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An Online Community Security System for Preventing Home Burglary

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KEYWORDS

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ABSTRACT

The lack of community bond has a negative impact to communities including burglary. The relationship between home burglary with community bond is negatively correlated; the stronger the community sticks together, the less burglary cases recorded. Therefore, a weak bond would lead to an increase of burglary cases. This work proposes a mechanism for community protection through the development of *Community Security System*, an online system for neighborhood monitoring. The initial idea was presented at a national *Research and Innovation Week* and this work is the materialization of the concept presented. An agile approach was adopted in the design and development of the system, ensuring that user requirements are fully met. The system provides the flexibility of neighbor selection, in addition SMS notifications. The system was validated in real community settings at a residential area in Kemaman and results have confirmed the feasibility and functionality of the system.

1.0 INTRODUCTION

The growth of the Internet and Information and Communication Technology (ICT) have greatly change the lives of individuals and societies. People prefer to spend their time indoors, distancing themselves from outdoor physical and social activities (Bosamia, 2013). Compared to the 1980s and 1990s, people nowadays do not spend much time outdoor as they used to be. Talking to neighbors or children playing with each other in the compound of one's neighborhood are scenes of the yesteryears, people are now more inclined to stay indoors with ICT gadgets to keep them company. This, amongst other factors, has loosen the bond between community members (mStar, 2010).

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The lack of community bond can have a negative impact to individuals and communities alike including burglary. It is reported that home burglary cases have become widespread in Malaysia both in rural and urban areas (Berita Harian, 2018). The relationship between home burglary with community bond is negatively correlated; the stronger the community sticks together, the less burglary cases recorded. Therefore, a weak bond would lead to an increase of burglary cases (Mamat, 2014).

Majority of home burglary cases occur during daytime, when the occupants are out, leaving their homes vacant. Statistically, the number of home burglary cases has risen from 14,189 (YData, 2018) to 15,742 cases 2018 (Jabatan Perangkaan Malaysia, 2019). In addition, home burglary is among the top three crime reported to the Royal Malaysian Police (RMP).

Although some home owners install state-of-the-art tools such as CCTV and third-party home alarm system for protection, these are the luxury which others could not afford. Some communities pull their resources together and setup security patrols such as *Rukun Tetangga* and *Skim Rondaan Sukarela*. The RMP provides patrol services through *Balik Kampung* form, normally distributed during festive seasons.

The authors propose an improvement to the existing mechanism for community protection through the use of ICT. This paper reports the works of a *Computing* undergraduate project at University College TATI under the *Software Engineering Research Group*. The group is dedicated to the development of computer applications to address real-life issues and example of past projects include creating a new tourism workforce through ICT (Fahmy et al., 2020); effect of e-book to learning styles (Roslina et al., 2013); and development of an App to check the status of Islamic preacher in Malaysia (Fahmy et al., 2019).

The initial idea of this project was presented at the Research and Innovation Week 2018 and was awarded the silver medal (Afifah, 2019). This work is the materialization of the concept presented and is organized as follows: Section 2.0 presents similar systems in the market; Section 3.0 presents the design and development of *Community Security System* (CSS), an online system for monitoring the local neighborhood; Section 4.0 presents the testing phase of the system; and finally, Section 5.0 presents the conclusion of the project.

2.0 SIMILAR SYSTEM

This section presents three similar systems to safeguard the local neighborhood namely *Volunteer Smartphone Patrol*, *i-Neighbour*, and *Leaf*. The comparison aims to identify common features to be incorporated into CSS.

Volunteer Smartphone Patrol (VSP) is an android application, commissioned by the RMP. VSP serves as a collaboration and cooperation platform in preventing crime where the RMC works hand-in-hand with local communities. Communities can report crime through the RMP hotline and/ or *Short Message Service* (SMS). VSP enables the reporting and attachment of photos, videos or GPS coordinate of the crime in addition to an electronic version of the *Balik Kampung* form.

i-Neighbour is an App for safe-guarding residential areas. It is accessible online through Android and iOS devices. Its main purpose is for managing local residents, visitors and the security officers. Everything is logged in electronically, without the use of paper reports. The application comes with a "*panic button*" facilitating residents in emergency.

