

The Commemorate Service Planning with Assistance-Oriented Architecture

Hung-Teng Chang¹, Rosa Ma², Pin-Chang Chen³, Han-Chen Huang⁴,

^{1,3}Department of Information Management, Yu Da University, Miaoli County, 36143, Taiwan, R.O.C.

²Department of Business Administration, Yu Da University, Miaoli County, 36143, Taiwan, R.O.C.

⁴(Corresponding Author) Department of Leisure Management, Yu Da University, Miaoli County, 36143, Taiwan, R.O.C.

Abstract:- As the market evolves, businesses are faced with a saturated market, shorter product life span, and consumer's demand for differentiation. In order to stay competitive, businesses must provide different services and offer packaged services to increase product value. Most funeral services are dull and monotonous in style. The overall service is not flexible and lacks choice to customization. Therefore, a funeral service design system that can customize funeral process and venue decoration would offer customers a better choice, hence meet their demand. During the funeral service, the food offered to the deceased is decided by the service provider, which limits the selection and has little flexibility in choice. Also, the traditional funeral service is held in accordance to the so-called "suitable date" on traditional Lunar Calendar. Therefore, it's inevitable to have more than one service to be hold on the same date at the same place. With the number of attendance and the expected amount of parking demand, sometimes the venue's own parking lot may not be large enough to take on the demand. Hence, the attendants have to spend extra time and effort in search for a parking space elsewhere. In response to these issues, the research will focus on the construction of venue design system, food offering management system, GPS parking management system, and the consolidation between the three systems. By adopting features of service-Oriented architecture (SOA) and the consolidation of the three service systems, it is believed that such structure will become the key for funeral service providers to stay ahead in the industry.

Keywords:- Funeral service planning, Customization, Venue Design, Parking GPS, Service-Oriented architecture.

I. INTRODUCTION

Birth, aging, illness, and death are the stages everyone goes through. As the final stage, no one can avoid the call of death. Therefore, we should face death with a more aggressive attitude and have full preparation for the inevitable. Through the movie "DEPARTURES", we see the solemnity and the care for the deceased in funeral industry. Due to its nature and often the accompanied superstition, funeral service is an industry that not many would want to be a part of. However, it still is an important part of life. The service includes hospice, transportation, memorial venue setup, placing in the coffin, memorial service discussion, memorial service preparation, pre-service commencement ritual, service commencement, cremation and urn-sealing, homecoming of the spirit tablet and ending of grieving period, final burial at the gravesite, and follow-up consultation. These rituals show respect for the deceased, but also make people feel memorial service is distant and can't be approached easily. This research hopes to address to this issue. The aim is to allow readers to face this process with more comfort, and approach it with respect with an open mind.

The information offered by traditional memorial service providers often lacks immediacy and is not openly shared with family members. Family members can only follow the procedures set by traditional memorial service providers. Sometimes, the two parties may hold different opinions on certain issue. When such situation occurs, the family members usually back down in hoping that the last trip for the deceased can be smooth and quiet. However, it's believed that the society needs and seeks to obtain the information openly. Memorial service venues should be customizable and can be designed to the wishes of the consumers. Using the service-Oriented architecture (SOA), the research aims to consolidate the heterogeneous service systems and construct a highly efficient online system for memorial service planning.

II. LITERATURE REVIEW

The development of memorial service planning system in this research consists of three parts (A. Memorial service venue design system, B. Food offering management system, and C. GPS parking and management system). Therefore, the research will analyze the concept and scope of the technologies used in the systems, along with which is required for SOA construction.

2.1 Traditional Taiwanese memorial culture

Taiwanese’s memorial culture is deeply influenced by the Karma theory in Buddhism, Confucianism, and Taoism. The idea “to serve the deceased as the living” is the ultimate expression of the Chinese showing obedience to elderly. With the passing of time, some of the traditions were forgotten over the years. The Chinese often avoids talking about death and see it as a taboo. The general impression to death is negative and “unclean”. But as the traditional Chinese saying goes “Death comes to all men” and the Taiwanese phrase “Death is already decided even before death”, it is an important stage of life. After all, with a beginning of life, an end will follow. Life and death don’t always have to be associated with tears. The aim is to face the issue with a more aggressive and healthy attitude. People tend to associate the unknown with ghosts and spirits, which are often exaggerated or being overly interpreted for manipulation purpose. As people also tend to distant themselves from the unknown, the exaggerations and means of manipulations are able stay unchallenged. Families of the deceased are often seen as “cash cows” because they lack understanding of memorial services, which makes them vulnerable to being cash-stripped by service providers.

