crime acts using K-means and principal component analysis. *Indonesian Journal of Electrical*

Engineering and Computer Science, 34(1), 224-232. http://doi.org/10.11591/ijeecs.v34.i1.pp224-232

Mansyur, C. (2005). *Sosiologi masyarakat kota dan desa*. Offset Printing.

Massa, R., & Fondevila, G. (2021). Criminal displacement in Mexico city's metropolitan area: The case of kidnapping. *International Journal of Law, Crime and Justice, 67,* 1-10. https://doi.org/10.1016/j.ijlcj.2021.100479

Mooney, L.A., Knox, D., & Schacht, C. (2017). *Understanding social problems*. Cengage Learning

Nassaruddin, H.E. (2016). *Kriminologi.* Sukoharjo: Pustaka Setia.

Nurhayati, Kusdarini, E., & Hamimu, U. (2021). Moral development on inmates as the effeorts to prevent recidivists. *Humaniora, 12*(3), 173-178. https://doi.org/10.21512/humaniora.v12i3.7006

Pramanik, A., Das, A.K., Pelusi, D., & Nayak, J. (2023). An effective Fuzzy Clustering of crime reports embedded by a universal sentence encoder model. *Mathematics, 11*(611), 1-18. https://doi.org/10.3390/math11030611

Soetomo. (2015). *Masalah sosial dan upaya pemecahannya*. Yogyakarta: Pustaka Pelajar.

Spadon, G., et al. (2017). Behavioral characterization of criminality spread in cities. *Procedia Computer Science, 108*, 2537-2541. https://doi.org/10.1016/j.procs.2017.05.118

Supranto. (2004). *Analisis multivariat arti dan interpretasi*. Jakarta: Rineka Cipta.

Sypion-Dutkowska, N., Leitner, M., & Dutkowski, M. (2021). Impact of metropolization on the crime structure (case study of provincial capitals in Poland). *Cities, 119*, 1-13. https://doi.org/10.1016/j.cities.2021.103359

Widiatmaka, P. (2016). Kendala Pendidikan Kewarganegaraan dalam membangun karakter peserta didik di dalam proses pembelajaran. *Jurnal Civics: Media Kajian Kewarganegaraan, 13*(2), 188 -198. https://doi.org/10.21831/civics.v13i2.12743

Widyaningrum, R.T., & Hartini, S. (2022). Penanganan kejahatan jalanan oleh Kepolisian Resor Kota Yogyakarta di masa pandemi COVID-19. *AGORA: Scientifics Journal of Pancasila and Civic Education, 11*(2), 159-170.