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ENHANCING LOCATION SAFETY PERCENTAGE THROUGH CRIME SPOT DETECTION USING FCM

[1]Gudiwaka Vijayalakshmi,[2]Yaramolu Poorna Pranathi Chowdary,

[1]Assistant Professor,[2]MCA 2nd year,
[1]Master Of Computer Applications,
[1]Sanketika Vidya Parishad Engineering College, Visakhapatnam, India

ABSTRACT
Preventing crime is a crucial responsibility because it is one of the most important and significant society challenges The prevention of crimes is another key challenge for law enforcement authorities It is necessary to create a system that detects crime in order to resolve this and make our society a society without crime analyzing and identifying crime rates is one of the scientific methods used today to lessen illegal activity worldwide Crime doesn't occur everywhere, it has certain patterns. There are a few things that contribute to crime occurring there, like how remote the area is from the city, which typically has a higher crime rate It is possible to reduce crime by forbidding travel to those regions Finding the location's safety percentage is necessary to determine which location is the safest to visit Machine learning methods can be used to achieve this The development of a model for determining the area's security rating involved the use of AI techniques Fuzzy c-means clustering and k-means clustering were employed as clustering algorithms to solve this problem. Using the offending dataset, tests were conducted using a variety of clustering algorithms, and it was discovered that FCM produces better outcomes Exploratory results demonstrate that fluffy c-implies grouping produces results that are 38% more exact than k-implies bunching In order to assess the location's safety percentage, it is therefore highly useful and also more accurate to utilise a machine learning technique called fuzzy c-means clustering

Keywords: Crime detection, Clustering, Fuzzy-c-means clustering, Safety Percentage, Preventing crime, society challenges, law enforcement authorities, detecting crime, crime rates, scientific methods, illegal activity, patterns, remote areas, reducing crime, travel restrictions, safety percentage, machine learning methods, AI techniques, Fuzzy c-means clustering, k-means clustering, offending dataset, clustering algorithms, accuracy.

I.INTRODUCTION

Criminality is an issue that both developed and developing nations must deal with. Both the public and private sectors may be impacted by crimes and criminal activity[1]. Public safety is crucial in establishing secure surroundings when people move or migrate. Actually, different types of effects could lead to different outcomes. Consequences occur for a variety of motives, including remarkable inspirations, human instinct and behaviour, fundamental circumstances, and necessity. Destitution is made worse by variables like unemployment, orientation inequality, dense population, child labour, and ignorance. Moreover, a number of factors, such as unemployment, orientation inequality, a dense population, child labour, and a lack of education, can be blamed for the rise in crime[2] . Higher crime rates in growing and densely populated urban areas are associated with a variety of factors, including commercial structures and metropolitan lodging areas. Several criminal researchers and analysts have recently made an effort to curb misbehaviour through investigation and estimation using various demonstrating and quantifiable approaches. Since crime rates are increasing, certain critical analyses may be necessary to aid policymakers and concerned departments in addressing challenges and issues in the area of wrong doing anticipation and control methods. When handled manually, a human's range of abilities neglects to monitor criminal records[3]. In order to analyse information related to crimes, a novel technique is needed. It is hardly unexpected that residents of a developing nation like India frequently hear about crimes. As cities continue to become more urbanised, we must always be mindful of our surroundings. We'll use the fuzzy c-means method to track crime rates in order to prevent the worst-case scenario. It will create a well-informed forecast about the kind of crime that will occur as well as when, where, and how it will occur.

This information will show patterns of crime in a particular location, which may be helpful in criminal investigations[4]. It will also alert us of the most serious crimes that have taken place in a specific area[5]. The fuzzy c-means machine learning technique will be used in this paper. Due to the abundance of data on crime, one of the police department's major priorities is the detection and identification of criminals[6]. There is a great demand for technology that enables quicker case resolution[17]. The idea behind this study is that crimes can be easily predicted if we can go through a large quantity of data and identify patterns that can be used to configure what is required[7]. Recent advances in machine learning have made this work possible. We will enter the date, time, and location (longitude, latitude) as inputs, and the output will tell us which crimes are most likely to happen there. Traditional approaches to crime evaluation cannot be