Leaf is similar to *i-Neighbour* where it safeguards residential areas. Among its features include visitor access management, information update, emergency alarm, CCTV monitoring and family members tracking. It is an integrated all-in-one application, connecting CCTV, barrier gate and smart cards.

Table 1: Comparison of Similar Systems

	VSP	i-Neighbour	Leaf
Initial Cost	No	Depend on total unit of house per year	Depend on total unit of house
Notification	No	Yes	Yes
Reporting	No	Yes	Yes
Platform	App	Web based/app	Web based/app
Real-Time	No	Yes	Yes

Based on Table 1, there is no initial setup cost for VSP compared to *i-Neighbor* and *Leaf*. Initial costs in latter systems include CCTV installation, smart cards distribution and barrier gates fixing. VSP does not provide any notification as its main aim is reporting purposes. Both *i-Neighbor* and *Leaf* provide user notifications to its member (local community). In VSP, reports are not allowed to be edited once filed, while reports in the other two systems can be edited by the user.

3.0 SYSTEM DESIGN AND IMPLEMENTATION

An agile approach was adopted in the design and development of CSS (Sheetal et al., 2012).

3.1 Requirements

Two types of users were identified for CSS namely *users* (residents) and *admin* (administrator). User refers to individual community members registered in CSS whilst admin refers to the person or group that manages CSS. Functional and non-functional requirements of CSS is illustrated in Table 2.

Table 2: Requirements for Community Security System

NO	REQUIREMENTS
1	A system should be able to keep members' information safely without letting any third-party from taking the information easily.
2	Each user must have an authorization to use the system.
3	A system is compatible to be run on various web browser.
4	A system is available 24/7.
5	Users may login to use the system using their IC number and password.
6	Users can fill up the *Away Form* if they are going to leave their home.
7	Users can include the vehicles left at home during their leave without limitation.
8	Users can choose up to 5 community members for home monitoring assistance.
9	Users can include the family members in their profile.
10	Users (preferred neighbor) will receive SMS notification once the form submitted.
11	Users (preferred neighbor) can update any information/incident in the system.
12	Users will receive any information updated in the *Away Form* by SMS.
13	Users can keep track of their previous away records.
14	Users can update their vehicles detail.
15	Admin can add new community members.
16	Admin can generate the list of members away records.
17	Admin can publish announcements to the members of the system.

3.2 Flowchart

Figures 1 and 2 illustrate the flowchart for both category of users. Admin has the options of adding new members, viewing members and viewing reports in CSS. User has the options of submitting forms, viewing reports, updating reports, updating comments, and printing reports. Access to CSS is validated by means of *userID* and *password* combination.

