A Novel Framework for Automated Travelling Management System Using Spring MVC

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Abstract: Nowadays, as most of the people travel frequently due to their livelihood and for the business purpose. But an efficient travel planning is a very tedious task and consumes more energy and time of the consumer. In some cases, it takes a whole day to plan. So in this era of a busy schedule, a person can't spend time on this annoying task. Therefore a user-friendly web-based travel management system is proposed which not only saves time but energy also. Elderly people often feel uncomfortable using web-based applications. Keeping in mind this difficulty, this proposed system is made very simple to use by utilizing the Model-View-Controller (MVC) framework. This proposed system not only facilitates the user to book a travel ticket of their time flexibility and in a specific route with the option to choose the driver having good feedback from the previous customer. In the proposed system, the administrator can have better control over the driver and the rout selection of the consumer.

Index Terms **- MVC, Spring Architecture, Travel Management System, Ticket Reservation System, Automated Travelling System.**

I. INTRODUCTION

In the recent days, travelling is the most common thing that a person has to do for his economic growth and social interaction with the world. But to plan a effective travel I with a less expertise and within a limited time is a very annoying job. Now day's different agencies are providing different predefined travel plan to the customers which cannot be fit for all type of the customer.

To address this issue a customized itinerary has been proposed by the authors in [1, 2]. As a customized itineraries are found to be too costly and time consuming when considering all possible search space, some researcher has reduced their search space to only some POIs (point of Interest) [1, 2]. When a customer plans to travel, then he/she has to go to the travel agency and has to choose a predefined package. But the main drawback of choosing a travel package is that it doesn't contain individual customer's requirement. While planning a travel, the customer has to reserve ticket for to and fro journey along with the reservation of hotel and local taxi or auto rickshaw reservation which involves great brain storming and manual work. Here the manual work involves standing in queue for hours. But for an elderly people, it isn't possible to do so. In order to avoid these problems, an interactive travel management system is highly necessary.

A travel management system, like Digital HRMS, Zoho and Beehive HRMS, helps travel managers book, track, and analyze business travel. Sometimes a traveler often depends on a travel agent or agency as their expertise in the field of travel is more systematic and affordable for a customer. The travel agent has a better picture of the travel plan which they can reflect on an electronic media or through a website. The customer amy visits their websites and can gather information which helps them to plan their travel in a better way. This practice can save the customer's lots of manual work and money as well [3, 4]. But this abundance of travel information can lead the customer to be more confusing and they will spend lots of time in searching and surfing in the web for a complex travel plan [5]. In order to resolve this issue, some research recommends a new approach named as travel recommendation system (e.g. www.expedia.com). But this approach is just a re- placement of traditional system without word of mouth communication [4].

The travel agents or agency are expert in their field but they can't fulfill all the requirements of every individual customer. As different customer has different POIs, the travel agency can't cover all the POIs in a single package. As some POIs may miss in a package. In order to include those POIs in travel plan the customer has to pay more. It is not possible for a travel agency to include all possible itineraries to include in the plan. The POIs like selecting hotel, pick point of the local travel, local visiting points are different from customer to customer. So the travel management system has to be customized itineraries services for the customer which include interested POIs along with specific time and travel budget.

In some cases, it has been observed that the customer chooses multiple day travel plan. The multiple day travel plan is quite different from single day travel plan. The itineraries for a single day can't fit for a multiple day travel plan. So the single day itineraries can't be added up to built a multiple day itineraries as a POI can appear only once in a itinerary. In order to solve this issue, POIs can be group together by using the geolocations or the rank based grouping of POI can be done depending upon its importance and priority with in an itinerary.

In most of the times, the agents urges for a specific POIs. The travel agent always wants to deliver a travel plan with high priority POIs. But for a customer who has visited that place many times mayn't be interested in that travel plan. So when a customer urges for a personal travel plan with specific POIs, the agent unable to give him service or charge him more money.

II. RELATED WORK

The travelling industry which includes the traveling agency along with agents, the users and the interface both the online and offline witnesses a transformation on it due to the technical intervention. The technology changes to the industry which intensifies the competition among each travelling agency. As a result the agencies are offering different travel products and services. But even after all these technological intervention, the end user still faces some difficulties to get the required information. In order to address this issue, some researcher has proposed travel recommendation system, which will give information about the product and services offered by agencies as per the customer's requirement. A travel recommendation system based on the users POI

preferences by utilizing Basian Network and AHP method to rank attention of the visitor is presented by Huang et al. [6]. Some other researchers have proposed the travel recommendation system for personalized hotels [7], flight [8] and travel pack- ages [9].