used when processing complicated queries and highly dimensional crime data, necessitating an efficient computer for crime prediction[8]. In order to effectively identify crime patterns, a tool for identifying and analysing criminal offences was required[9]. In order to forecast which crimes are more likely to occur in which locations and at what times, this study proposes a few methods. Data processing methods are used to simplify this endeavour. Because to better computer accessibility and data break throughs, law enforcement agencies have been able to connect vast databases with precise information on violent crimes like murder, rape, and arson[10]. Many crimes have been reported in recent years all around the world. A main offence is when a criminal threatens to use force against a victim[15]. It includes both crimes where the use of force is employed as a form of coercion, like robbery, and crimes where the use of force is the motive, like murder or rape. Violence crimes range from murder to harassment and can be committed with or without the use of weapons depending on the jurisdiction. Although reliable detection of illegal conduct is challenging, it is vital for stopping criminal behaviour[11]., types, and hotspots brings a number of computational opportunities and challenges Using historical trends to accurately estimate crime rates[16]. Even though machine learning-based crime detection is now the standard in the industry, only a few studies have thoroughly analysed various machine learning algorithms[12]. Crime detection is important because it helps with both the estimation of future crime rates and the prediction of crime rates[13]. This information can be used by authorities to take action and try to lower crime rates[14]. To determine crime trends, a lot of information is required. By determining the location's safety percentage based on local crime statistics, the primary goal of this effort is to decrease crime[18]. Machine learning methods can be used clustering to determine the safety percentage of a site and detect the crimes in a specific location.

II.EXISTING SYSTEM

One potential system for enhancing location safety percentage through crime spot detection using FCM
Data Collection collects crime data from various sources such as police records, news reports, and social media posts. The data should include the location, time, type, and severity of the crime. Data Preprocessing clean and preprocess the collected data by removing any duplicates, irrelevant information, and missing values. Also, transform the data into a suitable format for clustering analysis. Crime Spot Detection identify crime hotspots by analyzing the clusters obtained from the FCM algorithm. These hotspots represent the areas with a high concentration of crime incidents and can be used to prioritize safety measures such as increased police presence, improved lighting, and CCTV surveillance. Safety Percentage Enhancement calculate the safety percentage for each location by considering the number of crimes in the hotspot and the total number of crimes in the surrounding areas. The safety percentage can be used to prioritize safety measures and allocate resources effectively. Real-time Monitoring implement a real-time monitoring system that continuously collects and analyzes crime data to update the crime hotspot and safety percentage maps. This system can be integrated with a mobile app or a web portal to provide users with up-to-date information about the safety of their location. Evaluation evaluate the performance of the system by comparing the crime hotspot and safety percentage maps with the actual crime data. Also, gather feedback from users to identify any issues or limitations of the system and make necessary improvements.

III.PROPOSED WORK

A revolutionary idea that will help us choose the best region for safe living makes sense below after focusing on the many procedures and approaches to crime percentage discovery. To develop a model that provides an idea of whether a site is secure or not, we employ fuzzy c-means clustering. You can use any type of data, whether it be categorised or numerical, with fuzzy. Fuzzy C-Means Clustering: Apply FCM clustering algorithm on the preprocessed data to identify clusters of similar crime types and their respective locations. FCM clustering is a soft clustering algorithm that allows data points to belong to multiple clusters with different degrees of membership. Safety Percentage Enhancement: Calculate the safety percentage for each location by considering the number of crimes in the hotspot and the total number of crimes in the surrounding areas. The safety percentage can be used to prioritize safety measures and allocate resources effectively. Data Collection: Collect crime data from various sources such as police records, news reports, and social media posts. The data should include the location, time, type, and severity of the crime. Data Preprocessing: Clean and preprocess the collected data by removing any duplicates, irrelevant information, and missing values. Also, transform the data into a suitable format for clustering analysis.Real-time Monitoring: Implement a real-time monitoring system that continuously collects and analyzes crime data to update the crime hotspot and safety percentage maps. This system can be integrated with a mobile app or a web portal to provide users with up-to-date information about the safety of their location. The architecture of crime rate detection for safety purposes is depicted in Fig. 1. By this, safe living can be attained[19].

