

Common Crime Scrutiny and Predicting in Cyprus

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Abstract – Crime Scrutiny is a wonder approach for identifying patterns and relationships in crime. Our method would predict areas which have high chances of crime occurrence in Cyprus and can be called crime prone areas in Cyprus. Using the help of data mining we can come up with useful information from unstructured data or data that have yet to make any sense. Here we use the approach of data science and justice system to develop a data mining method that can help us solve some crimes in a faster manner for reasons of securing time. Using the old method which is checking criminal upbringing of involved persons in crime, our method is just going to focus on we statistically data of crimes committed yearly or at a particular time.

Keywords – Decision tree, Neo4j,

I. INTRODUCTION

Crime rate increases daily as crime cannot be predicted. Since it is a routine or a random act that makes increase or decrease in crime non consistent.

The predicted result cannot be viewed as fully accurate but shows how our method helps to figure out and reduce crime rate to a certain level. Our method provide security bodies with crime areas in Cyprus. In other to complete our results we have collected and evaluated data that contains some common crimes in Cyprus and also read and analyzed this crimes which helps us complete the accuracy of our method in request to help show

crime prone areas in Cyprus and help securities bodies to tackle this areas in reducing more crime occurrence.

We all know that before technology, crime detection and solutions have been difficult to come by but since the release of data that will give us clear definition and details to crime is little we decided to take ideas on how the crime should look like from news site and blogs. These data are small in Cyprus but it helps us in the creation of our method.

While creating our method we got into some difficulty ranging from information to be stored as the government releases so little information, also analyzing the found data, accuracy of the data as it governs the accuracy of our method, increase in crime information that has to be stored and analyzed, most data are inconsistent and are sparse therefore it is difficult to place together and also the limitation of getting these data. Even most data we found are too summed up and some are too diverse.

Finding patterns in crime takes lots of time, going through data to find if a particular crime fits into a known pattern or if we should classify it as new pattern.

That bring us to the steps we used to do the crime analysis. First step was collecting the data, second was classification, third pattern identification, lastly predicting and showing.

II. Mythology

1. Data collection

In this step we found and collected data from different website and mostly Cyprus government open data. The data was collected and stored into database for pre-processing and processing. And we also viewed small cases of collected data from articles online regarding daily crime boards in Cyprus.

2. Classification

For this step we used the Naïve Bayes algorithm, this algorithm is logic based technique which is simple but very powerful. It a probability technique that shows you the probability of an event occurring. To present it mathematically if A is an event and B is a second event and P is the probability we say $P(A \cap B)$ is probability of the two event happening together.

$$P(B | A) = P(B) * P(A|B) / P(A)$$

Using Naïve Bayes algorithm we create a model by training crime data related to murder, attempted murder, rape, attempted rape, robbery, drugs, burglary etc. by training our data(teach them on an input so that we can test them on unknown output). And it shows about 90% accuracy to our dataset. We test this algorithm on crimes in Cyprus the districts these crimes happened and also the year and we show probability of each crimes happening again in certain areas.

We are going to skip irrelevant details on how to go about this but just know that our method was performed on r studio.

3. Pattern Identification

In this phase we identify patterns in crime. Which helps us to identify areas that are crime prone areas. in this phase we use the Apriori algorithm in our case we did not fully implement this algorithm cause we never had time to update our crime files as we have limitations in the data we acquired but this algorithm is very effective for our case. The breakdown of the algorithm goes as follow, we have patterns of crimes for a particular location when a new crime occur we and follows the same pattern we can say the area has a high chance for crime occurrence and in that way we

can avoid the crime by taking necessary security majors for that are. Is like having different baskets and this baskets can be known as cities in Cyprus and we have contents to fill in different basic and this contents can be known as crimes in Cyprus, so when a crime happens we fill it in each basket by location so if we keep getting one kind of content entering a certain baskets that proves to show us that there is a high chance that if we pick that same content (crime) the next time, chances are there that is going to be placed in that same basket. So this algorithm help us keep track of the crimes. Is like saying if you go for shopping and you buy a milk there is a high chance that the next thing you are going to get is an egg.