Some authors in their research propose a real time taxi dispatch system implemented in Singapore by monitoring the real time traffic scenario. By utilizing these services, the customer will get the cab in less time [10, 11]. An investigation was carried out on the travel behavior of urban population to characterize it [12]. Some studies are also revealed the concept of team formation of customer by multi agent collaboration [13]. A public transportation ticketing system implemented on a vending machine is discussed by Caul field et al. which reveals that the overall travel expense, rout preferred to travel and the time factor is the major parameter for a customer to plan a travel. Some researcher presented a RFID or NFC based public ticketing system to enhance the transport system [15, 16, and 17]. Therefore up to the present study, none of the travelling management system is not fully automated and up to the mark of customer satisfaction. Some of the researchers are addressed about an advanced conveyance ticketing systems. Some of the travelling systems are employed with active RFID to commence and decommence from the journey are implemented in Easy Ride by Swiss Federal Railways Association [18], ComfoAccess from Trapeze in Leipzig, Germany [19], etc

III. METHODS & MATERIALS

MVC

In 1970, T. Reenskaug developed the Model View Controller pattern. The main tree components of MVC architecture is Control, Model and View as shown in fig. 1. All the three components can act independently. Storing and retrieving the data of specified application is controlled by the Model whereas View is used to represent the user response visually. The core part acting in between of the model and view is the controller [20]. It simplifies the user requests & informs view and model to make changes accordingly.

Benefits of MVC Architecture

1. Separation of Concerns: The MVC components are made generalized to improve the reusability of business logic.
2. Focus & Specialization of the developer: The design can be developed by the design engineer without concern about the user interface. Hence the model can also be developed by the information administrator.
3. Simultaneous development of tasks: As all the components are developed in parallel which facilitates better time management and ease of interdependency.

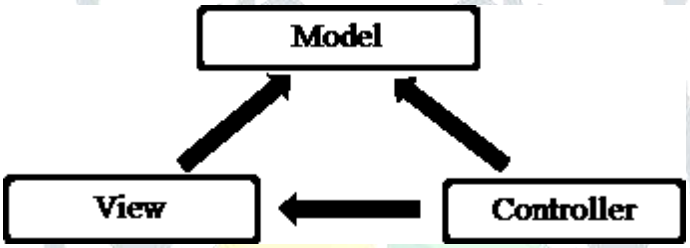

Fig. 1 MVC Design Pattern.

Spring

In 2003 Rod Johnson developed an open source Java framework known as Spring MVC framework which was released by Apache Foundation. In this modern era we had moved beyond XML due to its outdated configuration. To develop any java based application, spring framework features can be used, but there are extensions for developing web based applications. To make the use of J2EE development easier, spring framework plays a vital role. Spring is very small in size. It is a very lightweight framework which is around 2MB in size. Around the world many developers uses this framework to develop high performing, testing is easy and rewritable code. Spring increasingly incorporates some really advanced software techniques, such as Aspect Oriented Programming (AOP), Plain Old Java Object (POJO) etc. Due to its light- weight framework, it allows the developers of Java to make simple, reliable, & scalable applications. It makes easier development as compared to classic Java frameworks & Application Programming Interfaces (APIs), i.e. JavaServer Pages (JSP), Java Servlet etc.

IV. Proposed System

Automation Travel Agency (ATA) may be a secured website application dedicated to assist the purchasers to book the vehicles without tons of hustle. Admin can access, add and retrieve the info from the system which makes the booking workflow smooth. Various data by the admin like adding vehicles, drivers are often added and updated if required. An implicit database stores all the knowledge which helps in faster access and straightforward management of the system.

ATA provides vehicle booking facilities to users (Customers) alongside the choice of route selection across many cities. Customers can reserve the vehicles and also man- age their reservations consistent with their conventions. For admin, well the specifications are that he/she are going to be ready to add the small print of the driving force, vehicle and route. This overall gives each side of the users a reliable and memorable undergo of the web site. In the current scenario, a customer has got to visit different agencies to seek out the small print of places and book the tickets. This whole procedure often requires tons of your time and energy. A customer might not get the specified information from these offices and that they could also be misguided. It's tedious for a customer to plan for a specific journey and have it executed properly.