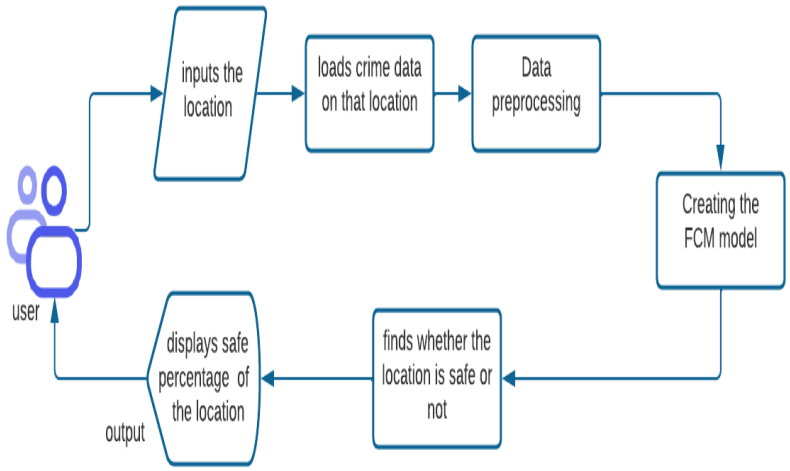

FIGURE.1. Block Diagram Of The Proposed Method

From the architecture diagram above, it is clear that when the user enters the location, our model helps us determine whether or not the place is secure. The input location is used to load the locale's crime data from the database[20]. The data is further preprocessed for better outcomes. The user is shown the location's safe percentage based on this information. This project aids users in determining if an area is secure or not. As seen in the above graphic, the system loads the location's historical crime data after receiving the name of the site as input[21]. As a result of the data being gathered from numerous sources, there may be discrepancies[22]. So, we will utilise various preprocessing methods to clean the data in the following phase. We will employ feature scaling and the remove a tuple approach to do this. These two techniques will finish the data preprocessing stages[23]. All uneven rows and columns are meant to be balanced via feature scaling. In AI, the final step in information preprocessing is highlight scaling. It is a method for normalising the free factors in a particular reach of the data set. With highlight scaling, we align all of our elements so that no one variable cancels out the others' effects. The imported data collection should first undergo exploratory data analysis before data preparation is carried out. It is the process that graphically illustrates the key qualities and summarises them. It improves the interpretation of the data.

IV.Crime Analysis

Crime analysis is a real challenge since it calls for collecting and analyzing massive amounts of information. Data mining techniques can be used to analyse crime statistics, criminal careers, bank fraud, and other significant problems. Association analysis, categorization and detection, cluster analysis, and outlier analysis are traditional data mining techniques that uncover patterns in structured data. It may be possible to identify crime patterns more quickly and effectively by combining criminology concepts with modern technology. A criminal automated analysis platform may be implemented to help with the burden, which would streamline the procedure and enable more precise and insightful finds and detections. Crime is a social ill that negatively affects society. For the purpose of trying to prevent crimes from occurring, governments invest a lot of money in law enforcement. Today, a lot of law enforcement organisations have a lot of crime-related data that needs to be analysed in order to be turned into useful information. As crime data has several dimensions and is available in different formats, including string records and narrative records, it is difficult. Because of their diversity, it is challenging to mine them using commercial statistical and machine learning data analytics techniques. That is the primary cause of the lack of a global platform for crime data mining. While there are some predictive platforms for forecasting and analysing crime data, they are restricted to a small number of crime types, cannot be expanded, and do not have an API for other systems.