4. Visualization

Bellow we give graph of all areas in Cyprus and their number of crime. We got this result by creating classes of areas and linking them with common crimes in Cyprus and their total number of crime just for the first half of 2018 in Cyprus.



Figure 0

figure 1

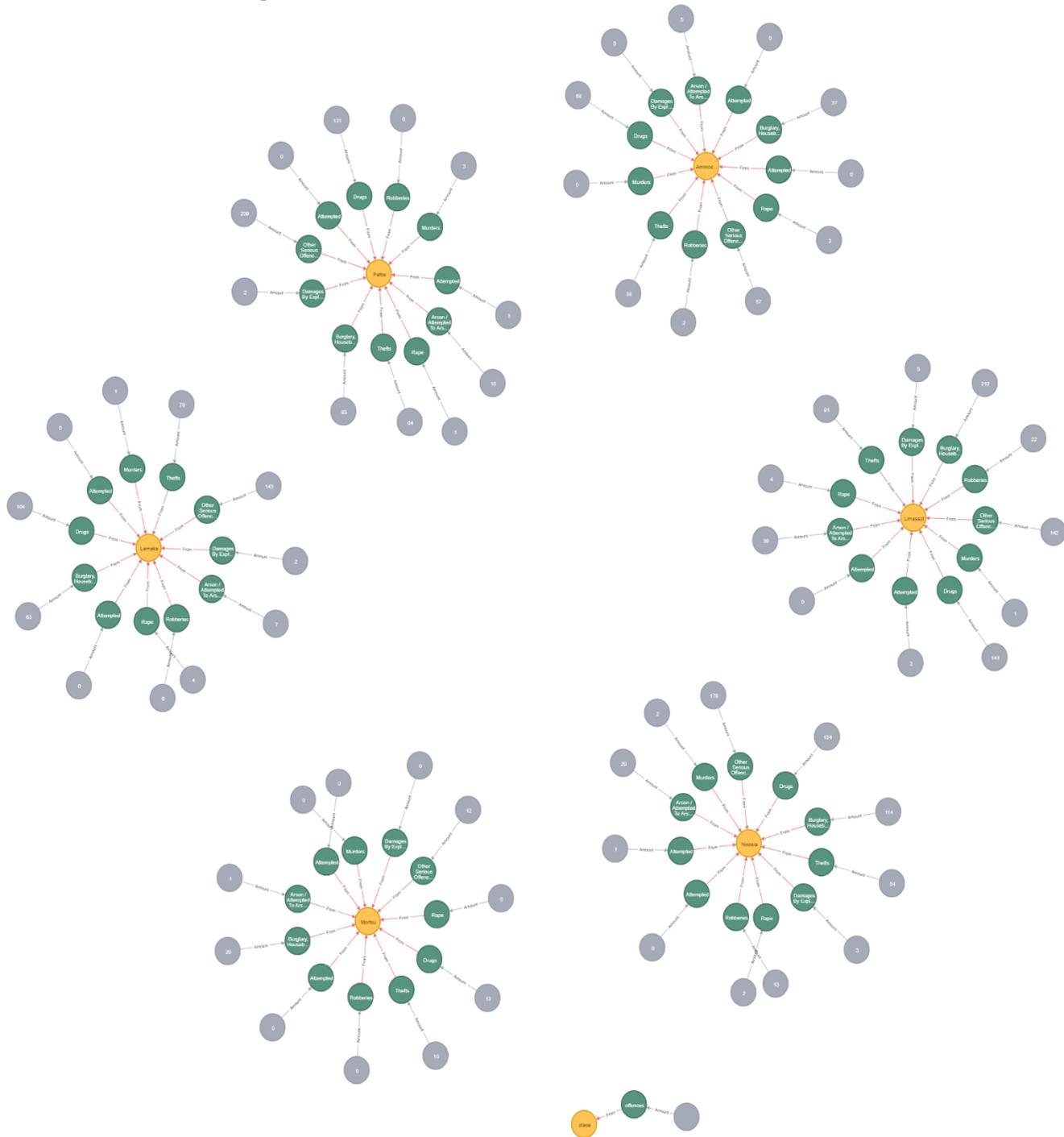


Figure 1 shows the number of crimes in all cities in Cyprus and the type of crime committed using this graph we figure out patterns in the increase in some certain kind of crime in Cyprus and it help us establish places that we can regards as crime prone

areas in Cyprus. For sure all cities have records of crime as there is no pattern in committing crime but not areas can be regard as crime prone areas. But with our method we have establish areas that can be regarded as crime prone are.