In contrast, the memorial services in western countries often take place in churches for families and friends to say goodbye to the deceased. Small gathers are then held in home. As the style of such service is being accepted by Taiwanese, “Pre-death planning” thus emerges. Besides deciding on the service provider, people can also choose the ways that the service should be conducted, and even prepare the memorial videos. All these are to make the decease feel respected on their final journey [1-3].

2.2 Virtual Reality

Virtual reality (VR) displays a three-dimensional virtual environment produced by computers that provide life-like visual, audial, and other sensory stimulations. Users are immersed in this virtual environment, which appears as authentic as the real world. The methods of constructing a virtual reality system are categorized as follows [4-6] (Table 1 compares the advantages and disadvantages of the two types of virtual reality systems):

Table 1: Comparison of the Advantages and Disadvantages of the Two Types of VR Environments

	Advantages	Disadvantages
Geometry-based (graphic-based)	<ul style="list-style-type: none"> ● High interactivity ● Can move freely within the environment ● High-visual perception of three-dimensional space ● Can produce virtual reality, rich in imaginative quality 	<ul style="list-style-type: none"> ● High cost and high degree of difficulty in production ● High requirements for hardware ● Quality related to the size of image files ● Lengthier development process
Image-based	<ul style="list-style-type: none"> ● Low-cost rapid development process ● Scenes are created from actual photographs, and thus, is realistic and natural. ● Hardware requirements are cheap and basic. ● Image files are smaller. 	<ul style="list-style-type: none"> ● Low interactivity ● Can only be viewed from fixed points ● Cannot produce three-dimensional effects ● Cannot process non-lifelike scenes; can only create realistic scenes

2.2.1 Geometry-Based VR (also known as Graphic-Based VR):

Geometry-based VR requires using 3D model construction software to build the desired virtual environment. Editing and other features of virtualization software provide a range of characteristics to different objects. Specific devices are integrated to achieve a multi-level interactive effect.

2.2.2 Image-Based VR:

Image-Based VR is further divided into two categories: the first category comprises touring of the virtual environment, while the other consists of viewing specific objects from different angles.

2.2.3 Touring the virtual environment:

Techniques of panoramic photographs are used. The digital camera center is used as the rotating axis, and multiple images (24) of the surrounding environment are taken at 3600. Image processing methods, such as titled image correction, image warping, and image stitching are used to adjust image blending, after which the images are gathered into a circular cylinder. The system calculates a relative image according to the direction of the viewer’s gaze.

2.2.4 Viewing from specific angles:

Photographs of an object taken from several angles are inserted before the interpolation and augmentation process to produce images from other angles.

2.3 Service-Oriented Architecture (SOA)

The service, including complete functions, must be clearly defined, capable of operating independently without relying on other services. The SOA is a solution for systems requiring interactions in a heterogeneous IT environment, providing the required stability of system functions, enhancing reusability, and reducing development and deployment costs [7, 8]. Though the SOA is not a new concept, it has been the subject of much research in recent years, and has become the most popular enterprise framework currently used for corporate integration in the IT industry. The SOA is a type of IT strategy using a well-defined interface and service contracts to link different service applications to support business flow. A SOA organizes the functions included in various enterprise applications into interoperable standardized services. These services can be rapidly combined, as well as re-used, to satisfy customer requirements. The SOA function is shown in Figure 1 [9, 10].

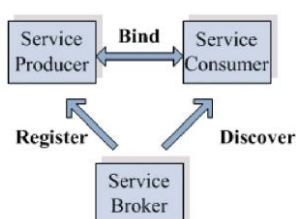


Fig. 1: Service-Oriented architecture

The operation model of a SOA is divided into three roles: service broker, service provider, and service requester [11, 12].

2.3.1 Service broker:

The service broker plays the interlocation role between the service provider and service requester. By using UDDI, the service broker can provide a range of service directories from various service providers, enabling the service requester to select the desired service(s).

2.3.2 Service provider:

Responsible for providing business processing functions for other people's use. Using WSDL allows service providers to describe their services, the input data required for use of these functions, and the expected output results while providing URL links to elucidate the purpose of the offered services. Lastly, service providers use UDDI to make this information public.

2.3.3 Service requester:

Uses web services to send a search command in SOAP messaging format to the UDDI service login database. They then obtain required web services from the resulting information on service providers, and establish direct contact with the providers to obtain desired services. These three main roles in the SOA interact through three basic operations: register, discover, and connect. Service providers register their services with service brokers before service requesters find the services they need from service brokers, and connect to service providers, completing the service transmission.

