Global Advanced Research Journal of Educational Research and Review (ISSN: 2315-5132) Vol. 1(10) pp. 226-230, December, 2012. Special Anniversary Review Issue
Available online http://garj.org/garjerr/index.htm

Full Length Research Paper

Conducive areas for gated communities and guarded neighbourhoods on the basis of physical security determined with the aid of GIS

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Accepted 03 December, 2012

The concept of Gated Communities (GCs) and Guarded Neighbourhoods (GNs) that are surrounded by walls and fences, and that are free of vandalism imparts the perception of security among the residents. Hence, the element of security is very important in the planning of Gated Community and Guarded Neighbourhood housing. However, the current scenario in the development of such neighbourhoods indicates that there needs to be better planning and management of physical security such as security fencing or guard posts. This research aims to discuss the criteria related to physical security features present in the current Gated Community housing. Such information can serve as a basis for the construction of spatial models and spatial analyses aided by GIS to indentify the most suitable areas for Gated Community housing. The physical security information system that is being developed will be very important to construction developers, homeowners, and especially to the planning department of the local authorities. Information from such a mapping exercise will be simplified and shared by multiple users, making it even more versatile in enhancing the management of housing development in Gated Communities and Gated Neighbourhoods.

Keywords: Gated Community, Gated Neighbourhood, Physical security, Spatial analysis model, GIS, Suitability Index

INTRODUCTION

Proper planning of housing development is important as the development that takes place today might have serious consequences in years to come. To ensure properly planned housing development, especially those that adopt the concept of Gated Communities, the government requires the private sector to have in place a competent system of management. The burgeoning developments in information technology today have introduced numerous advances and applications that can be adopted in community planning. In particular, the applications brougt about by the Geographaphic Information System (GIS) have changed the methods and approaches in arriving at planning decisions. Gated Community housing has become increasingly popular in recent years. Such schemes are gradually being extended to “landed gated communities” all over the

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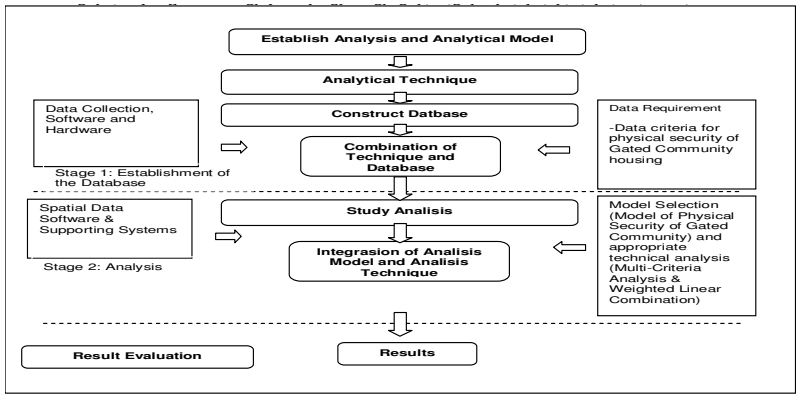

