



Temporal and Spatial Crime Hotspot Verdict: An Introduction



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Prediction view;

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Temporal;

Spatial

Abstract

The storage and analysis of criminal databases, undebatable, is an essential program. To intuiting the crime, we need to find the map and create some hotspots there. Crime investigation system is a challenging process for every police or detectives to finalize the primary target. Sometimes the polices or investigators are unable to reach the main goal or criminal. To contact the primary goal, we need to validate the temporal and spatial hotspots among the crimes arena. It is crucial to find the chief criminal to protect the world since criminals, now, are applying different kinds of methods to do their crimes. Such as now criminals are using GPS systems, Cybercrime, Facial replication, etc. That's why it's vital to know the types of crime before investigating or rating the crime spots. This paper is going to show the usage binary and genetic flavour to investigate the crime hotspots. This paper aims to make the task easy for every polices and investigators to protect the world from dangerous criminals.

1. Introduction

The most critical thing to find a criminal is to detect the motive and scope of the crime. Sometimes, its not real which is we are seeing, cause of crime motive. So for this system, we have to use crime mapping with digital purposes. The crime mapping system is a very quickest mapping system by which w can predict the crime with a more straightforward method than the manual. We can't provide the information on crime every single day cause many crimes are happening in decades. That is why in this paper, we are going o map the crime spots with binary like (0 or 1). In many past issues, we have seen that computer science has an important role in investigating crime. Event assumption is the important key to map the spots as we can't get the per second information of crime so that we need to predict crime events. After that, we can give a pre-security to the crime

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spots. The implementation of countermeasures that initially drive prevention and deterrence and where required, detection, intervention, and response form the basis of our approach (Soon, 2019). Wildlife crime is an international issue with the illicit trade of flora and fauna estimated to be worth several billion dollars (Borrion, 2019). It involves critical examination of existing studies, and the development of solvability and resourcing concepts and a resourcing-solvability theoretical model (Coupe, 2018).

2. Materials and Methods

To improve the crime investigation system, we need to use the binary as we said earlier. The materials we need to accomplish the system is the set of data by which we can survey, need to use data mining as all know using this we can get structured data from many unstructured data, need to use a binary ending method to locate the spots. In the case of the methodology, we need to know the crime types or motives first. Here some example is given below with maximum assumption percentages.

Table 1: Types and ratings of crime

Types	Spots	Ratings(out of 5)	Frequency(in percentage)
Alcohol	X	4.5	90%
Property	Y	4.3	88%
Vehicle	Z	4.6	93%
Marital	M	4.1	85%

Here, in the Table 1 above, every type of crime indicating different categories of motivation. In these crime types, we have added marital crime which is a new one. But, if we see the recent activity of these crimes, it is alarming hints for us. Because nowadays every educated and uneducated persons are doing this crime. Husbands are beating wives, and wives are also doing the same. In this case, though it's in the rear side in table 1, it's increasing rapidly all over the world, although alcohol, property case, vehicle accidents are happening daily.

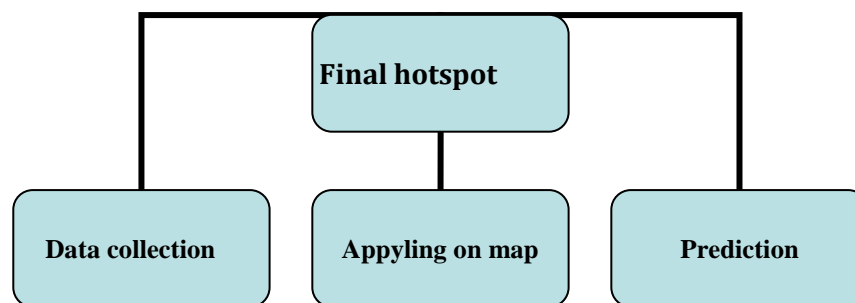


Figure 1. Simple methodology

3. Results and Discussions

To predict crime and analyze crime activity, we need to proceed with a systematic approach with data mining. By using a data mining system, one can predict locations that have a huge probability. Now, before getting the result, we need to apply the methods. We are going to introduce two sections which are a spatial and temporal crime. Identity crime is well known, prevalent, and costly; and credit application fraud is a specific case of identity crime (Phua, 2012). As crime rates keep spiralling each day, new challenges are faced by law enforcement agencies (Vineet,2016).

Spatial crime:

Nowadays, the investigators are using the temporal system to get the result quickly. But, spatial mapping of crime is also very important to analyze the crimes. With the huge advantages of IT (Information Technology), we have done many techniques to predict and prevent crimes. In the spatial section, we use kernel surface algorithms with the most number. The formula of this algorithm is :

$$S = \{ (X_1, Y_1, Z_1, P_1), (X_2, Y_2, Z_2, P_2), (X_3, Y_3, Z_3, P_3) \dots \dots \dots, (X_n, Y_n, Z_n, P_n) \}$$

Calculate $n: R_n \rightarrow R$
 Formatting $p(X_i) = Y_i \forall P_i$
 $n(x) \leq P_i(Z) \forall Z_i$

After plotting the surface, the dot means spots are shown as follows.