III. RESEARCH METHODS

This research is based on the aim of constructing a memorial service planning system. From which, it's expected to create three key systems (A. Memorial service venue design system, B. Food offering management system, and C. GPS parking and management system) using ASP.NET, AJAX.NET, and web services. Using SOA, the research focuses on standardizing the services of the Memorial service venue design system, Food offering management system, and GPS parking and management system. With web services as the interface, data is accessed through XML. By consolidating the services in the three systems, redundant processes can be avoided, hence reduces processing time. The service applications should be flexible and extendible in order to facilitate the construction of a stable and well-rounded online system for memorial service planning. For the structure of the online system, please refer to Figure 2 as follows:

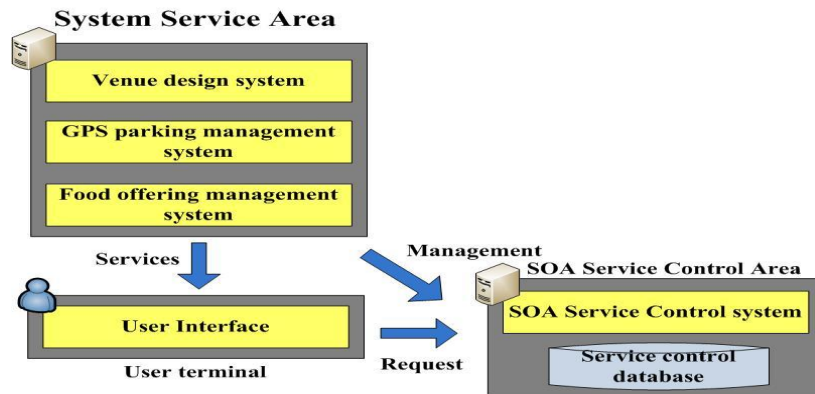


Fig. 2: The online structure of memorial service planning system

3.1 Memorial service venue design system

Users will be checked on their identity at login. Upon confirmation, users can start designing the memorial venue with the help of the system. The system will request for confirmation as the venue design is finished. Users can choose to restart the process or print out the design. The full process pseudo-code is as follows:

```

Permission = False;
While (not permission) do
{
Enter login info
  If (permission check) then
    Permission = true;
}
Select layout price;
Site selection;
Complete = false;
Done = false;
While (not Done) do
{
  Get layout from database;
  Show venue design in 3D;
  If (price is over) then
  {
    If (not modify layout) then
    {
      Done = true;
    }
  }
  Else
  {
    Done = true;
    Complete = true;
  }
}
If (Complete) then
  Output venue design;

```

Explanation of procedures:

- (A) Program entry point: this system was constructed using a modular design. Therefore, it can be used as an independent system or as the sub-system of a larger system. The program entry points for these two types of usage differ. When the system is used alone, the program entry point is the system login interface. When the system is used as a sub-system, the user is already logged in, hence, is not required to log in again.
- (B) User authentication: ASP.NET technology was used to write the authentication program. When users lack appropriate permission for access, they are guided to the login page.
- (C) Select decoration price: the system program provides users with a selection of pre-established price sets

obtained from the database.

- (D) Select venue: the first step in system functions, the program enters the database and obtains venue information, which is provided to users for their selection, to determine the size of the venue to be designed.
- (E) Venue decoration and design: the program shows available decoration components according to the selected price range, and uses drag-and-place methods to facilitate the design and layout of the venue. Preset decoration components can also be changed.
- (F) SD display: The system uses VR technology to display the venue designed by the user, providing the user with a visualized environment to facilitate decision-making.
- (G) Price checking: when the user confirms completion of the venue design, the system checks whether the total price of the decoration exceeds the price previously selected by the user; if not, the system outputs the design.
- (H) Design output: the system outputs the venue designed by the user as a blueprint, and provides a list of suppliers according to the selected design components.

