# TOURISM INFORMATION SYSTEM USING GEOGRAPHICAL INFORMATION SYSTEM (GIS)

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# ABSTRACT

In Penang, There are several places of attraction for tourist around the world to come here to have vacation. Unfortunately, Jabatan Pelancongan Pulau Pinang only uses the manual system for the tourist to explore and go to the certain places. For example, the tourist will refer to the magazines, books, pamphlets and manual maps to search for certain places. Tourist also cannot record the information safely using the manual system. They also have problem in searching the places in Penang and have to ask other people to get detail information. This situation can make them difficult to find places and always loss the information about certain places. By using Tourism Information System Using GIS, tourist can search and get information about certain places easily. Tourist only needs to refer the map and click to the places that they want to get information. The map also can be enlarge in certain size and looks more interactive for clearer view. Hopefully, this system can solve the problems faced by the tourist and be a new method for promoting tourism in Penang.

# ABSTRAK

Di Pulau Pinang, terdapat beberapa tempat menarik untuk pelancong dari seluruh dunia datang ke sini untuk bercuti. Malangnya, Jabatan Pelancongan Pulau Pinang cuma menggunakan system manual untuk pelancong menjelajah dan pergi ke sesuatu tempat. Contohnya, pelancong akan merujuk kepada majalah, buku, risalah dan peta manual untuk mencari sesuatu tempat. Pelancong juga tidak dapat menyimpan maklumat dengan selamat menggunakan system manual. Pelancong juga menghadapi masalah dalam mencari tempat di Pulau Pinang dan terpaksa bertanya kepada orang ramai untuk mendapat maklumat yang lebih terperinci. Situasi ini boleh menyebabkan pelancong menghadapi kesukaran dalam mencari tempat dan selalunya maklumat yang disimpan akan hilang. Dengan menggunakan ' Tourism Information System Using GIS' pelancong boleh mencari dan mendapat maklumat tentang sesuatu tempat dengan mudah. Pelancong hanya perlu merujuk kepada peta dan klik pada tempat yang dikehendaki untuk mendapatkan maklumat. Peta ini juga boleh dibesarkan kepada saiz tertentu dan kelihatan lebih menarik untuk pandangan yang lebih jelas. Semoga system ini dapat menyelesaikan masalah yang dihadapi pelancong dan menjadi satu cara baru untuk mempromosikan industri pelancongan di Pulau Pinang.

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| | | |
|---|---|---|
| GIS | - | Geographical Information System |
| TIS | - | Tourism Information System |
| DBMS | - | Database Management System |
| 2D | - | Two Dimentional Image |
| 3D | - | Three Dimentional Image |

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# CHAPTER 1

# INTRODUCTION

## 1.1 Introduction

Tourism Information System (TIS) Using Geographical Information System (GIS) is an information system about tourism area based on geographical map. It is basically develop for the tourist to get information and guide them to a specific place. The system also includes creating image such in 2 dimensional graphics map to visualize a certain place. It also will show the geographical of a place to give real condition of the area. Tourist also can get knowledge about the geographical of the area instead of making a vacation there.

The system also will visualize all the location such as buildings, hill and street to name a few for better understanding of an area using geovisualization. The system is associated with map. All the data of a place will be stored in the database using geodatabase in order to give information to the tourist when they choose a specific area. By using the geoprocessing technique, the system will use a rich set of tools to work with and process geographical information. All these technique will be combining in developing the system to be an intelligent GIS.

## 1.2 Problem statement

Majority of the tourist that comes to Penang want to know about interesting place such as Batu Feringghi, Komtar, Penang Hill, Padang Kota and Teluk Bahang to name a few.

Manual system always make tourist faced many problems. The tourist needs to use manual system to search all the information of location in Penang such as through the magazines, books, pamphlets and also manual maps. As a result, the tourists waste their time to find the information of the location that they want to visit because they must review the information first. Besides that, the tourist also needs to ask other people to get the information about the place. It will create a difficult situation for them. Tourists also must go to the tourism center to get the information about the place in Penang. This situation will waste tourist's time to find the tourism center and also create a difficult situation for them if they are come from other country.