Figure 1 Methodology of the study

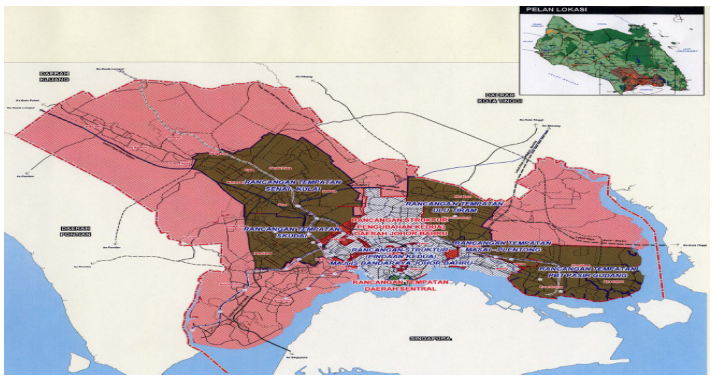

Figure 2 Location plan of the Johor Bharu District

world, including the United States. This concept has found its way to Europe, in such palces as Portugal, Poland and Scandinavia (Derek, 2006). The concept of the Gated Community is still relatively new in Malaysia and there are few reliable statistics that reveal the actual number of such communities in the country. Nevertheless, the development of gated communities in Malaysia in recent times is fast expanding, especially in Kuala Lumpur, Penang, Johor Bahru and other locations where property value is high (Ismar M.S. Usman, Nur Akmal Goh Abdullah, Zuhairuse Md. Darus, Nik Lukman Nik Ibrahim, Mazlan Mohd Tahir, Abdul Halim Ismail, Azimin Samsul Tazilan, 2005). Nevertheless, there are numerous gated communities that do not abide by the local building codes and regulations. As a result of this, problematic issues related to the physical planning of Gated Community and Guarded Neighbourhoods have surfaced frequently. For example, the inappropriate location of guard posts, the setting up of unauthorized physical barriers or the requirement for visitors to surrender identification documents effectively deny entry of these housing schemes to the public and even to officials of local authorities who need to monitor such development. Even the design and dimensions of fences in Gated Communities and Gated Neighbourhoods and the landscaping, especially at the perimeters of such schemes, have frequently been done without regard to the specified standards and specifications. Good planning requires every decision to be made only after considering relevant factors and sensitivities through seeking the views of all interested parties (Mohd Sanusi, 2007). Hence, the security of Gated Communities and Guarded Neighbourhoods requires prior careful study and analysis to enure that the earmarked development area meets with all the requirements of physical security.

METHODOLOGY

This study involves several levels of implementation including data acquisition, data modeling and data analysis. The various techniques adopted in this study are shown in Figure 1. The GIS system, the primary methodology used in this study, also involves the construction of a database for spatial analysis. In the analysis, two techniques are employed, *viz.* the Multi-Criteria Analysis (MCA) and the Weighted Linear Combination (WLC). They help ensure that Gate Communities are highly secure from the aspect of physical security.

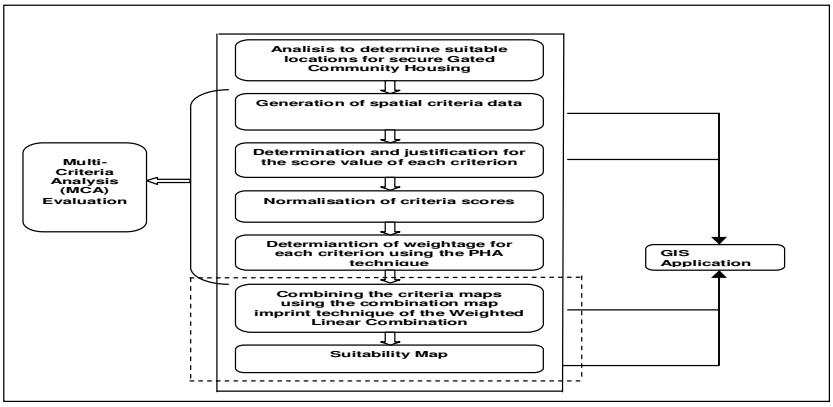

Figure 3 Performing the Multi-Criteria Analysis (MCA) to determine the appropriate locations for secure Gated Community housing

Experimental programmes

The model is developed using the GIS software that involves the selection of appropriate criteria in planning the most secure Gated Community housing. Studies to identify appropriate criteria compatible with the concept of the Safe Township need to be based on contemporary principles and philosophy in accordance with the guidelines set for the development of Gated Communities and Guarded Neighbourhoods. Figure 2 depicts the study area encompassing five housing estates in the District of Johor Bharu, i.e. Taman Setia Indah, Bandar Dato' Onn, Taman Setia Tropika, Taman Seri Austin and Taman Adda Heights. The focus of the study is the analysis of the physical security criteria, namely housing design, guardhouse construction, fencing and other elements of physical security that govern the development of a safe Gated Community and Guarded Neighbourhood housing.

Multi-Criteria Analysis (MCA)

Various criteria in the GIS raster model are evaluated through decisions that integrate spatial data according to their degree of importance. This procedure involves analysing the results of relevant criteria maps to determine the most secure locations for the development of Gated Communities. The criteria maps are derived from constraints maps or factor maps. The analysis is aimed at evaluating the extent to which a Gated Community meets the various criteria that are considered vital in terms of physical security. This information is important in designing elements of physical security to enhance greater efficiency and rationality in the development of Gated Community housing of the future. The approach adopted for this analysis is the Multi-Criteria Analysis (MCA). The Analytic Hierarchy Process (AHP) will be used in performing the Multi-Criteria Analysis (MCA). The technique is aimed at determining the weightage for each criterion that is used together with GIS. The AHP procedure will increase rationalization with respect to a model or result that is adopted. The accuracy of the MCA results has to be verified before it is entered into the database of GIS attributes to generate useful results for planning purposes. The selection of appropriate criteria for Gated Communities is based on the effect of each element on physical security. Nine criteria have been considered for the purpose of determining the most secure Gated Community housing from the aspect of the best physical security, namely