3.2 Food offering management system

The aim of the system is to for customers to customize on the food offering menu and its price. The system offers more efficient and flexible communication platform for service providers and customers. The system process pseudo-code is shown as follows:

```

Permission = False;
While (not permission) do
{
Enter login info
    If (permission check) then
        Permission = true;
}
Set price;
Complete = false;
Done = false;
While (not Done) do
{
    According the price get default menu from database;
    Modify menu;
    If (price is over) then
    {
        If (not modify menu) then
            Done = true;
        Else
            Set price;
    }
    Else
    {
        Done = true;
        Complete = true;
    }
}
If (Complete) then
    Output the menu;

```

Explanation of procedures:

- (A) Entrance point: Since this is a modular system, it can be used individually or as a part of a larger system. The entrance point is different under the two circumstances. When the system is used individually, the entrance point is the login page. However, when it's part of a larger system, users should have already signed in and therefore requires no additional login step.
- (B) User verification: The verification process adopts ASP.NET technology. If a user is not authorized, the system will return to the login page.
- (C) Set price: The first step of the system. Users can enter a target price into the field. The system will record the number using SESSION, so the system will be able to recall the number as it progresses to the steps after.
- (D) Decide if any default combination fits the target price: The system now compares the default food

offering combination in the database with the target price. Matched combination will be listed on screen for users to select. If there are no matches, the system will enter the next procedure.

- (E) Entering system user interface: Users will see matched combinations and the list of all combination sets on screen. Matched combinations show the combination of food offerings that matches the target price. The list of all combination sets means users will see all different combinations available. AJAX technology helps to make the selection process more immediate and dynamic.
- (F) Price decision and combination output: Once a user submits a combination of food offering, the system will check if the combination exceeds the target price. If not, the combination will be outputted as the menu. If the price is exceeded, the system will inquire if the quotation is acceptable. At this step, users will see the price of the selected combination, along with three different choices: A. Current quotation is denied. System will return to the combination page. B. Accept the quotation and edit the target price. User will be given a new field to enter the new target price. This new target price will appear on the food offering menu that's printed afterward. C. Accept the quotation and accept the previous target price. Print out the food-offering menu.

3.3 GPS parking navigation and management system

Regarding parking management, the system allocates and reserves parking spots for consumers automatically. Control and management of reservation time periods are automated, and the system update the information of available parking spaces. The system provides restaurant owners and consumers with an interface to assess the availability of parking spaces. When parking places are not available, the system provides GPS navigation services to assist users in selecting their navigation service. Due to a large and diverse number of navigation services on the market, this system used the well-known cross-platform navigation support system PAPAGO. For other navigation system users, or consumers without a navigation system, this system constructed a simulated navigation system using Google Map API, greatly enhancing the practicality and applicability of the system. The system flow is shown in Figure 3.

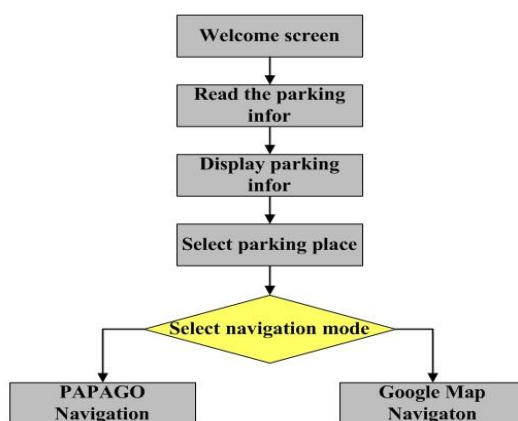


Fig. 3: GPS parking management system flow chart

Explanation of procedures:

- (A) Welcome page: introduces the steps to using the parking management system.
- (B) Obtain parking place information: the parking management system obtains information on the number of available parking places in the restaurant parking lot and the reserved parking lot.
- (C) Display parking place information: the system lists information on all available parking spaces. If parking spaces are no longer available in the restaurant parking lot and reserved parking lot, the system lists information regarding all parking lots in the vicinity.
- (D) Select parking location: when the user selects a restaurant parking space or reserved parking space, the system automatically reserves the parking space for two hours.
- (E) Select navigation model: the system provides two navigation models for user selection:
- (F) The PAPAGO navigation system, through PAPAGO SDK, outputs parking information to PAPAGO. Users can locate specific parking spaces with the guidance of PAPAGO.
- (G) The Google map navigation system uses the Google Map API-simulated navigation map to direct users to specific parking spaces.

The system architecture diagram is shown in Figure 4.

