Hindusthan International Journal of Multidisciplinary Research (HIJOMR)
Volume 1 Issue 2, December 2024, pp 7-11

ENHANCING CYBER CRIME CONTROL USING GEOGRAPHIC INFORMATION SYSTEM(GIS) IN COIMBATORE CITY

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ABSTRACT

The virtual environment consists of four different types of network layers, each of which has nodes that are locatable in space-time.as defined by the US Army Training and Doctrine Command. The layers comprise of the data, device, network, and geographic layers. Flow of energy between two points leads to transfer of packets in the geographic layer. This analysis demonstrates that cyberspace is not virtual; it is hierarchical. This vertical analysis adds rigor to the mission impact assessment of cyber disruptions. Without this structure, mission-impact assessment has often been ad hoc. While data, device and network have been the subject of various research not much importance has been given to the geographical layers particularly where security and its importance in interdicting and resolving cyber-attacks and crimes. The paper aims to provide a method for predicting possible geographical location from where attacks or crimes can be launched or committed by employing pattern recognition, hotspot identification, stylometry.

Keywords: Geographic Information System (GIS), Cyber Crime, Hackers, Crackers, Geography.

1. INTRODUCTION

Cyber Crimes refers to the acts done contrary to the laws of the land either with or on an electronic device with input/output facilities. The device itself could also be a perpetrator. The cyber crime as per IT ACT 2000, refers to all activities done with criminal internet in cyber space or using the medium of internet, either criminal activities in the conventional sense or activities newly evolved with growth of the new medium. Any activity, which offends human sensibilities, can be included in the ambit of cyber crime. In the report, 12,317 cases under IT ACT and cyber crimes under IPC provisions were registered during the year 2016. Cyber-crimes make use of various tools and techniques are installed on the victims system through exploitation of the vulnerabilities in the systems/networks or gaining access to victim system.

KaramchandGandhi[4] presented overview study on cybercrimes in internet fully based on various reports from news media and news portal.Neeleshjain[5] explores an overview of cybercrimes, the cybercrime perpetrators and their motivations also he discussed in detail of different cybercrimes and unique challenges and response issue which may be

encountered during the prevention, detection and investigation and also outlined the different section of IT ACT 2000 of india also proposed new provision in IT ACT 2000.Brain.E.Mennecke[1] summarized the research framework for GIS. UshamarySharma[6] describes cybercrime that are usually occurs and the different types of cybercrimes that are committed today, also shows the students made on e-mail related crimes as email is the most common medium through which the cybercrimes occur some case studies also included.ZhiyongHu[7] presented GIS Mapping and Spatial analysis of cybersecurity attacks on a florida university. The research paper aims to provide method for enhancing cyber crime by implementing pattern theory, hotspot identification and reducing, investigating the crime in Coimbatore city.

2. PORTRAYAL VIEW OF GIS IN CYBER CRIME

Cyber Crime denotes all crimes committed in cyber space commencing with unauthorized access of devices, stealing of data, manipulation/erasure of data, useof information to gain illegal pecuniary advantage denial of service the list is not exhaustive. BroadlyCyber crimes maybe classified based on the target i.e personal, institutional, societal, industrial, and national. Alternatively it can be classified on the Modus Operandii or method of operation. In either classification GIS uses computer generated mapping processes to integrate and access massive of amounts of location based information. The term cyber crime describes the criminal activity or network, internet are the tools for execution in the global environment. The criminal activity can be broadly classified as casual or opportunistic crime and professional crime. The casual crime is done primarily for personal reasons, while professional crime is organized by gangs. Geographic Information System (GIS) uses geography and computer generated maps as an interface for integrating and accessing massive amounts of location based information, allows police official to plan effectively for emergency response, determine analyse historical events ,mitigation priorities, and predict future events. This system also helps the crime branch to determine potential crime sites which maps inmate populations, fixtures and equipment to provide for the safety of inmates.

The GIS play effective role for controlling cyber crime in coimbatore city to access and process spatial information which is received from the various sources to allocate resources effectively, which used in criminal analysis, traffic safety, Internet/Intranet mapping. The operational activity in the cyber includes spatial relationships, collect vast amounts of data from many sources which includes arrests, first information reports, daily report which displayed graphically for investigators, supervisors, administrators. The coimbatore police has initiated special cyber cell across the city and had started educating people from different domains and people from different areas.

3. METHODS OF CYBER CRIME

The role of GIS in cyber, which explores the relation between crime and the environment, which uses two methods for controlling the cyber crime in city. They are

1. Crime Pattern Theory
2. Hotspot Identification

The role of GIS covers the dynamic of the organic relationship that exists between the crime, the criminal and his geographical location. Depending on the nature of the crime, sophistication of the attack and destination of the crime proceeds GIS can using the patterns of the attack identify and label the hotspots from where a crime originates or is expected to originate, the nature of the attack and the possible targets. Every criminal leaves behind his signature at the scene of crime. In cyber space, patterns of attack can be described as one of the signature of the criminal. Analysis of this pattern lends to creation of a map which could

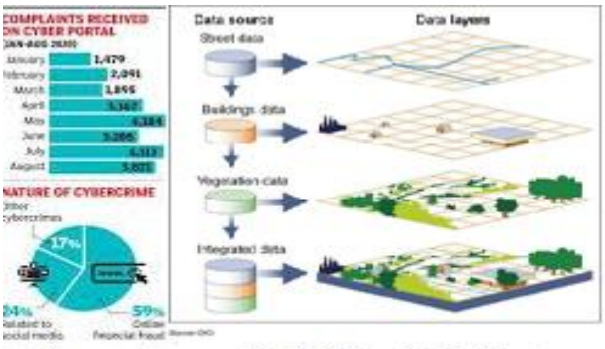
detail the personal paths of a victim, the routes of the criminal and the intersection points where the crime, is or is expected to happen.