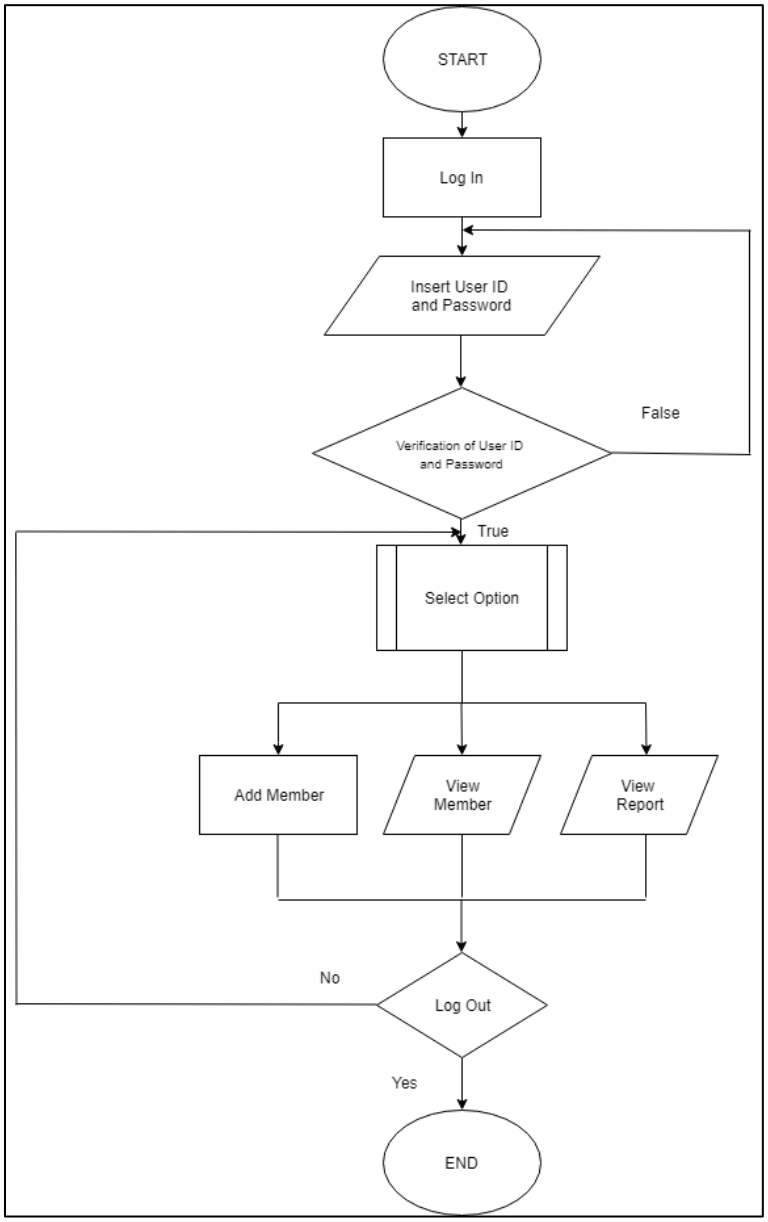

Figure 1: Admin Flowchart

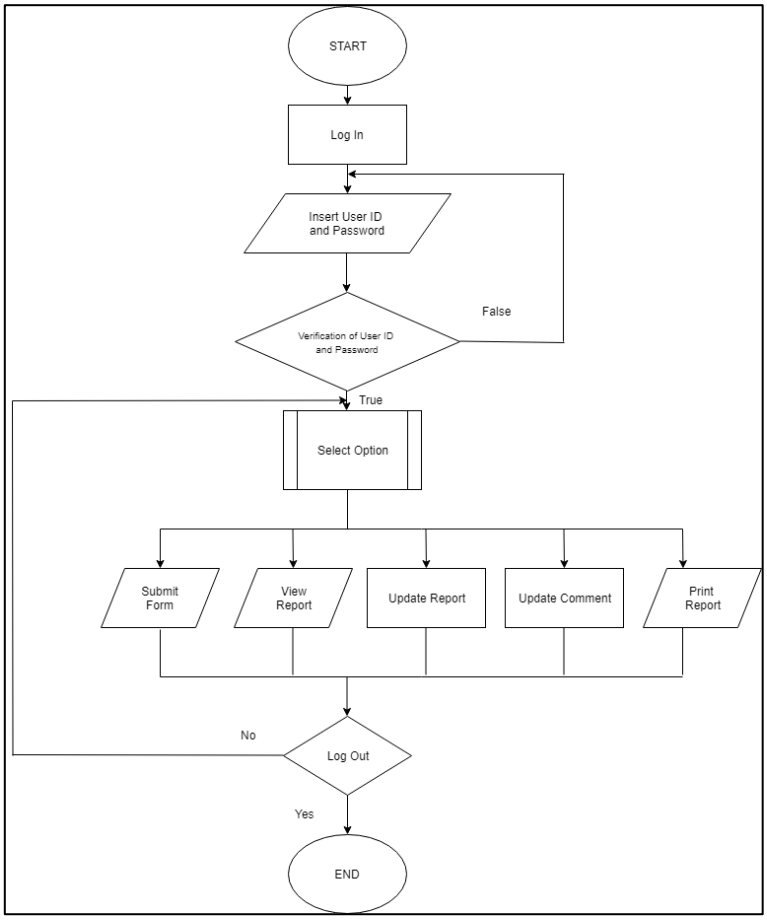

Figure 2: User Flowchart

Figure 3 illustrates data flow of CSS. First, user will login into CSS, fills the "*Away*" form and selects neighbors. Next, CSS will send SMS notification to the user and selected neighbors. Neighbors will be able to add feedback or comments in CSS