

成功大學資訊工程學系



National Cheng Kung University
Department of Computer Science and Information Engineering

DEH – An Interactive Mobile Navigation Service for Demodulating and Encoding Heritage

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Outline

- Motivation
- Architecture and Scenario Design
- Content Creation
- System Functions Design
- System Implementation
- Conclusion

Motivation

- Most of the heritage preservation projects are non-interactive.
- Humanities education and learning are ineffective.
- Lacking creative applications to promote the humanistic learning.

Motivation

Background -

Technical

1. Prevalence of wireless network (3G/3.5G, WiMAX)
2. Precise positioning technology
3. Powerful, easy-to-use web map service (Google maps API, Bing maps SDK)
4. Prevalence of smart phone and open platform

Humanity

1. Governments emphasizing about humanistic content preservation
2. Demands of creative humanistic application
3. Demands of humanity education
4. Local characteristic popularizing

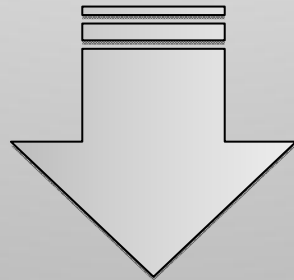
Environment

1. Cycling is becoming popular
2. Tourism population increasing
3. Energy-saving trend
4. Integrate LBS application with leisure life

Objectives

So, what is such a service?

- To take humanistic contents into daily life.
- To create greater value of humanistic content uses.



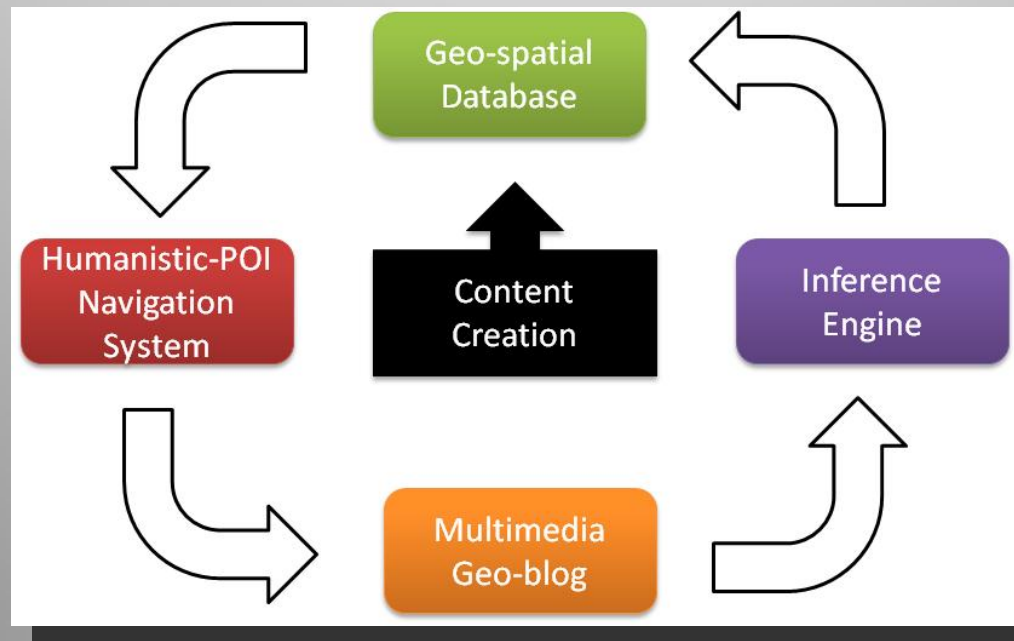
Heritage
Preservation

Humanities
Education

Creative Service
Creation

Architecture and Scenario Design

- Target:
 - Heritage attraction contents preservation and promotion



Architecture and Scenario Design

- Scenario
Three phases during a humanistic tour



- Select a recommendation itinerary
- Tourist arrange an appropriate itinerary with several POIs on the geo-blog

- Following the POI navigation instructions to make a round trip along these POI
- Refer to the real-time recommendation of other nearby related POI

- Sharing tour experience to other users
- Showing the route and photos on the digital map
- Trajectory simulation

Content Creation

Metadata to interpret humanistic POI

- Metadata is generally defined as data about data
- Metadata contains a common set of terms
- **Dublin Core** is a metadata scheme with 15 basis elements, and its defined elements support a broad range of purposes and can be used to describe resource in variety domains.