All these problems can be solved by using this system. This system will provide location detection Using Geographical Information System on web. This system is all based on map of Penang. Tourists will get all the information about the place in Penang through the visualization map. Tourist just can search the place just by clicking the maps.

## 1.3 Objective

In developing this system, there are several objectives that will be achieved for the system development. There are:

i) To develop a prototype system name Tourism Information System.
ii) To search the location for certain place.

iii) To manipulate the map by zooming and analyzing data.

## 1.4 Scope

The scope of this system is to develop the Tourism Information System only consists of Penang map. The system will use ArcView 3.1 and Avenue scripting as an application language. The system use vector data type and can visualize places in Penang. The system also developed using layer based in plotting certain places and use geodatabase as the system database. The system can search certain places in Penang and performing the zooming function in 125 scales. The system can analyze the data in the geodatabase according to the price of hotel, rating, cities and location.

# CHAPTER 2

# LITERATURE REVIEW

Literature review is used to find and collect information in developing this system. All the related information and research with this system will be figure out and make specific analysis. All the review will base on Tourism Information System using GIS.

## 2.1 Definition Of Geographical Information System

Geographical Information System (GIS) is a technology that is used to view and analyze data from a geographic perspective [1]. The technology is a piece of an organization's overall information system framework. GIS links location to information (such as people to addresses, buildings to parcels, or streets within a network) and layers that information to give better understanding of how it all interrelates [2]. GIS manages, analyzes, and displays geographic knowledge, which is represented using a series of information sets. The information sets include:

i) Maps and Globes

Interactive views of geographic data with which to answer many questions, to present results, and to use as a dashboard for real work. Maps and globes provide advanced GIS applications for interacting with geographic data [2].

ii) Geographic Data Sets

File bases and databases of geographic information-features, networks, topologies, terrains, surveys, and attributes [4].

iii) Processing and Work Flow Order

Collections of geoprocessing procedures for automating and repeating numerous tasks and for analysis [2].

iv) Data Models

GIS datasets are more than DBMS tables. They incorporate advanced behavior and integrity like other information systems. The schema, behavior, and integrity rules of geographic data sets play a critical role in GIS [7].

v) Metadata

A document catalog enables users to organize, discover, and gain access to shared geographic knowledge [2].

## 2.2 Three Views of a GIS

A GIS is most often associated with maps. A map, however, is only one of three ways a GIS can be used to work with geographic information. These three ways are:

The Database View: A GIS is a unique kind of database, called geographic database (geodatabase). It is an "Information System for Geography. Fundamentally, a GIS is based on a structured database that describes the world in geographic terms [4].

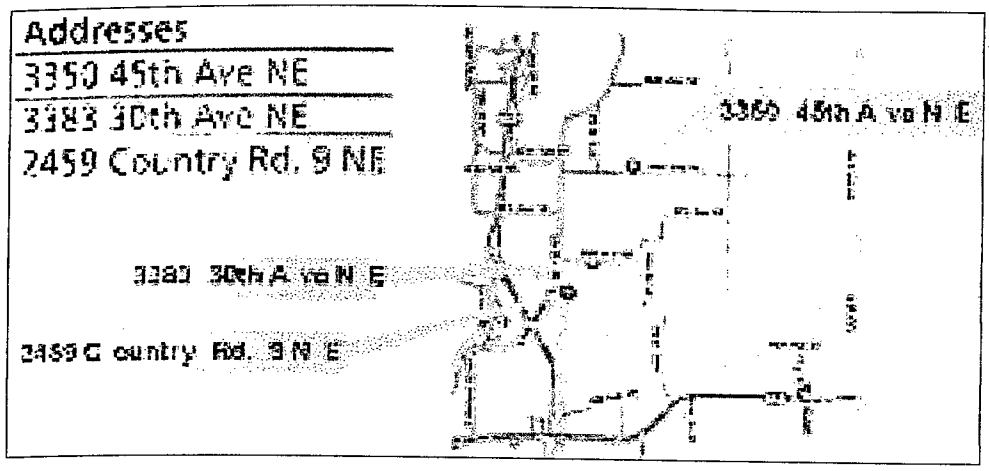


**Figure 2.1** Database View

Source: GIS in Land and Property Management (2003)