which will also be forwarded to the user through SMS. Admin will be able to view request and confirmation status.

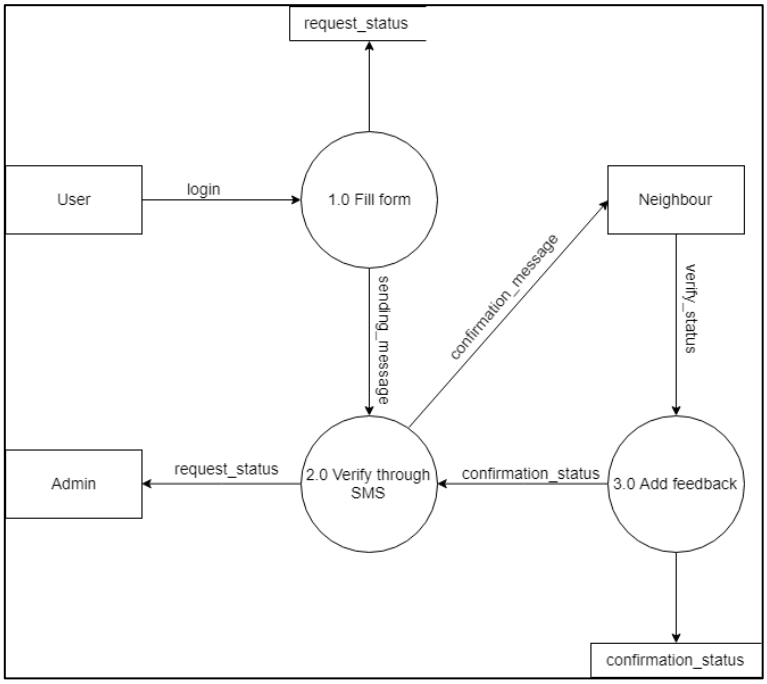

Figure 3: Level 0 Diagram

3.3 Database

Figure 4 illustrates the entity relationship diagram for CSS. There are seven (7) main tables in CSS namely *Announcement*, *Family*, *Transport*, *User*, *Vehicle*, *Request* and *Neighbor*.