In a traditional way, when a person plans for a travel, he/she generally visits the traveling agency or meets a travel agent who has previous expertise on the place of visit. But sometimes even with a good expertise, one can't fulfill all the requirement of the traveler. To collect and plan a travel without prior knowledge about the destination is very mind storming job and tedious also. So some web based solutions are offered by the travel agencies. But they failed to fulfill the customer's POI in the following way.

1. The current system is extremely complex with tons of services that affect the user experience.
2. The current system features a complex UI with tons of options that's not the simplest in terms of user experience.

3. Elderly people find it very confusing to use the interface that's used on these apps hence we offer the only and clean user experience.

The main advantage of our website over the opposite systems is that it's cost effective and efficient. People can sit at their resting place and be ready to book consistent with their respect requirements.

1. Unlike other application it doesn't have a posh UI with tons within the plate rather offer an easy UI for the user to possess easy and best experience.
2. This web app is merely specific for selected and daily use transport vehicle and native preference is taken into consideration.
3. Booking a journey is simplest in terms of user experience.

The proposed system is coded by using spring MVC for server side which acts as a backend platform. In this proposed traveling system the Angular JS is act as frontend design i.e. web based user interface. Spring MVC is basically a part of a spring server which handles the server side coding. The methods in the proposed system are Register, Login, Authenticate, view route details, book vehicle, cancel booking and view the booking details. The work flow of the proposed system is as follows and is shown in fig. 2 and fig. 3. Users have to first register by filling all his/her details. Then he/she has to select the route want to travel. There is an option to check the booking details after booking has been done. Here the user can select available driver in that rout based on the feedback given by the previous customer who has been travelled in that location. Generally the feedback is collected after the journey has been completed with a code which is automatically sent to the corresponding customer's portal. After selecting the vehicles payments can be done. The user can able to download or view the booking details. After printing the receipt he/she can travel. Fig. 4 shows the process flow diagram of the proposed sys- tem. The case diagram for administrator and user is shown in fig. 5 and fig. 6 respectively.