The Maps View: A GIS is a set of intelligent maps and other views that show features and feature relationships on the earth's surface. Maps of the underlying geographic information can be constructed and used as "windows into the database" to support queries, analysis, and editing of the information. This is called geovisualization [4].

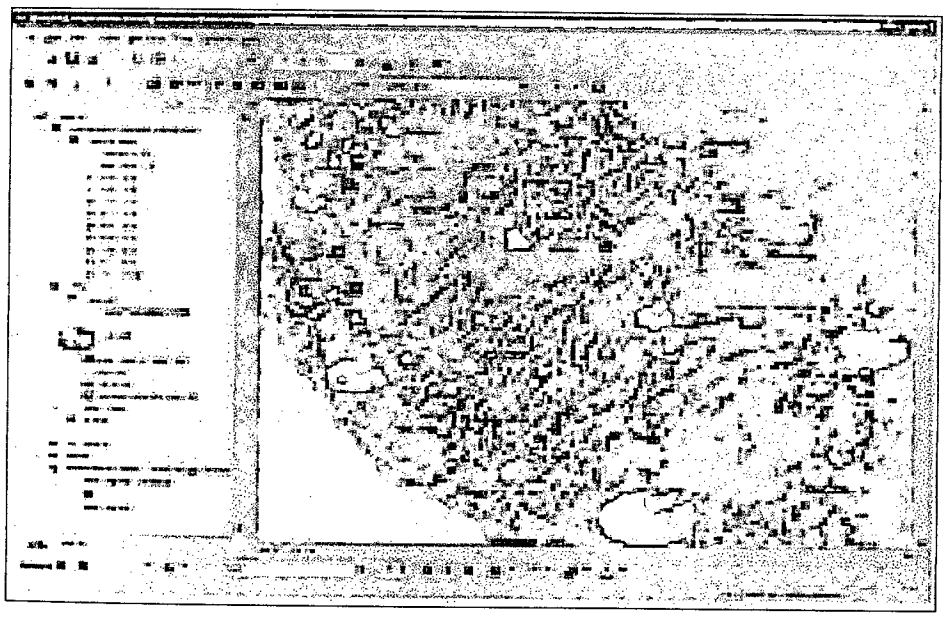

**Figure 2.2** Maps view

Source: GIS in Land and Property Management (2003)

The Model View: A GIS is a set of information transformation tools that derive new geographic datasets from existing datasets. These geoprocessing functions take information from existing datasets, apply analytic functions, and write results into new derived datasets [3].

## 2.3 Data Types

Geography is information about the earth's surface and the objects found on it. This data comes in three basic forms:

i) Map Data: Map data contains the location and shape of geographic features. Maps use three basic shapes to present real-world features: points, lines, and areas (called polygons).

ii) Attribute Data: Attribute (tabular) data is the descriptive data that GIS links to map features. Attribute data is collected and compiled for specific areas like states, census tracts, cities, and so on and often comes packaged with map data. When implementing a GIS, the most common sources of attribute data are your own organization's databases combined with data sets you buy or acquire from other sources to fill in gaps.

iii) Image Data: Image data ranges from satellite images and aerial photographs to scanned maps (maps that have been converted from printed to digital format).

## 2.4 Data Model

### 2.4.1 Vector Data Model

Vector model represent the real world phenomena as a point and line which define the border area. This method is same with drawing on the map/plan. And this approach also known as objects basis representative. The entity sites define by the location on the map based on the unique coordinate. The entities sites will be possibly represent exactly the same with the real world [6].