V.METHODOLOGY

To develop a model that provides an idea of whether a site is secure or not, we employ fuzzy c-means clustering[24]. Using unsupervised learning, the fuzzy C-means clustering algorithm creates clusters[25]. This is a soft clustering approach, as the word "fuzzy" in this context means "not sure," implying. The "K" in "K-means" has been changed to a "C" to provide the term "C-means," which stands for "c cluster centres," a new appearance. In light of the k-means clustering method, fuzzy C-Means are developed. An approach to soft clustering is fuzzy c-means. The soft clustering technique known as fuzzy C-Means clustering, each piece of data is assigned a likelihood or probability score indicating how likely it is to belong to that particular group. Depending on the degree of membership, each cluster and data point are assigned to a particular fuzzy cluster; in fuzzy C, each object can have a membership value ranging from 0 to 1. You can use any type of data, whether it be categorised or numerical, with fuzzy. By tying the values of the cluster data to each individual data point in this clustering, the degree of each cluster is established. The membership values of the datasets should all be one. The fuzzy inference system fuzzy c, which manages the data's uncertainty, is built by clustering raw data and generating a membership function from the data. A dataset is divided into N clusters using the data clustering technique known as fuzzy c-means, and each cluster is somewhat filled with the information that is directly related to it. When compared to other algorithms, fuzzy c-means clustering is a better option. The information point can have a place with more than one group with a probability in the fuzzy c-means method. For overlapped data sets, fuzzy c-means clustering produces superior results. Clustering, also known as cluster analysis, is the most popular method of grouping relevant data so that things inside one cluster are as similar as is reasonable while others may be virtually as diverse as is realistically predicted. Every piece of information can be assigned to numerous groups in a grouping approach called fuzzy clustering. There are several fields that use clustering problems, including surface science, biology, health, psychology, economics, and a number of others. The frequency should be computed after creating 11 clusters for 11 distinct crime types. To calculate the crime rate based on the area or neighbourhood, a new data frame will be produced. Once you have determined the crime rates for each place, enter all the data into the Python dictionary. The output is the area's crime rate when a user specifies a place. In Python, dictionaries are a type of hash table. Any Python type can be used as a dictionary key, but numbers and texts are the most common. Contrarily, values can be any Python object of your choice.

A. Experimental Setup: We used the following software packages to execute clustering techniques such fuzzy C-Means clustering, which is used to test the effectiveness in detecting crimes. Using Python 3.8 as the scripting language, the model's performance was assessed using Jupyter Notebook and the Anaconda IDE. The project is being implemented using frontend technologies such as Microsoft Studio Code and Jupyter Notebook. For this, we also utilised Python libraries.

B. Model Fitting : We first need to install our model, Fuzzy C Means. Bring FCM in from the means. after installing fuzzy C means at work. Using a fuzzy c Means model, clustering is performed. The data must therefore be given a number after the software has been deployed in order to cluster it. Fitting our model is required before finding centres and labels for clustering our data after identifying the number of clusters. By combining labels and centres, the clustering is created. While centres are established directly, labels are determined by model prediction. The clustering displays the number of infractions, which aids in determining whether or not the area is secure. A place is considered to be safe if there is a low crime rate there. Moreover, the clusters display the crime rate in various colours. Two different hues, one for high safety and the other for low safety, can be found if we take two clusters. If there are two or more clusters, they are divided by the offence rate percentage and displayed in various colours.

C. Data Set : To establish if the places are safe or not, we need information on historical crimes in the area. Visit the GitHub source to have access to the data set. Author Vashista used this information to analyse and visualise crime data patterns. We'll use this data collection to carry out our project. We applied this knowledge to the work we were doing. This data collection includes crimes that happened in 2017.There are 33,116 records altogether for the four criteria. The criteria define the offence reporting date and time, the offense's place of occurrence, and the number of offences at that place. Washington, United States of America, is included in the data set. The longitude and latitude of the coordinates are provided. The data set contains both positive and negative latitude and longitude values. The data set needs to be preprocessed since the offence column contains words rather than numbers. This word (ARSON) is now being replaced with the average value we determine from the remaining numbers. Currently, we are determining whether or not all of

the values are integers. All values are now in their proper placements. Preprocessing is now finished. The following software tools were employed with the preprocessed data that we used. Using Python 3.8 as the scripting language, the model's performance was assessed using Jupyter Notebook and the Anaconda IDE. The project is being implemented using frontend technologies such as Microsoft Studio Code and Jupyter Notebook. For this, we also utilised Python libraries. After the data has been preprocessed, a graph is drawn with latitude on the x-axis and longitude on the y-axis. The graph is plotted using the downloaded data set. We have now developed the FCM model in order to visualise the clusters on the graph. Now that the FCM model has been applied, the clusters are plotted on the graph with the latitude on the x-axis and the longitude on the y-axis, which reflect the crimes in the corresponding places.

