EUROPEAN
ACADEMIC
RESEARCH

MisOr-Patrol: A Web Application for Crime Prevention and Control through Police and Community Collaboration

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Abstract:

The conventional crime prevention and control scheme of the Philippine National Police (PNP) in the province of Misamis Oriental need to be enhanced through active participation of the community in preventing and controlling crimes. The Misamis Oriental Police Provincial Office (MOPPO) focuses solely on police efforts not utilizing the advantages of online technologies. This issue creates collaboration gap between the police and the provincial community, thus limiting the capability of the MOPPO to effectively and efficiently prevent crime in the province. The aim of the study is to design and develop MisOr-Patrol, a web application for crime prevention and control through a collaborative effort of the MOPPO and the provincial community. Methods such as data gatherings and interviews were used. Adobe Dreamweaver and MySQL applications software were used to develop both the front-end and back-end of the system. The application empowers the Misamis Oriental provincial community to help participate in crime prevention. Evaluation showed that the MisOr-Patrol is functional, reliable, efficient and useful and it bridges the collaboration gap between the MOPPO and the community in crime prevention and control.

Floreto B. Quinito, Jr., Julieto P. Catipay, Floramae Glycer C. Hallazgo, Jess Lauren C. Balistoy, Jerelyn F. Baynos- **MisOr-Patrol: A Web Application for Crime Prevention and Control through Police and Community Collaboration**

INTRODUCTION

Misamis Oriental is one of the five (5) provinces of Region 10 (Northern Mindanao) located in the southern part of the Philippines. It has a total land area of 3,102.90 square kilometres. This province has two major cities: its capital is Cagayan de Oro City and the other is Gingoog City. Misamis Oriental has a total population of 813,856 composed of twenty three (23) municipalities and has total of 424 barangays (the smallest local administrative units).

The Philippine National Police (PNP) - Misamis Oriental Police Provincial Office (MOPPO) visioned that by the year 2020 the organization will deliver a highly capable, effective and credible police service working in partnership with a responsive community. MOPPO's mission statement mandated the organization to enforce the law, prevent and control crimes, maintain peace and order, and ensure public safety and internal security with the active support from the community. The MOPPO has exerted considerable efforts to prevent and control crimes in the province. The conventional method of community policing like foot and mobile patrol, police visibility and checkpoints, and collaborative intelligence system are still embraced and continue to be strengthened by the MOPPO. But despite of all their efforts still numerous crimes were committed both in urban and rural communities. For the calendar year 2015, the total reported index crimes in the province of Misamis Oriental was 2,224. These index crimes includes murder (3%), homicide (2%), physical injuries (23%), rape (5%), robbery (19%), theft (53%), and car-napping (5%). Only 16% of these reported index crimes were solved and the remaining 84% are still unsolved. The conventional method of

community policing implemented by the MOPPO lacks collaboration from the community. Such conventional method are of less certain value than commonly believed (Plant & Scott, 2009). The police cannot fight crime alone (Adebayo, 2013). Safety and crime prevention is not a sole responsibility of the police but also for the community itself. Therefore, the community has to do its part.

The widespread use of Information and Communication Technology (ICT) changed the way people live their life. The utilization of ICT in home and workplace has proven to be time and resource efficient. The emergence of social media like *Facebook*, *Twitter* and *Instagram* impacted behaviour of the online communities to the point that it has been already part of their lives. This study aims to design and develop *MisOr-Patrol*, a web application for crime prevention and control. The use of ICT and the utilization of *MisOr-Patrol* support the mission of the MOPPO by empowering the provincial community to be actively involved in crime prevention.

LITERATURE

Law enforcement agencies are creating collaborative partnerships within their communities in their determination to reduce crime more effectively and efficiently (Portland State University, 2011). This kind of partnership aids trust and confidence between community members and police organizations (Skogan et al, 2002a). Portland State University (2011) emphasized that an important reason for law enforcers to form partnerships with the community is to radically reduce crime and improve the quality of life of the community members. The concept of crime prevention means it is better to prevent crime from happening than punishing it after is has occurred (Lea, 2007). While community involvement in crime control gives rise to new structures and forms of local

governance (Crawford, 1994), policing is shared by the community and the police (Morris & Heal, 1981). Cooperation and partnerships should be an integral part of effective crime prevention (United Nations, 2010). UNAFEI (2006) concluded that criminal justice system can never, on its own, succeed in combating crime and disorder without the support of the community because the community is at the heart of the criminal justice system (Pamintuan, 2000).