The vector data model represents each feature as a row in a table, and feature shapes are defined by *x,y* locations in space (the GIS connects the dots to draw lines and outlines). Features can be discrete locations or events, lines, or polygons. Locations such as the address of a customer or the spot a crime was committed are represented as points having a pair of geographic coordinates. Lines, such as streams or roads, are represented as a series of coordinate pairs. Polygons are defined by borders and are represented by closed polygons [5].

### 2.4.2 Raster Data Model

Raster model functions to divide the space or area on the map into polygon units or cells that being arrange in matrix mode also known as formation. This site of units commonly has a size, shape or same orientation such as rectangle, triangle or hexagon [8].

Continuous numeric values, such as elevation, and continuous categories, such as vegetation types, are represented using the raster model. The raster data model represents features as a matrix of cells in continuous space. Each layer represents one attribute (although other attributes can be attached to a cell). Most analysis occurs by combining the layers to create new layers with new cell

values. The cell size use for a raster layer will affect the results of the analysis and how the map looks. The cell size should be based on the original map scale and the minimum mapping unit. Using too large a cell size will cause some information to be lost. Using a cell size that is too small requires a lot of storage space and takes longer to process without adding additional precision to the map.

**Figure 2.3** This map shows vector data (the streets) laid on top of raster data (the mountains and valley floor).
Source: GIS in Real Estate (1998)

## 2.5 Geographic Information System (GIS) and Database Relationship

Database is the important component in developing GIS application. GIS consists of two data model which are attribute data model (non-graphic data) and spatial data model (graphic data). GIS will give the answer the request about 'what' and 'where'. 'What' refer as attribute data and 'where' refer as spatial data which point to the location or coordinate on the map[7]

## 2.6 Mapping and Analysis Using GIS

All GIS packages have the ability to produce high quality thematic or topographic maps from the feature data stored within the system. Datasets such as topographic maps, aerial photographs, satellite imaginary and complex databases can be combined and visualized concurrently. Map annotation, scale bars and legends can all be generated and placed on the map by the user [4].

In many cases, insets showing more detailed portions of the main map can also be produced. More advanced systems also allow the user to define their own symbols to fit in with house styles and existing practice. Because the GIS commonly incorporates a database of thematic data, extra analytical information such as graphs and charts or summaries of tabular data can often be included alongside the maps. Geographical Information System brings a high level to the processes of topographic and thematic mapping.

Whether or not features are included and how are symbolized on the map, the map scale and ancillary textual information are decided by the user. Complex drafting procedures are completed automatically by the computer from the geographical data structures. This high level of cartographic power brings with it some potential pitfalls.

The user needs to be aware of cartographic good practice such as the choice of appropriate symbolization, an appropriate number of categories and colour schemes for effective visualization of the information that is to be mapped and the limitations of scale and generalization caused by source data. There are three useful typology of common mapping operations that can be carried out using standard GIS techniques [2]:

i) Mapping a single feature type.

ii) Mapping by category.

iii) Mapping using quantities and ratios.

### 2.6.1 Mapping A Single Feature Type

It is often necessary to produce a map showing the geographical distribution of a single feature type such as houses, roads, railways or towns. For example, in the case of roads this might be a red line, or in the case of town, a black dot. It is unusual to produce a finished map showing a single feature type. Instead, some background information is often included to provide a context for the information that is presented [2].