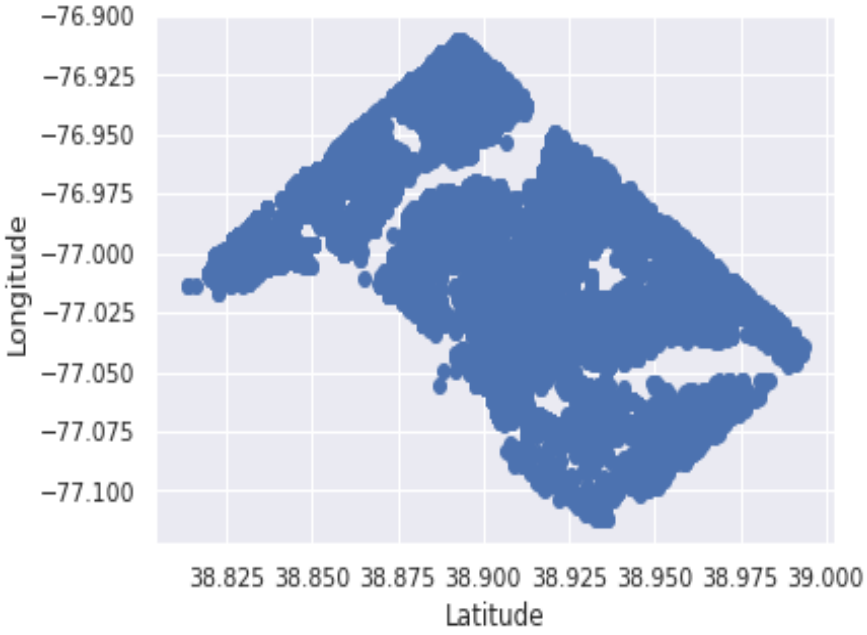

FIGURE 2.Plotting Latitude And Longitude Before Clustering

The sites where we collected the data set are shown in the accompanying figure. For the purpose of executing our research, we have gathered and utilised the crimes that occurred in the aforementioned places as our dataset.

The following outcomes are obtained after successfully applying the FCM algorithm to our dataset: To put this into practise, first we preprocessed the data in our dataset and then, using the FCM clustering technique, we separated the data into clusters. We can classify the areas into those with high crime, low crime, and medium crime based on the clusters that have formed. Using four clusters as the number of clusters makes this possible. These four groups—high crime, low crime, and medium crime—represent four different types of neighbourhoods. After clustering, the graph that was previously shown is once more shown.

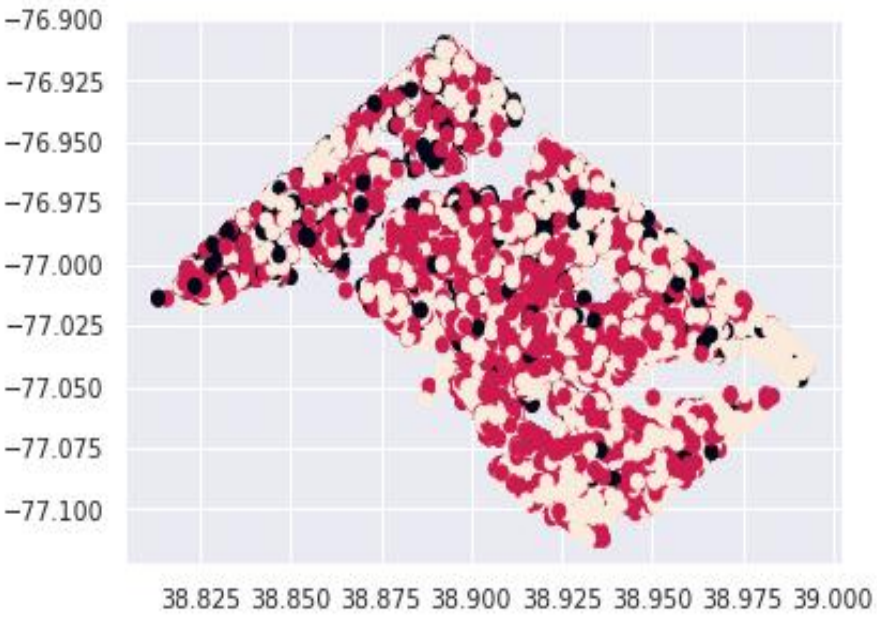

FIGURE 3. Plotting Latitude And Longitude After Clustering

Using the fuzzy c means clustering approach, as previously discussed, we put our project into practise. Fuzzy C, on the other hand, denotes both a clustering method and an unsupervised algorithm. A clustering algorithm's accuracy cannot be determined using a conventional methodology. Thus we employed the k-means clustering algorithm in order to demonstrate the effectiveness of fuzzy clustering. We created a k-means clustering model to compare to the fuzzy c-means clustering model. The fuzzy c-means model will be benchmarked using the findings from k-means. The number of clusters for both fuzzy c-means and k-means has been increased to four in order to accomplish this. Fuzzy c-means clustering provides 38% faster and more accurate results when compared to k-means clustering.