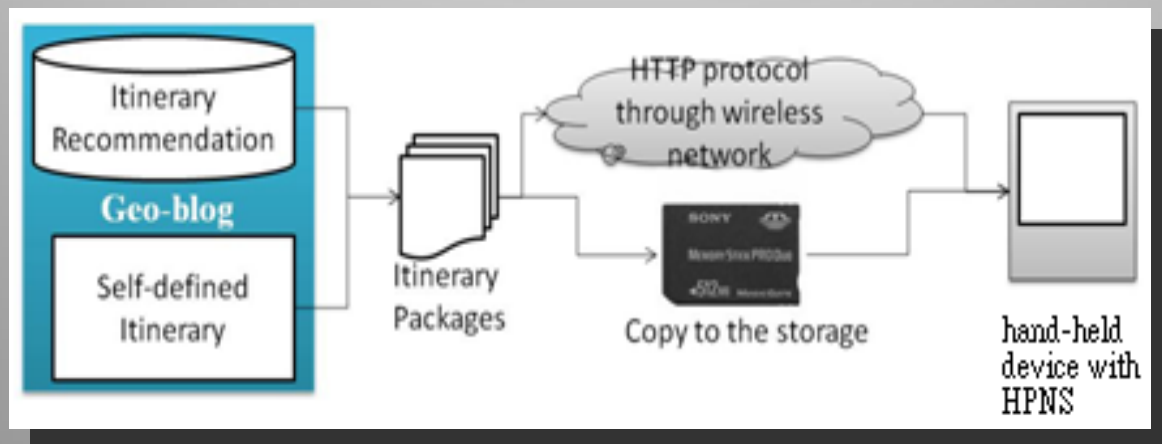
Content Creation

Metadata scheme in DEH project

Class	Element
Identification	Metadata id, Title
Classification	Subject, Keyword, Type, Relation
Spatial-Temporal Information	Location, Coverage, Era
Data Source	Source, Creator, Publisher, Contributor, Copyright,
Description State	Language, Format
Resource	Images and Videos

System Functions Design

- Itineraries Planning and Storing
 - Selecting a itinerary recommendation or define a itinerary on the digital map
 - Download itinerary through the storage card and HTTP protocol



System Functions Design

- Real-Time Recommendation

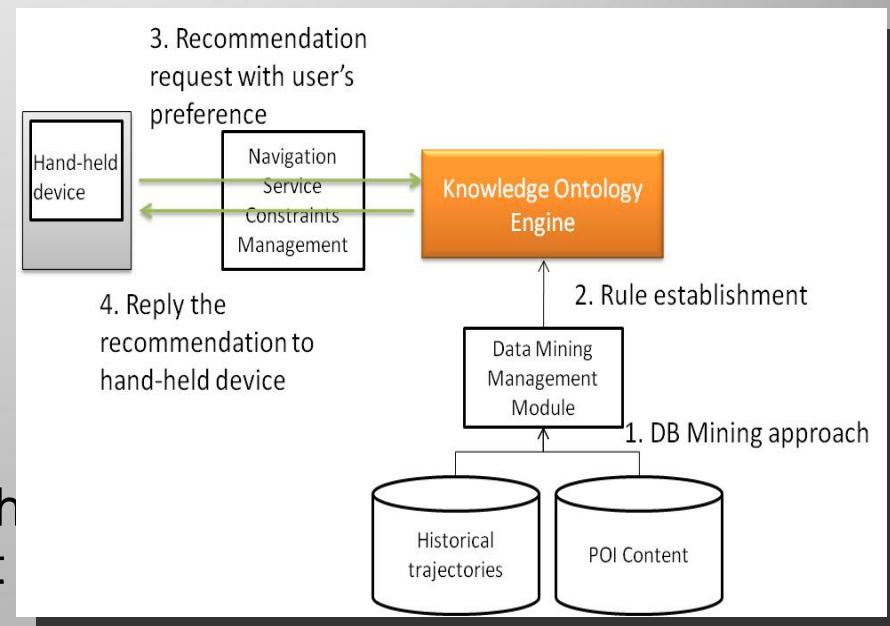
1. Data Mining approach

- Association is used to discover interesting relations between POI.
- Classification is used to predict someone's favorite POI by analyzing other user's trajectory.