Leones (2006) reported that crime rates are higher in poorer areas with higher population density. Examples of these are all forms of crimes related to street crimes, illegal drugs, crimes against women and children, and terrorism. For the past decade the nature of crimes in the Philippines has grown more organized and complex, because criminals are utilizing new technologies. The most common crimes conveyed to the authorities were physical assault, robbery and theft according to the PNP - Directorate for Investigation and Detective Management (PNP-DIDM).

Community-Oriented Policing System (COPS) is primarily a national police strategy for crime prevention, based on the implementation of the proposed holistic National Anti-Crime Strategy (NACS). Coronel (2005) concluded that the success of COPS lies along the following perspectives: *1) Credibility and image of the implementor; 2) Higher level / quality of participation (ideally, commitment) on the part of the implementor; 3) Proper behaviour as public servant and protector that will make him/her well-liked, approachable and easy to get along with the people; 4) Being apolitical or non-partisan on the part of the implementor; 5) Responsiveness and civic-mindedness of the people in the Community.*

ICT plays a major role in community partnerships. Modern computer technology has shown to be a best practice in police and community partnerships. Technology such as Graphical Information System (GIS) mapping systems need to

be used by all of the contributing agencies. Creating an agency website makes law enforcement agencies more accessible to the public, thus, strengthening police legitimacy and trust (Portland State University, 2011). (Portland State University, 2011).

The Federal Bureau of Investigation has a website that provides the public with myriad of information about crimes and crime prevention. It provides detailed information of most wanted fugitives, terrorists, bank robbers, kidnappings and missing persons, parental kidnappings, white collar crimes and *cyber's* most wanted. Furthermore, the public can send tips to FBI through the website. The FBI partnered with the National White Collar Crime Centre and the Bureau of Justice Assistance provides the public with a web site that accepts complaints especially on internet-related crimes through the Internet Crime Complaint Centre (IC3). IC3 provides reporting scheme for suspected terrorism or threat complaint to the FBI. The public can also submit a complaint or report to the National Centre for Missing and Exploited Children (NCMEC).

METHODS

Information Gathering

Information gatherings through interviews and data collection were conducted. Series of interviews were taken in the MOPPO and in the Regional Police Office (RPO). The purpose of the interviews was to find out the current crime prevention strategies the MOPPO implemented in the province. The result of this interview found out that MOPPO embraced the conventional way of community policing; foot patrol, police visibility in populated areas, and collective intelligence report. Selected police officers were also asked how they utilize the emerging technologies specially the Information and Communication Technology (ICT) in their information

dissemination. It found out that MOPPO does not rely much on the use of ICT. The MOPPO has no television nor radio program that provides the public information broadcasting about the MOPPO's programs and activities. Localized emergency hotlines are provided for each of the municipalities through the Municipal Police Stations (MPS). The PNP's mobile assistance centre which is the *PNP Text 2920* does not cater much on crime prevention but it serves as a mobile complaint assistance against police personnel misconduct. The MOPPO's website is static. It posts informative articles which the public can view but the website's features are very limited. Though it has very minimal crime prevention features through its crime prevention tips and infographics but it has no features that accepts reports from the public. The interviewees were also asked how the police can earn the trust and confidence of the people in order for the MOPPO to gain the support from the community. The police need to be professional and ethical. They should perform their duties well. They should give prompt and appropriate action for every incident reported to them. They should reach-out to people especially in those remote areas. Selected community officials and residents in different municipalities of the province were interviewed. The purpose of this interview was to find out how the community could easily collaborate with the MOPPO in crime prevention and control. The common answer lies to the accessibility of police personnel and police offices providing the public good means of communication and information dissemination. Benchmarking of online technologies for crime prevention and control was conducted. Different web applications models were studied. The study focused mainly on the different crime prevention features that the web application provide to the users and what the users can do in return.