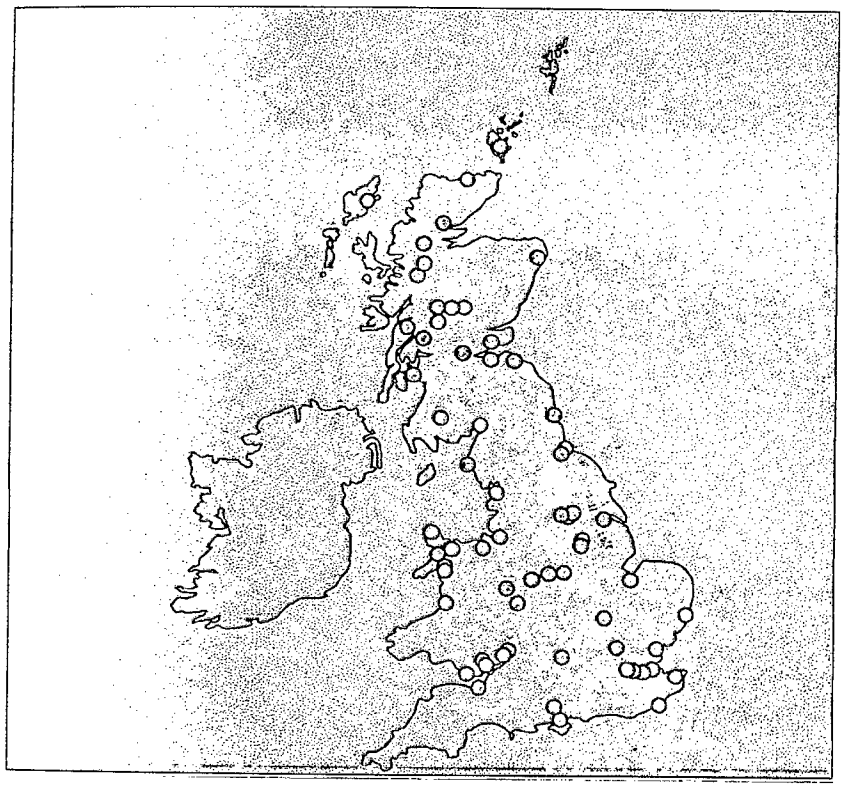

**Figure 2.4** Mapping with single feature

Source: GIS in Land and Property Management (2003)

### 2.6.2 Mapping By Category

It is a common requirement to depict different of the same feature on map. In the power station example it might be interested in the generation method used, for example coal fired, oil fired, and gas powered or nuclear facilities. It may require information about different classes of road from local routes to national motorways or different types of land use zoning in a town centre [2].