2. Rule establishment

3. Recommendation request with user's preference and context

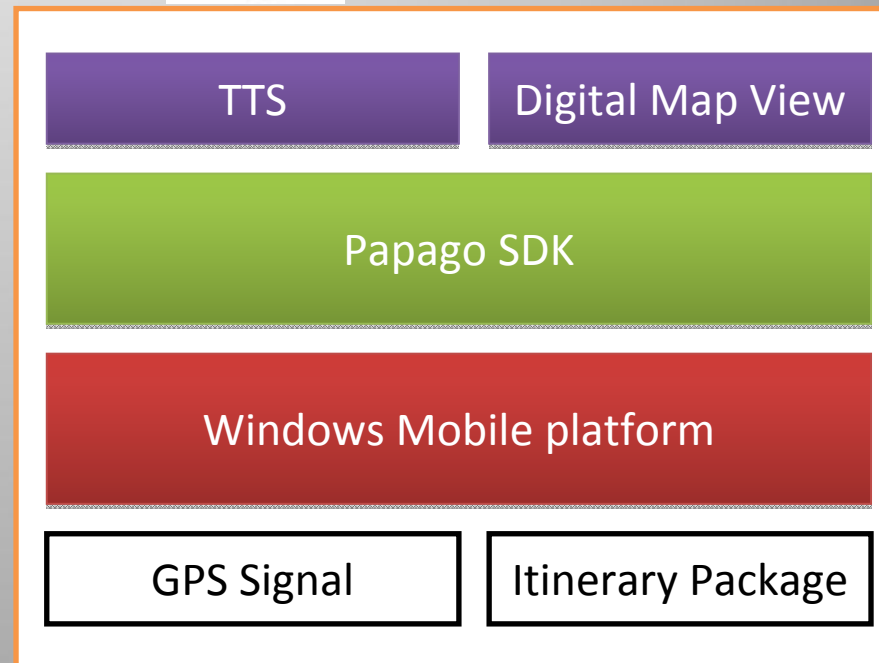
4. Reply the recommendation to hand-held device



System Functions Design

- **Routing Navigation**

- To direct user to the next POI base on the GPS data.
- When user approached to the target POI, the POI contents are showed on the hand-held device screen and speech to the user about the POI



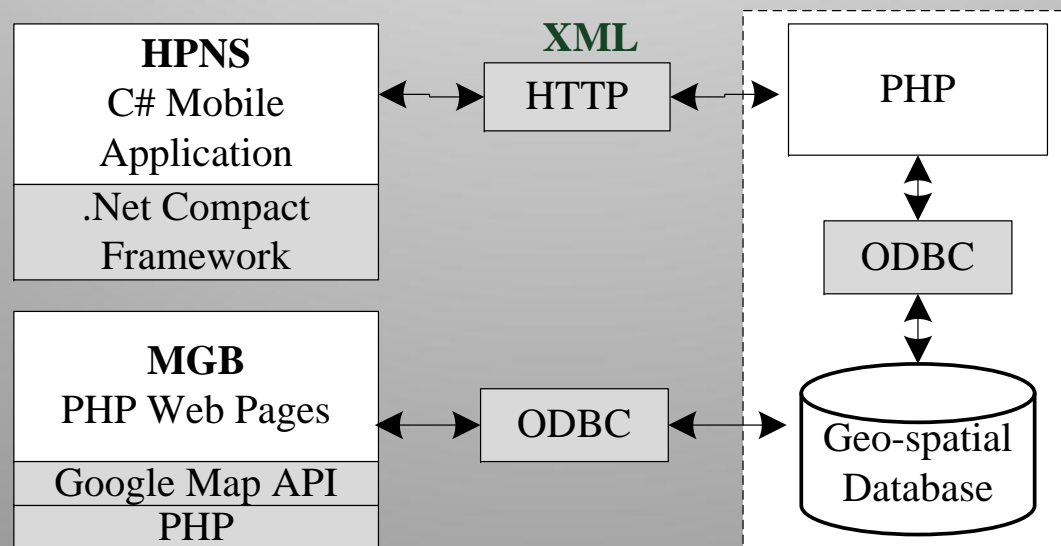
Framework of Humanistic POI Navigation System