MisOr-Patrol's Design and Architecture

The result of the information gatherings were consolidated and led to the following design considerations: 1) the system must be internet based for easy access of police information and services; 2) the system must have multi-level user account; 3) the system must cater a real time collaboration of all users. MisOr-Patrol has two types of users: *Administrator* and *Patroler*. Master-Administrator and Co-Administrator. The Master-Administrator is provided with full administrative control on the system. This account is provided with user authentication to access the management features of the system. The Master-Administrator can manage the entire system: Contents, Accounts and Reports. On the other hand, the Co-Administrator has limited administrative control depending on the privileges assigned by the Master-Administrator. Figure 1 below shows the Use-Case diagram of the Administrator user.

Fig. 1. Use-Case Diagram for Administrator User

The online community who access the system uses the Patroler account. This account has no log-in requirements. The Patroler can view all information posted in the system, send report to the Administrator, can search and can send tip about wanted

persons, missing persons and properties, and can send feedback. Figure 2 shows the Use-Case diagram for the Patroler user account.

Fig. 2. **Use-Case Diagram for Patroler user**

Adobe Dreamweaver was used to create the user interface. *MySQL* will runs on the back end to keep the data on its storage. MisOr-Patrol is hosted in a remote third party web server and is accessible using a web browser via an internet provided by the Internet Service Provider (ISP). The Master-Administrator is logically stationed in MOPPO while the Co-Administrators are stationed in their respective MPS. A report or a tip sent by a Patroler will be broadcasted to MOPPO and to all MPS. The Master-Administrator will validate the information. Figure 3 shows the *MisOr-Patrol* architecture.
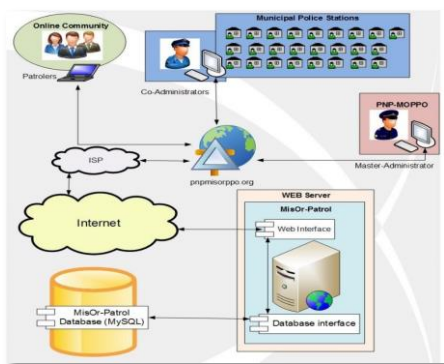

Fig. 3. MisOr-Patrol Architecture

Pilot Testing

The MisOr-Patrol was pilot tested for three months. The application was hosted in one of the remote web servers of an I.T. service provider and is accessible via internet. Police officers and personnel of MOPPO and Municipal Police Stations undergone formal orientation on the different features of the application. MisOr-Patrol Administrators were identified and trained how to use the administrator's control panel. On the other hand, local residents of the province were also oriented of the new application.

MisOr-Patrol Performance Evaluation

A self-made evaluation from was used to evaluate the system. The form contains five criteria: functionality, reliability, efficiency, usability and presentability. Each criterion has three items. The questionnaires used the Likert Scale with five (5) intervals. Each item is to be rated from one (1) to five (5). The intervals and verbal ratings used are as follows: (1) - Strongly Disagree, (2) – Disagree, (3) – Neutral, (4) – Agree, and (5) – Strongly Agree. Table 1 below shows the items under the five performance evaluation criteria.

Tab. 1. Performance Evaluation Items for MisOr-Patrol

Functionality		
	1)	The application is accessible via internet
	2)	Icons, tabs and links works properly
	3)	The application is error-free
Reliability		
	1)	The information in the application is accurate and reliable
	2)	The content of the application is relevant and updated
	3)	The application provides contacts and has administrative control
Efficiency		
	1)	The application is easy to access and navigate
	2)	The contents are well arranged and well organized
	3)	The application is easy to use
Usability		
	1)	The application provides vital and useful information
	2)	The application is useful in crime prevention and control
	3)	The application aids police and community partnership
Presentability		

1)	*The text and images are visible and clear*
2)	*Icons used are appropriate for the purpose*
3)	*The color combinations complements good design*