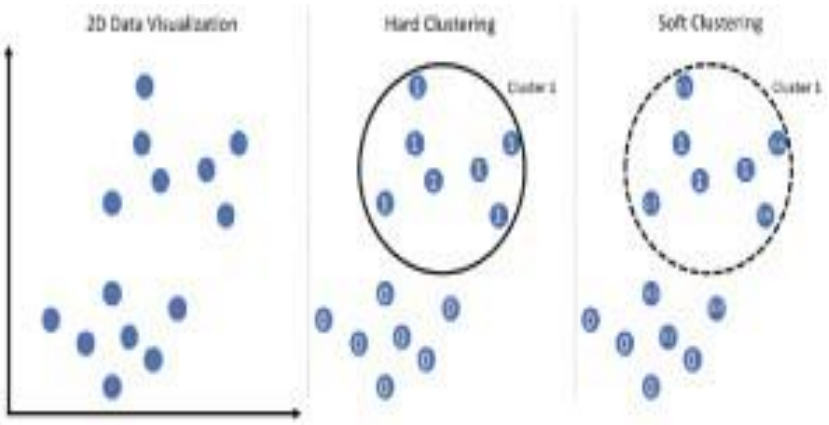

FIGURE 4. Hard And Soft Clustering

The above figure shows Hard and Soft clustering. Each dot represents a data point, the number in each dot is the probability of its belonging to Cluster 1, and the black circle represents the cluster boundary of Cluster 1.

Hard Clustering:

In hard clustering, each data point is clustered or grouped to any one cluster. For each data point, it may either completely belong to a cluster or not. As observed in the above diagram, the data points are divided into two clusters, each point belonging to either of the two clusters. Fuzzy c-means clustering can be considered a better algorithm compared to others. In the case of the fuzzy c-means algorithm, the data point can belong to more than one cluster with a likelihood. Fuzzy c-means clustering gives comparatively better results for overlapped data sets.

Soft Clustering:

In soft clustering, instead of putting each data point into separate clusters, a probability of that point to be in that cluster assigned. In soft clustering or fuzzy clustering, each data point can belong to multiple clusters along with its probability score or likelihood.

To propose a model that gives an idea of a location, whether it is safe or not we use fuzzy c-means clustering. Fuzzy C-means clustering algorithm is an unsupervised learning method. Here name “Fuzzy” means “not sure”, which indicates that it’s a soft clustering method. “C-means” means c cluster centers, which only replaces the “K” in “K-means” with a “C” to make it look different. Fuzzy C-Means clustering is a soft clustering approach, where each data point is assigned a likelihood or probability score to belong to that cluster. Fuzzy clustering is used to assign each data point and each cluster belongs to based on the membership degree, in fuzzy C an object can have a membership value of 0 to 1. Fuzzy is applicable for all types of data like categorical or numerical. In this clustering the values of the cluster data are connected to each data point it is denoted as the degree of each cluster. The membership values of all the datasets should be one. Clustering the raw data produces the membership function from the data and creates the fuzzy inference system fuzzy c handles the uncertainty condition of the data. Fuzzy c-means is a data clustering technique in which a data set is grouped into N clusters with every data point in the dataset belonging to every cluster to a certain degree. For example, a data point that lies close to the center of a cluster will have a high degree of membership in that cluster, and another data point that lies far away from the center of a cluster will have a low degree of membership to that cluster. Fuzzy c-means clustering can be considered a better algorithm compared to others. In the case of the fuzzy c-means algorithm, the data point can belong to more than one cluster with a likelihood. Fuzzy c-means clustering gives comparatively better results for overlapped data sets.