The hotspots identification are areas on a map have crime intensity, developing maps which contain hotspots are becoming a critical and influential tool for policing which can be implemented by two methods, in which one is using spatial and temporal analysis of crime and another one of nearest neighbour. Samuel Bates et al[2] used tool to create hotspot which contain a high area density of crime on a map. Clark and Evas[3] presented spatial arrangements of points, creating the foundation of nearest neighbour. The crime hotspot defined as an area containing dense clusters of criminal incidents, various agencies place colored pushpins in wall maps to visualize individual crime and examine spatial distribution of crime locations. GIS can be used to detection of hotspot in which analyzers examine the hotspot over a period of time with X and Y coordinates with accurate visualization of data on the map.

4. RESOURCES TO IMPLEMENT GIS FOR CRIME CONTROL

1) **Data:** The data play vital rolewhich includes information about latitude and longitude of location, elevation, zip codes.
2) **Standards:** The standards are followed while accumulating the data which shared by different private agencies which bonds with the cyber world.
3) **Hardware & Software:** GIS application, tools and software package installed.
4) **GIS Trainer:** The trainer handle the GIS data and ananlyse the spatial data involved in the cyber crime.
5) **Linkages:** Spatial data is shareable and reusable, so there is always a need to have linkages with private agencies.
6) **Financial Analysis for GIS Investments:** The financial analysis include feasibility study or need for assessment, hardware, software, maintenance contracts, data entry, data transfer, data purchases, data development, training and technical support for system users.
7) **Time Stamps,** IP addresses and cell tower location information

5. SURVEY OF CYBER CRIME WITH GIS IN COIMBATORE CITY



Cyber crime with GIS in Coimbatore City

The Coimbatore city cyber cell uses digital maps for visualizing the entire crime scenario. The locations of crime events, arrests can be routinely displayed on maps which provides easy way to viewing activities in an area rather than searching through list of events. The crime location can be symbolized according to the day of week, type of crime, modus operandi (suspect's method of operation when committing a crime) or frequency. The nature

of cyber crime includes online financial fraud (59%), social media (24%), other cyber crimes(17%) and the complaints received on cyber portal increases from January (1479) to August (3821). The law enforcing agencies can control the crime using GIS in the city by reducing and investigating crime. In the reducing crime, GIS act as an effective tool for identifying location, hotspot. Location of hotspot in low income group area suggest that the offender may be committing the crime because of poverty, in such case providing employment to the people of effected area may lead to decrease in crime. In investigating crime, come into action once the crime has been committed includes crime investigation and bringing the offender to justice. This crime calls for homicide experts, detectives, cover officers, finger print analysis along with the pattern analysis can be done effectively by using GIS tools.

6. CONCLUSION

The system is used to map, monitor and check crimes in city, enforced to implement GIS effectively to reduce and control the crime. Recently crime agencies are using customized GIS software and its usages in a rudimentary stage and there is always tremendous scope of improvement in future for Coimbatore city.

REFERENCE

[1].Brain E Mennecke, Martin D.Crossland (1996),Geographic Information Systems, Proceedings of the 29th Annual Hawaii International Conference on system sciences.
[2].Block,Carolyn Rebecca (1995),Stac hotspot areas: A statistical tool for law enforcement, Crime Analysis Through Computer,Police Executive Research Forum, 15–32.
[3].Clark,Philip J(1954),Distance to nearest neighbor as a measure of spatial relationships in populations,Ecology,35,445–53.
[4].Karamchand Gandhi (2012), An overview study on cyber crimes in internet, Journal of Information Engineering and Applications, 2, 1-6.
[5].Neelesh Jain (2014), Cyber crime changing everything-An Empirical study, International Journal of Computer Application,1, 76-87.
[6].Ushamary Sharma, SeemaGhisingh (2014), A study on the Cyber-crime and Cyber Criminals: A Global Problem,3,172-179.
[7].ZhiyongHu,Baynard, Chris,HongdaHu,Fazio, Michael (2015), GIS Mapping and Spatial analysis of cybersecurity attacks on a floridauniversity,IEEXplore Digital Library:1-8.

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Dr.SujithJayaprakash is Tech-savy education director with nearly 15 years of trans-continental experience in Higher educational brand development and partnerships. Core specialization is setting up and profitably scaling educational brands, optimum curriculum delivery solutions and developing successful student recruitment systems.

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