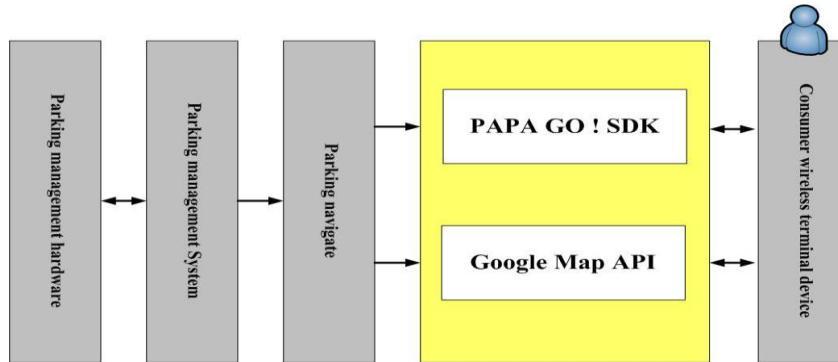


Fig. 4: GPS parking management system architecture diagram

IV. RESULT

Selected web pages from the reception venue decoration system, menu layout system, and parking navigation/management system developed by this study using the aforementioned methods are shown in Figures 5-8:



Fig. 5: Result of reception venue decoration system

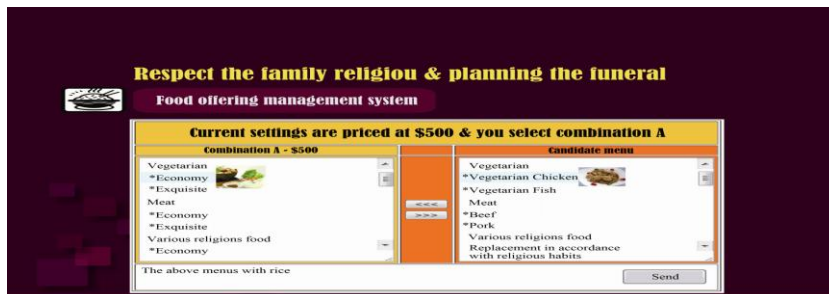


Fig. 6: Result of menu layout system



Fig. 7: GPS parking navigation selection

User can choose their own GPS navigation system to use.

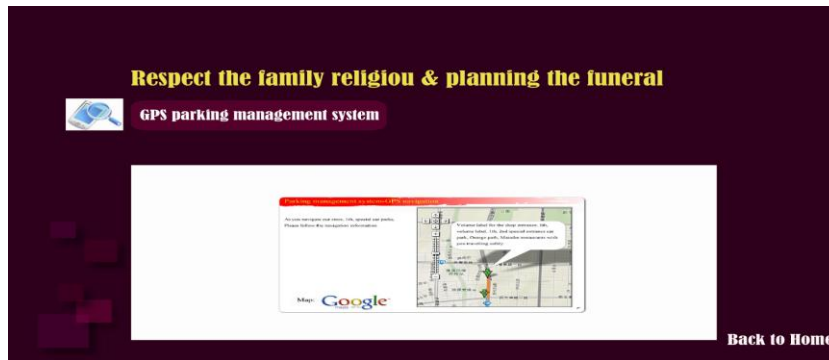


Fig. 8: Navigation system features map

The benefit of the research includes:

- A. Elevate the image of traditional memorial and memorial service provider. Constructing an efficient memorial service planning system.
- B. Create an analytic for memorial and memorial service provider. The analytic focuses on business environment, business strategy, human resource education, business management, management strategy, etc.
- C. Information on memorial service is presented in 3D image. The website should have short responding time and record viewer's experience and customer demand in database.
- D. The digitalization and data consolidation of memorial service venue design system, food offering management system, and GPS parking and management system.
- E. Customers are able to design the venue and decorations through the system. This will increase the efficiency in the design construction.
- F. Through the system, customers are able to know immediately if the venue planning and the design are under the budget. Any changes can be applied instantly.
- G. Customers are fully notified of the process involved in the memorial service through the system.
- H. The system allows customer to modify requests whenever it's needed, thus enjoying the convenience.

The system can indicate parking space openings that are both within the venue and at the surrounding parking lots. This allows user to find a parking space in the shortest time possible.

V. CONCLUSION

The key feature of service-Oriented architecture (SOA) is its interoperability among applications on different platforms. It offers clear definition on the service it provides, features on well-rounded functionality, operates independently and doesn't rely on other services. These points allow the system that's developed above it to be stable in performance. The service reusability is increased, thus achieves cost-effectiveness. Based on these points, the research consolidates the three heterogeneous service systems, which are the memorial service venue design system, the food offering management system, and the GPS parking and management system, into the memorial service planning system. Service providers are able to use this system to understand current business development, become alerted on challenges from competitors, and understand the needs of customers. Ultimately, the system could assist with business strategy planning.

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