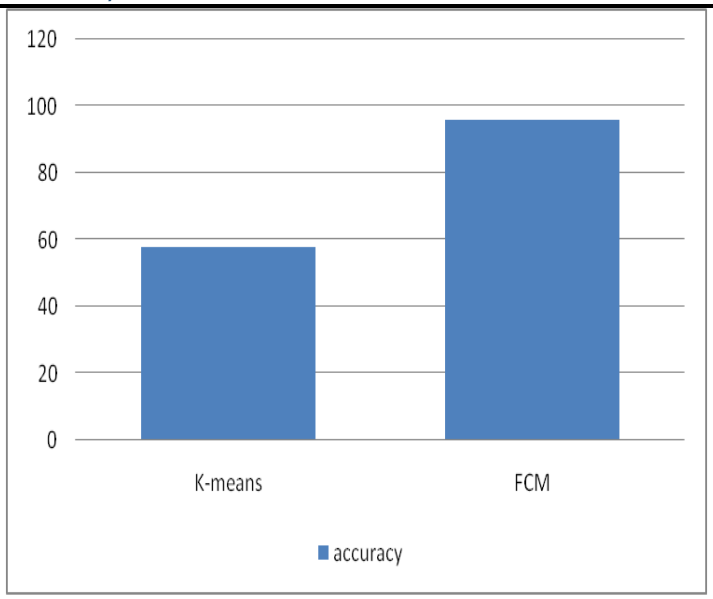

FIGURE 5. Comparisons Graph

It is mostly used to identify places that are more likely to experience crime. For security reasons, it is employed. The police force and the department of crime can make use of this project. The department of traffic safety may also utilise it. It would be beneficial for those who are new to a location if it were created and used as an application. Even though a person may take the fastest route when travelling to a new location, they may not be aware of the location's safety. The location's safety rate is determined thanks to our initiative.

VI.RELATED WORK

The Crime tracer model is introduced by Martin Ester et al, In this model some processes are implemented. The stochastic process in which the starting state is known and the future state is computed using a transition probability matrix that calculates the likelihood of migrating from one graph node to another. The random walk method converges to a stationary distribution that assigns an important value to each node in the graph under particular conditions. Matthew S. Gerber used a Decision Support System for crime rate detection. The DSS is an information system that assists and participates in human decision-making. DSS can help decision-makers use data, model, and solve unstructured situations in general. As a result, they finalized that there are certain DSS that can be utilized to assist security authorities in making sense of crime data and resolving the challenge of crime prevention decision-making.J.Fitterer et al. used BNEs for patterning and detecting crime. Many police departments are employing geographic information systems (GIS) as a crucial tool in intelligence-led policing, and spatial forecasts of crime are being used to minimize crime. The most frequent technique for detecting crime is to utilize statistical detection algorithms to obtain the frequency and parameters of crime. There has been a lot of research done in this area. ARIMA and STL are two of the most common regression models. The ARIMA model outperforms the other two techniques in terms of fitting and detecting accuracy. Maria R et al, prepared a review document on the statistical physics of crime, Controlling the spread of crime in urban areas remains a significant concern. Crimes may be repeated and proliferate if left uncontrolled, according to empirical research. Clustering techniques were employed by S.Sivaranjani et al,to detect crimes. Crime is a form of human rights violation that is frequently prosecuted and punished by the law. Criminology is the study of crime, and it is an interdisciplinary science that collects and examines data on crime and criminal behavior. In 2011, a spatial-transient model of crime recognition in light of criminal individual qualities was created. A few articles, for example, ARIMA-LSSVM model for crime time series conjecture, notice blended models. To overcome the problem, a strategy based on the TPML-WMA algorithm. It differs from other approaches in the following ways: First, the data set's geographical locations are divided into administrative districts. Second, Xinlei Wei et al, built the Vector Motion model and utilized change likelihood networks to show the impact across regions, as well as planned a calculation to become familiar with the frameworks, because of the uniqueness of the information collection and examination challenges.

Qiang Zhang et al,performed hotspot detection based on Mixed Spatial-Temporal Characteristics of crime. The model's core idea is to convert the problem of Hot Spots detection into a multi-class classification problem by encoding area-specific criminal episodes into multiple degrees of heat levels. Different sorts of security-affecting features were merged into mixed spatial-temporal characteristics, which were employed as input variables for detection in the new model. Sunil Yadav et al., used Isotropic triggering for crime rate detection. The aim is to describe the criteria that will be used to segment the entire database; once this is done, each dataset will naturally fall into one or more categories. Existing datasets may be easily understood with the help of classification, and it also aids in detecting how fresh individual datasets will behave based on the categorization criteria. Cory Schnell et al,used three degrees of geographic aggregation community regions, neighbourhood clusters, and street segments. These geographical aggregation levels were chosen for their usefulness in understanding Chicago's geography as well as their previous application in social science research. They used different machine learning algorithms to implement their idea. Nelson Baloian et al,proposed methods for treating data based on data mining, also known as detective analytics, that can discover new criminal patterns. Near repeat approaches have been applied to the country of Merseyside in North West EnglandFinally, technologies based on geospatial techniques can be used to add new layers of data to crime maps. George Mohler et al,provided an approach for predicting crime. For this Hawkes process was used. Using this they also created a model which enables the communication between any two organizations for transferring information like tips for the safety of the public, crime information, etc.This method is also used in other social media applications like Twitter. T. Sarvani et al,used a feature selection process to detect crime patterns.