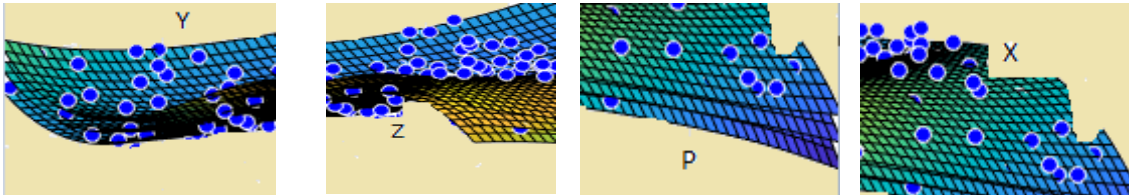


Figure 1: Dot means spots

After developing spatial crime system in figure 1, we can get the blue dots which are indicating the hotspots, in which

$$\rho(X_n, Y_n, Z_n, P_n) = \frac{||X_n - Y_n|| - ||Z_n - P_n||}{\sigma}$$

Here, σ is the rating scale of crime basis function by which we can get the local hotspots after analyzing datasets.

Temporal crime:

At present, we are using the temporal system to get the result with a quick version. We can approach this algorithm:

Input: Crime spatial sets of $(nX_i \rightarrow nP_i)$

Output:

Basis $f: N_2 \rightarrow n$

```

while Not done do
  |
  | for spot  $P_i$  do
  | | Evaluate  $Z(|X_i - P_i|)$ ;
  | | With rating  $\alpha_n = -\eta n(n(X - P))$ ;
  | | end evaluate  $N = \text{maxspot}(X(n) - P(n))$ ;
  |
end

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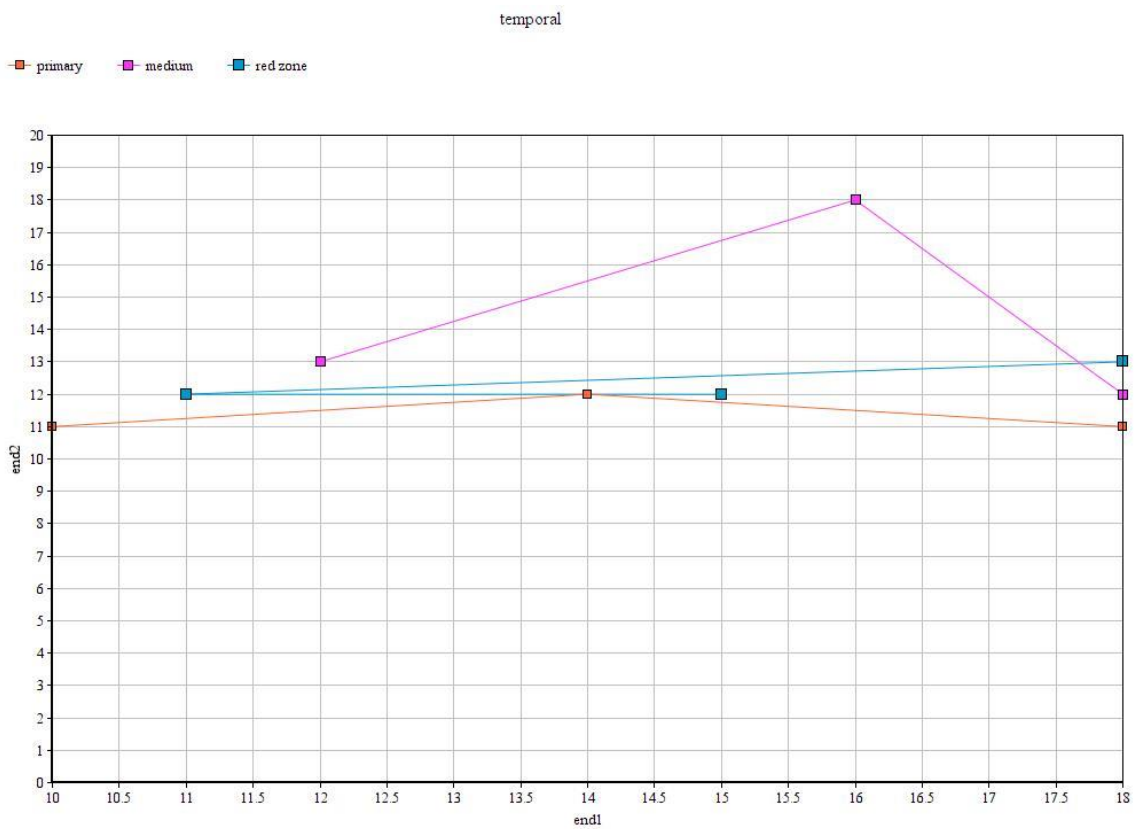


Figure 2: Temporal spots

4. Conclusion

After evaluating all this, we conclude that with a digital mapping system we can easily detect any kind of crime and we can reach the main goal of our paper which is to catch the big criminal or the big fish. Driving restriction programs have been implemented in many cities around the world to alleviate pollution and congestion problems (Carlillo, 2018). Now, we can predict the crime spots easily and can give alertness to the govt and police also. In this work, we explained the spatial and temporal features to some assumed data which is very difficult. We followed two methods of spatial and temporal system, such as geolocated data and shortest crime distance. The result here shows the accuracy of the investigation.

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Biography of Authors

Sritha Zith Dey Babu is studying computer science and engineering in Chittagong Independent University, Bangladesh. He has published six papers in his earlier bachelor career. His research are mainly related to data mining, genetic algorithm, and business data solving.

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