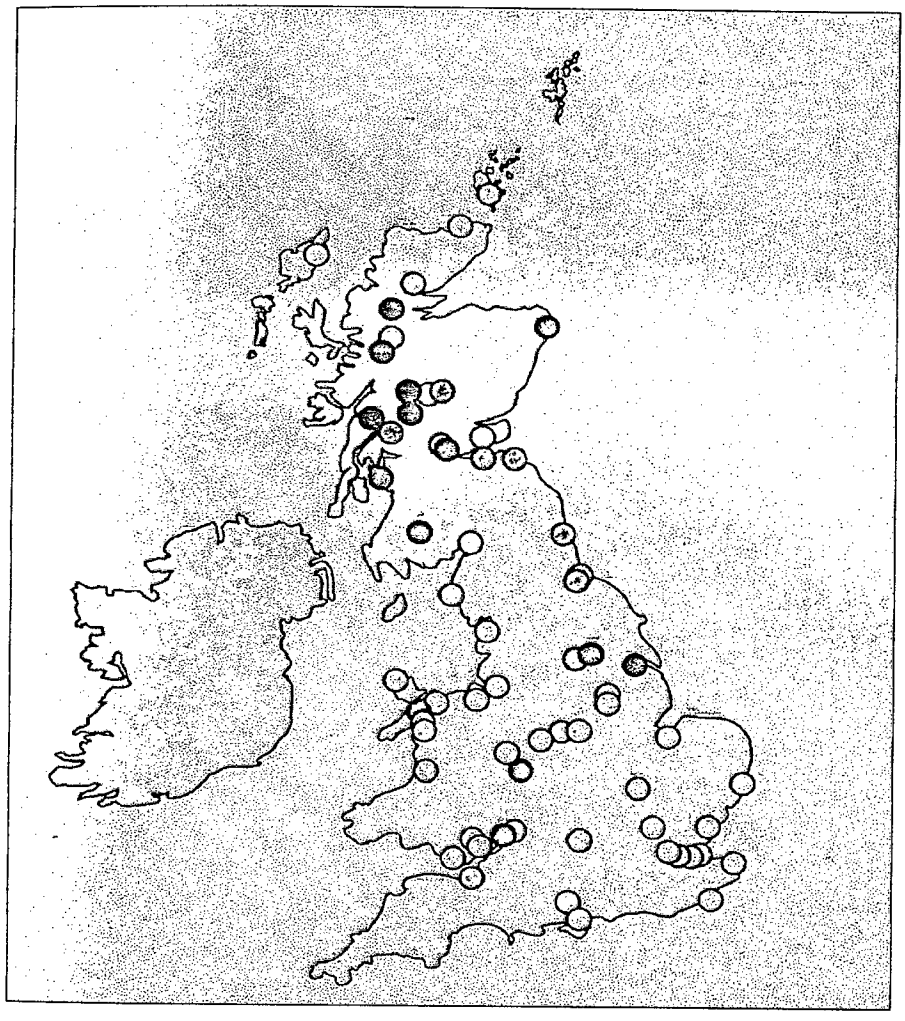

**Figure 2.5** Mapping by category

Source: GIS in Land and Property Management (2003)

### 2.6.3 Mapping Using Quantities And Ratios

More elaborate possibilities become available when introduce to the numerical information into a mapping project [2]. The most common methods of visualizing such information use graduated colors of different shading patterns to describe the values of variables in particular areas while variations in symbol size and colour can be used to depict different levels of magnitude for a numerical value at point locations or along lines [4]. The Percentage measurements are commonly used to summarize ratio variables, and

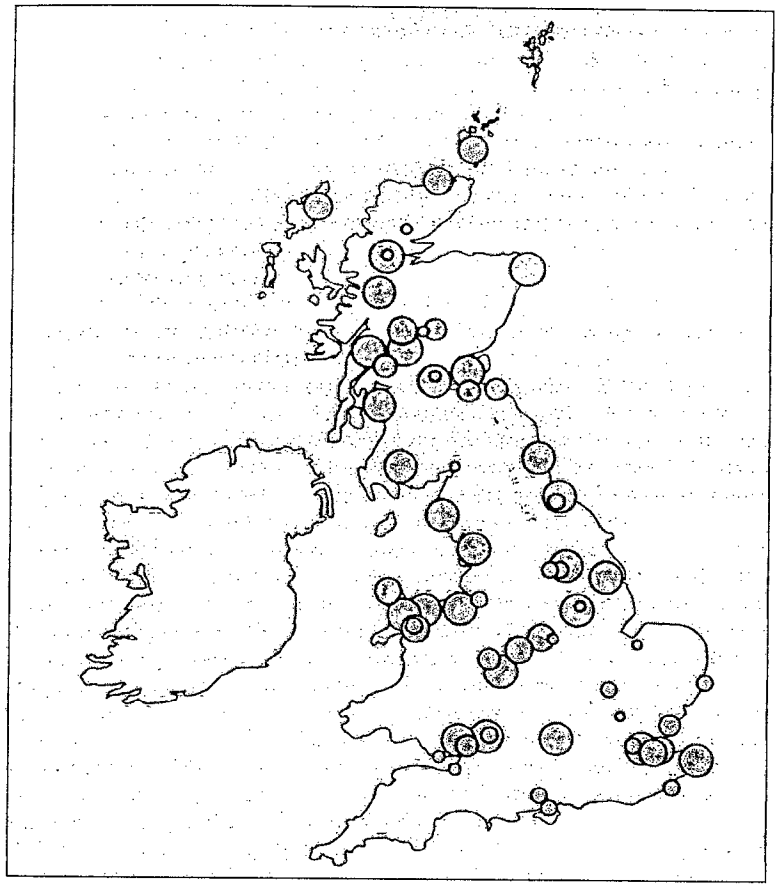

**Figure 2.6** Mapping using ratio

Source: GIS in Land and Property Management (2003)