The evaluation of the application was conducted at the end of the pilot test. Forty one identified respondents completed the evaluation process. Forms were collected and ratings were computed. The statistical Mean was used to represent the overall ratings of the respondents. The following *Mean* ranges shows their respective descriptive rating: *1.0 to 1.5* - Strongly Disagree, *1.6 to 2.5* - Disagree, *2.6 to 3.5* - Neutral, *3.6 to 4.5* - Agree, and *4.6 to 5.0* - Strongly Agree. Forty one (41) respondents participated in the evaluation. These respondents were composed of police officers, community officials and local residents.

RESULTS

The MisOr-Patrol User Interface

MisOr-Patrol can be accessed using a web browser thought the address *www.pnpmisorppo.org.* The *Home* page provides the Patroler different tabs of MOPPO's *Community Activities, Accomplishments, Services, Offices* and *Municipal Police Stations.* The *Accomplishment* Tab provides accomplishment reports about *1) OPLAN Lambat Sibat, 2) Arrests of Wanted Person, 3) Illegal Gambling, 4) Illegal Drugs, 5) Illegal Possession of Firearms, 6) Illegal Fishing, Mining and Logging, 7) Anti-Car napping and 8) other accomplishments.*

The *Services* tab provides the public the following features: *1) Report a Crime, 2) Wanted Persons, 3) Missing persons, 4) Missing Properties, 5) Disaster Prone Areas, 6) Crime Mapping, Crime Prevention Tips* and *7) Feedback.* This module of MisOr-Patrol allows the public to contribute and participate in the community crime prevention and control. Figure 4 shows the Home page and sub-menu content of the

Services tab. The *Report a Crime* feature allows the public send a report directly to the MOPPO by filling in the form with the following information: *1) Fullname, 2) Contact Number, 3) Municipality, 4) Exact Location of the Incident, 5) Date and Time it happened, and 6) Description.* Pictures of the incident can also be uploaded. Figure 5 below shows the *Report a Crime* interface.

Fig. 4. Home Page and Sub-menu of the Services Tab

Fig. 5. Report-a-Crime Interface

The modules such as *Wanted Persons, Missing Persons,* and *Missing Properties* display brief details of wanted persons including fugitives, missing person and properties. This modules provide the public with a *Send us Tip* feature which enables the MOPPO to accept essential information from the community that will help the MOPPO to capture, rescue, and locate wanted, missing person and properties. Figure 6 below shows the interface of the Send-a-Tip interface.
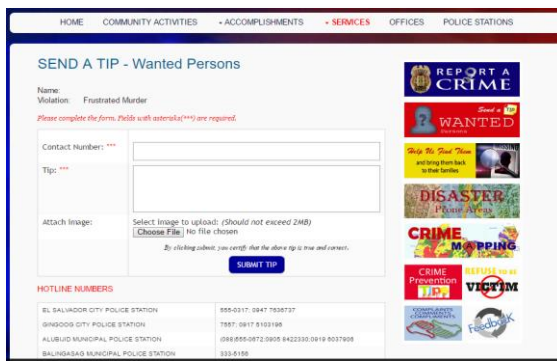

Fig. 6. Send-a-Tip Interface

The *Crime Mapping* interface displays a graphical image for each municipality of the location, category of crime, date and time, information of the suspect, and the status. The category of crime displayed on this module are the six crime focus: *murder, homicide, physical injuries, robbery and theft, car-napping and motor-napping*. Each crime in this interface is represented by a colour. Figure 7 shows the image of a crime mapping.

Fig. 7. Crime Mapping Interface

Only the MisOr-Patrol Administrators can log-in to the system. Once logged in, the administration panel will be displayed. This panel has three sections: *1) Manage Contents, 2) Manage Reports* and *3) Manage Accounts*. The *Manage Content*s section allows the Administrator to add, modify and delete contents. This section contains the following modules: *Community Activities, Operational Accomplishments, List of Wanted Persons, List of Missing Persons, List of Missing Properties, Office Contact Details, Feedbacks, Post Announcements* and *Crime Mapping.* The *Reports* section allows the Administrator to view tips and reports from the viewers who sent tips and reports to MisOr-Patrol.