System Functions Design

- Experience Sharing
 - Multimedia Geo-Blog is a space to share the experience by editing the description of certain POI and uploads the photo, video and trajectories.
 - the trajectories recorded by the navigation system during the tour can be simulated as animation on the Multimedia Geo-Blog .

System Functions Design

- Database Access Interface
 - The extendable ability of database allows the content in the database to be used in variety creative applications.



System Implementation

- Itinerary Planning (Pre-Tour)

2009年08月29日 Sat 11:00:39 歡迎 MOEexpert 登入系統 登出

觀看POI 新增POI 下載POI內容 下載POI XML 觀看Area 新增Area 新增專家建議 新增專家建議2

景點快速搜尋 請選擇景點主題 請選擇景點類型 請選擇景點時代

豐田導覽-1

景點區域：	Shoufong		
行程描述：	結合日式建築,宗教信仰,手工DIY之旅遊行程		
建立者：	MOEexpert		
交通工具：	單車		
旅遊時間：	375 分鐘		
行程總距離：	53.9 KM		
上傳時間：	2009-06-25 19:29:27.000		
景點內容：	景點 1: 豐田文史館	停留時間: 20分鐘	至下景點時間: 2分鐘
	景點 2: 地神碑	停留時間: 10分鐘	至下景點時間: 1分鐘
	景點 3: 日式農宅	停留時間: 10分鐘	至下景點時間: 1分鐘
	景點 4: 大阪式菸樓	停留時間: 10分鐘	至下景點時間: 4分鐘
	景點 5: 鳥居	停留時間: 10分鐘	至下景點時間: 1分鐘
	景點 6: 參拜道	停留時間: 15分鐘	至下景點時間: 2分鐘
	景點 7: 碧蓮寺	停留時間: 20分鐘	至下景點時間: 1分鐘
	景點 8: 泊犬	停留時間: 10分鐘	至下景點時間: 104分鐘
	景點 9: 關村紀念碑	停留時間: 10分鐘	至下景點時間: 104分鐘
	景點 10: 風鼓斗草屋	停留時間: 40分鐘	

刪除

Route Planning - Windows Internet Explorer
http://140.134.26.12:8080/moe/RoutePlanMap.php?P

System Implementation

- Navigation View (Touring)



System Implementation

- Trajectory simulation (Post-tour)

首頁 留言板 使用說明 工作日誌 軌跡 QR-Code 發表文章 登出

*如有問題可至留言板留言，謝謝。

搜尋
關鍵字

主題館
活化與再造的
體驗的
消逝的
阿里山

行程規劃
專家建議行程
使用者建議行程
使用者自訂行程

類別
所有分類 (28) [RSS]
旅遊 (8) [RSS]
阿里山的 (2) [RSS]
生活 (0) [RSS]
心情 (0) [RSS]
學校 (0) [RSS]
運動 (0) [RSS]
棒球 (0) [RSS]
籃球 (0) [RSS]
高爾夫球 (0) [RSS]

地圖 衛星 混合地圖 地形 地球

1000 英尺
500 公尺

某使用者位置 我的位置 我的位置 顯示位置 停止顯示

1 2 3 >>

瀏覽模式: 普通 | 列表

Conclusion

- We have proposed a creative service to combine the humanistic knowledge with travel and leisure.
- Assist the local tourism development and economic prosperity.
- The experiences for future work included
 - (1) System development framework
 - (2) Metadata scheme definition
 - (3) Data flow and user scenario design
 - (4) development experiences of system functions
 - (5) Real-time POI recommendation structure.



Thank You!

主題: 活化與再造
類別: 人文景觀
年代: 日治
時間: 1896
地址: 花蓮縣壽豐鄉豐山村站前街34號