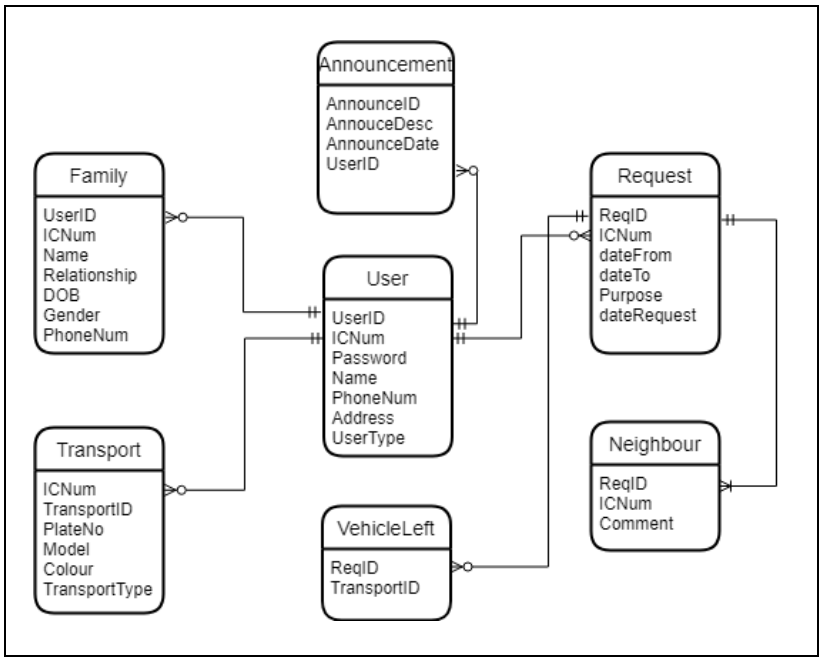

Figure 4: Entity Relationship Diagram

3.4 Implementation

Development tools used include Adobe Dreamweaver for interface design, PHP (Mobatext Editor) as the scripting language, MySQL as the database; and Apache as the development web server.

Figures 5 and 6 illustrate the *Away* and *Add Neighbor* pages respectively. Users may choose up to three different neighbors for notification purposes. Users will also be able to track their leave records as illustrated in Figure 7.

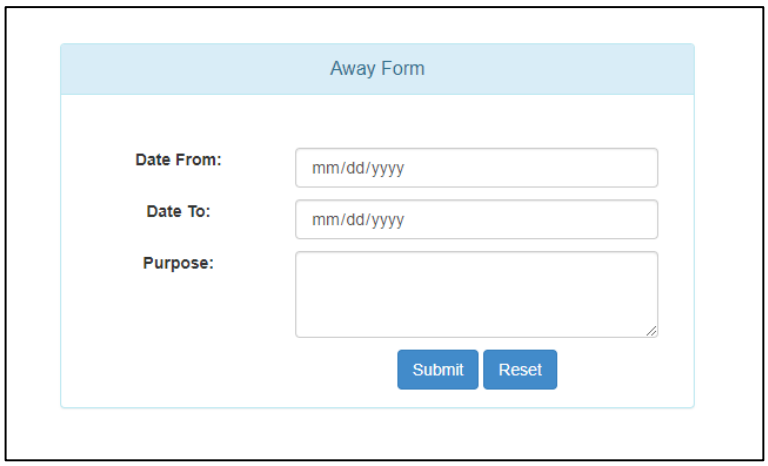

Figure 5: Away Page

Figure 6: Add Neighbor Page

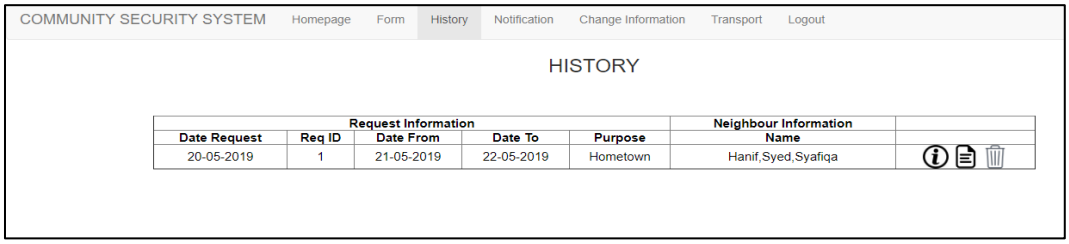

Figure 7: Away History

4.0 TESTING

The *Community Security System* was tested by a group of 52 residents at Lot 114, Kemaman. Lot 144 is an urban residential area with close to 200 housing units. The test aims to confirm the functionality and feasibility of CSS. Minor technical glitches were reported on the first week and slight modifications were immediately carried out. The system was running smoothly by week 2. One advantage of the system as noted by the residents was its flexibility to choose neighbors and leaving comments. Overall, users expressed satisfaction with CSS with some expressed interest should the system be commercially available in the near future.

5.0 CONCLUSION

This project has proposed the use ICT to help communities safeguard their local neighborhood through *Community Security System*. An agile approach was adopted in the design and development of the system, ensuring that user requirements are fully met. CSS was validated in real community setting at a residential area in Kemaman and results has confirmed the feasibility and functionality of the system. Directions for future work include the integration of CSS with RMP and extension of the comment section in the system.

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