I. CCTV System
II. Fencing
III. Guard Post
IV. Building Design
V. Entry and Exit Points
VI. Landscape Design and Planting
VII. Hierarchial System of Roads
VIII. Pedestrian Walkways
IX. Adequate Lighting at Night

Suitability Index Model

A Suitability Index Model will be devised to handle and process primary data derived from the GIS system function. Among these functions are the input functions, explanations, outcomes, updates and outputs. The Suitability Index Model will be constructed using the Multiple Criteria Evaluation (MCE) in conjunction with the Weighted Linear Combination. Figure 4 shows the database component for forming the Suitability Index Model to determine the most secure Gated Community and Guarded Neighbourhood areas, based on the criteria of physical security.

The Suitability Index to evaluate the suitability of locations is established after taking into consideration the map images related to 7 selected criteria as shown in Figure 5. The analytical model will be formed conceptually to reflect the final processes of the map

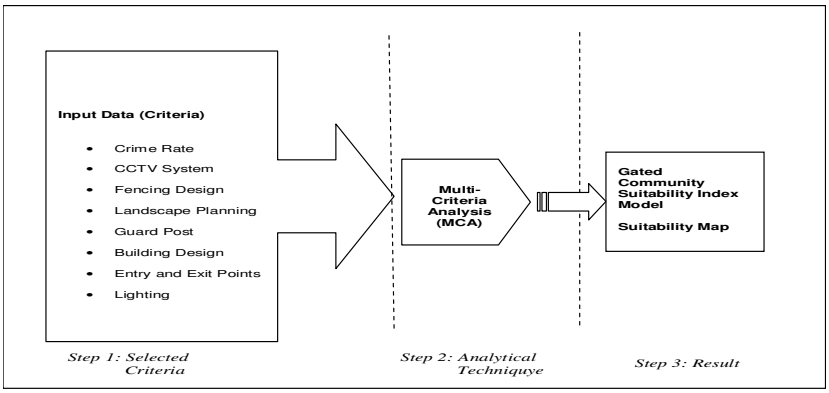

Figure 4 Suitability Index Model to Determine Suitable Locations for Gated Communities

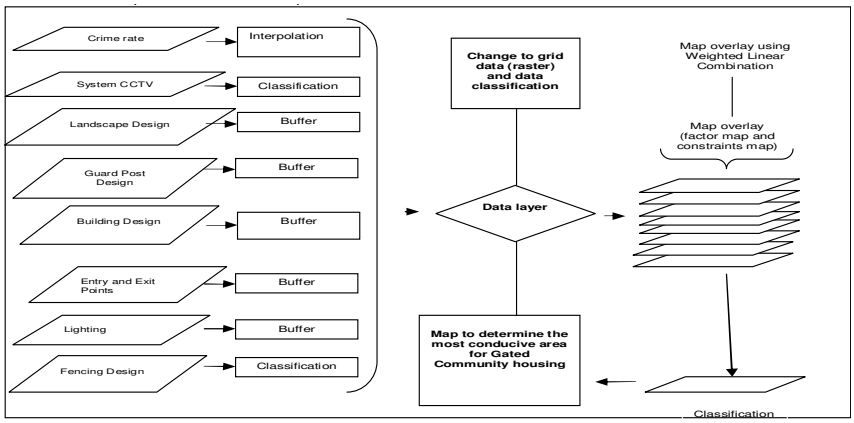

Figure 5 Planning Model in Physical Security for the Development of Gated Community Housing

image. The analytical results from GIS pertaining to the criteria are presented in the form of standardized factor maps and constraints maps.

CONCLUSION

The results of this study will present an analysis of the criteria for the elements of physical security that must be considered for the development of Gated Communities and Guarded Neighbourhoods. The proposed criteria based on suitability models will help the local authorities evaluate and monitor the development of gated and guarded communities in Johor Bahru so that they do not conflict with the principles and practices of contemporary town planning. At the same time, the analysis will also provide guidance for developers in the planning of physical security in gated and guarded communities in accordance with accepted guidelines and standards. The location information system that will be developed should be of tremendous help to developers and to property buyers by providing access to information regarding physical security measures of the Gated Community in the form of maps. The mapping information system will further facilitate development planning in the Malaysian housing industry.

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