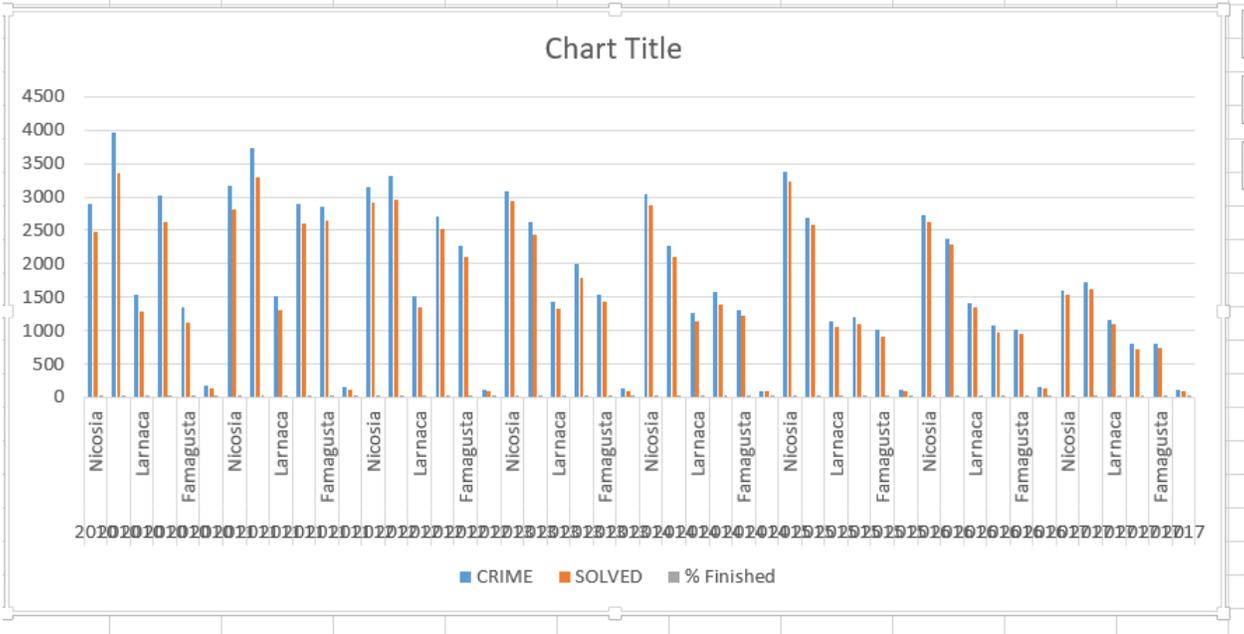


Figure 2

Figure 2 shows statistic of crime from different cities from 2010 up unto 2017 this 7 years record help us to see the rate at which certain type of crime have increased and decease in areas in Cyprus. The y – axis is the number of crimes which is the rate of crime and the x - axis is the cities in Cyprus over repetition for 1 decade.



Figure 3

Figure 3 shows the map of Cyprus crime prone areas in Cyprus, for clarity purposes our study exclude North Cyprus.

In conclusion we can see that our model can be regard efficient enough to pick out crime prone areas in Cyprus with the way decrease in crime is going on in Larnaka Cyprus we are convince that if we run our method in next two years that part of Cyprus should be out as crime prone area. We strongly suggest that the security team in Cyprus look into these crime prone areas and find a way to place surveillence and regular parole on those area.

5. Future work

In addition to our concept and model we are going to develop a model to help us be more specific on particular areas where a crime is going to perform and we hope to include northern Cyprus in our new model.

References

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