Further applied Naive Bayes classifier for identifying the type of crime that is frequently happening. Their paper discusses both predicting crimes and the type of crime happening. The main question addressed is whether it is possible to reliably estimate chosen crimes in local locations, such as police precincts, a month in advance. B.Sivanagleela et al, used fuzzy clustering for analyzing and

predicting crimes. Using the crime data available, preprocessing and clustering were performed, as they result in detecting crime rates, leading to a decrease in crimes. Clustering raw data generates a membership function from the data and builds the fuzzy inference system fuzzy c, which deals with the data's uncertainty. Crimes can be predicted from the above results, This is clearly shown in their paper. Chao Huang et al,presented the recurrent neural networks model for anticipating crime hotspots that use spatial and temporal information and compared machine learning algorithms. This work is conducted by dividing the area into a number of square parts. Every square part consists of crime data that happened in that location in the past. This approach is similar to the divide and conquers technique.L.Lochner,investigated several data mining techniques used by law enforcement authorities to detect and prevent terrorism. The authors also looked into the limitations of data mining in fighting crime in San Francisco and came to the conclusion that data mining can only be utilized to help law enforcement authorities analyze crime. N.V.Keerthana et al,used different machine learning algorithms to predict crimes. This paper not only predicts crimes but also predicts the type of crimes. One of the machine learning algorithms that achieve the above-mentioned goal is Naive Bayes. Of all the machine learning algorithms used in the previous work, Naive Bayes give more accuracy, remaining algorithms give accuracy but are not used for predicting the type of crime.

VII.CONCLUSION

A strategy to stop crime in society was offered in this project. Finding the most secure travel region is made easier by this project. If someone is unfamiliar with a city, they might not be aware of whether or not a certain road is safe to follow. Even though he may not be aware of its safety, if the person needs to get from one place to another quickly, he will pick the quickest path that is open. So, in this instance, our project is advantageous. The way that this project is built up allows us to receive the location's safety percentage as an output if we provide it as an input. In order to accomplish this assignment, we used one of the clustering strategies, the Fuzzy-c-means clustering algorithm. Using this method, we were able to cluster the data and calculate the safety rate for the given area. There is currently no accepted formula for calculating the accuracy of clustering algorithms. We utilised k-means clustering to evaluate the FCM. Based on the results provided by k-means, the accuracy of the FCM approach will be compared and estimated. Due to the use of this, FCM is found to be 38% more accurate than K-means.

VIII.FUTURE ENHANCEMENT

For the future enhancement of this idea, Currently, this concept is only being implemented in one city, with plans to expand it in the future. It may be expanded in the future so that the entire nation will use it. This project can only be utilised by those who have access to the python code because it is used exclusively in its implementation. In the future, this may be created and turned into a mobile app or web application so that the general public could use it.

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BILOGRAPHY

Gudiwaka vijayalakshmi working as a Assistant professor in Computer Science and Engineering sanketika vidya parishad engineering college, visakhapatanam Andhra pradesh. with 2 years of experience in Computer science and engineering (CSE) , accredited by NAAC. With her area of interests in java, python,.Net, HTML.

Yaramolu Poorna Pranathi Chowdary is studying her 2nd year Master of Computer Applications in Sanketika Vidya Parishad Engineering College, Visakhapatnam, A.P.With her interest in Python, machine Learning and as a part of academic project she choose enhancing location safety percentage through crime spot detection using fcm using Python. The article have been evolved from an idea to understand the flaws in conventional reporting and keeping time consistency, A full fledged project along with code has been submitted for Andhra University as an Academic Project.