This Report section contains the following modules: *Crime Reports, Tips for Wanted Persons, Tips for Missing Persons, and Tips for Missing Properties.* The Accounts section allows the Administrator to manage user accounts. The Administrator can create another administrator account and assign specific privileges on the management of MisOr-Patrol. Figure 8 shows the Administrator's control panel and Figure 9 shows the Create Co-Administrators interface that displays selections of privileges that can be assigned for Co-Administrators.
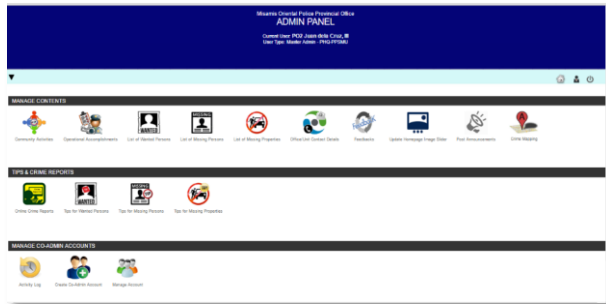
Fig. 8. Administrator's Control Panel

Fig. 9. Create Co-Administrator Account Interface

Performance Evaluation Result

The performance evaluation result shows the respondents *Strongly Agree* that MisOr-Patrol is functional *(mean = 4.66)*. The application is accessible via internet. The icons, tabs and links works properly and the application is error-free. The respondents *Agree* that the application is efficient *(mean = 4.54)*. It is easy to access, navigate and easy to use. The contents are well arranged and well organized. The

respondents *Strongly Agree* that the application is usable *(mean = 4.80).* It provides vital and useful information to the public. It use useful in crime prevention and control and it aids police and community partnership. Respondents *Strongly Agree* that the application is reliable *(mean = 4.66).* The information posted is accurate, reliable, relevant and updated. It provides contact details and has administrative control. Furthermore, the respondents *Agree* that MisOr-Patrol is presentable *(mean = 4.56).* The text and images are visible and clear, icons used are appropriate in their purpose, and the colour combinations compliments good design. An overall *mean* of *4.65* suggests that the MisOr-Patrol application generally performs well. Figure 10 shows the summary of the performance evaluation result.
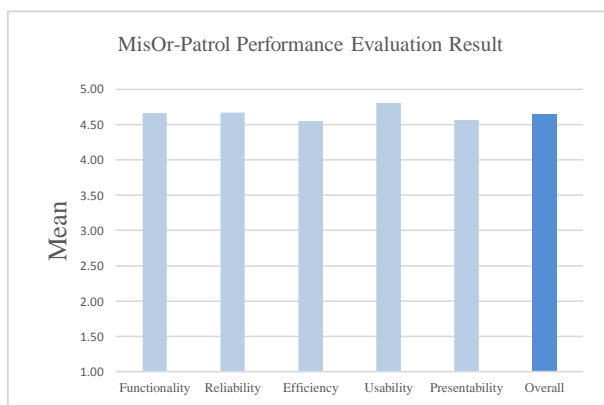

Fig. 10. **Summary of Performance Evaluation Result**

CONCLUSION AND RECOMMENDATIONS

The MOPPO has been doing all its best to combat crimes in the province of Misamis Oriental. Their conventional approach of policing limits the involvement of the community in crime prevention and control. There is a need for the MOPPO to fully integrate the different available tools in ICT to carry out their police duties to the community by empowering the community to be involved in crime prevention and control. The MisOr-

Patrol web application provides an online link for MOPPO and provincial community to share essential information to prevent and control crimes in the province. This application bridges the collaboration gap between the MOPPO and the community in combating crimes. MisOr-Patrol is fully functional, reliable, efficient and useful in so many ways. It is recommended that MisOr-Patrol must be upgraded to be utilized in a national level to serve as an online collaboration tool for the entire Philippine National Police organization and the whole Filipino community for crime prevention and control.

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