Fig. 2 Sequence flow diagram of the user in proposed system

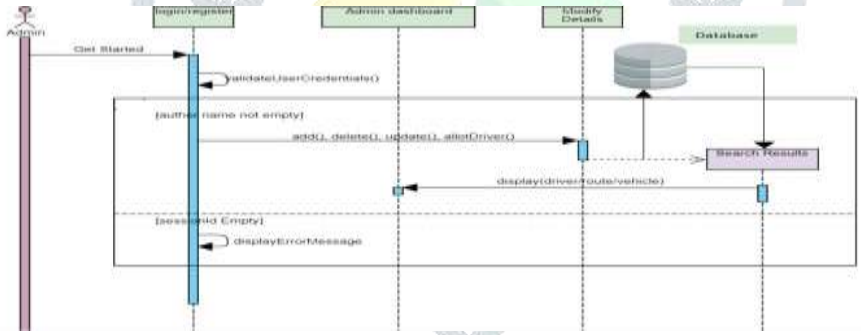

Fig. 3 Sequence flow diagram of the administrator in proposed system

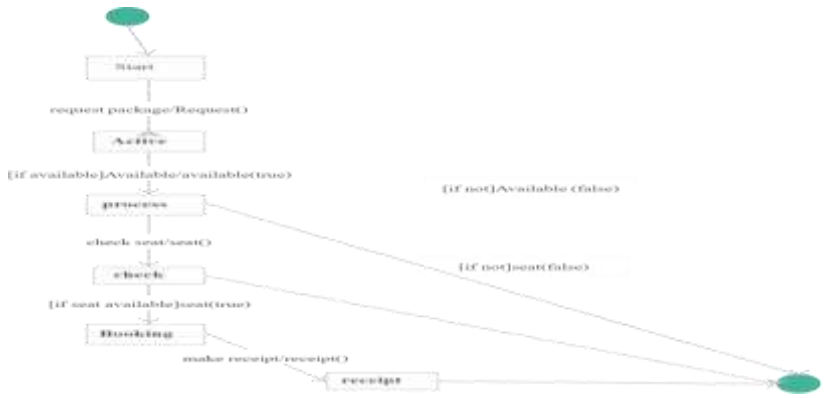

Fig. 4 Process flow diagram in proposed system

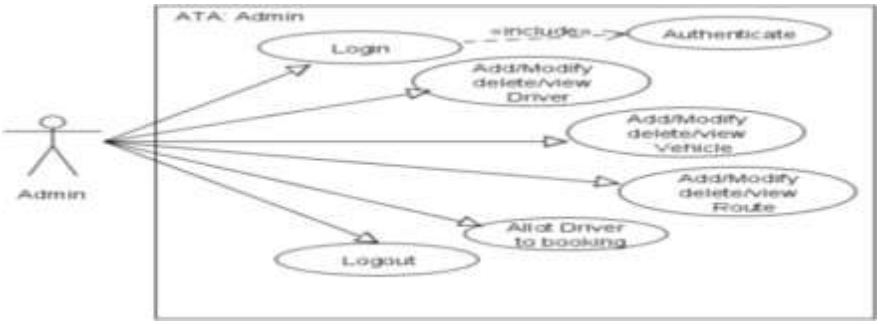

Fig. 5 Administrator Case diagram in proposed system

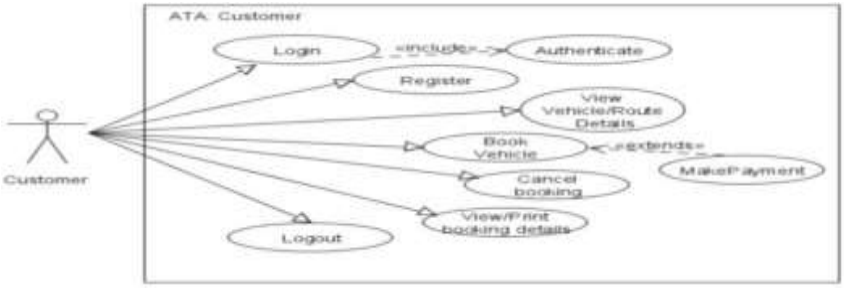

Fig. 6 User Case diagram in proposed system

Algorithm:

1. On clicking on GET STARTED in the web portal, an option will be highlighted to login whether as a User or Admin as shown in fig. 7.
2. If we are already having the account registered, then we don't have to signup
3. If not then we have to signup first.

For Admin:

1. For admin, a person has to enter a basic information details and then he/she can signup as shown in fig. 8.
2. The admin can manage all the route, driver, vehicle details etc.
3. The admin can delete, add or modify the driver as well as the vehicle in between the travel also as per the requirement.
4. Can logout or go back to home whenever required

For Users:

1. Customers can sign up by entering a lot of information like name, street, locality etc as shown in fig. 9.
2. After doing so, he/she can login and get the booking as per requirement
3. The customer has to enter the booking dates and then the source and the destination.
4. The customer can select the driver based on the previous feedback.
5. Can logout or go back to home whenever required.
6. The customer can give feedback on the journey and about the driver after completion of journey in their web portal.

User-Interface (UI)

Fig. 7 Registration page of Automated Travel Agency

Fig. 8 Admin Sign in User interface of Automated Travel Agency

Fig. 9 User registration page of Automated Travel Agency

V. CONCLUSION & FUTUREWORK

The proposed automated travelling management system provides the user a better experience of journey to choose the rout as well as the driver of their choice. The spring along with the MVC architecture facilitates a user friendly and hassle free web based environment to book their ticket. The online feedback system will enhance the productivity and the accountability of the driver as well as the administrator. In the future the present work can be extended by utilizing the GPS based tracking of the vehicle in the web portal of the administrator and the user.

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REFERENCES

[1]. S. Dunstall, M.E. Horn, P. Kilby, M. Krishnamoorthy, B. Owens, D. Sier, and S. Thiebaux, "An Automated Itinerary Planning System for Holiday Travel," Information Technology and Tourism, vol. 6, no. 3, pp. 195-210, 2004.

[2]. S.B. Roy, G. Das, S. Amer-Yahia, and C. Yu, "Interactive Itinerary Planning," Proc. IEEE 27th Int'l Conf. Data Eng. (ICDE), pp. 15-26, 2011.

[3]. Litvin, S. W., Goldsmith, R., & Pan, B. (2008). Electronic word-of-mouth in hospitality and tourism management. Tourism Management, 29(3), 458-468.

[4]. Rabanser, U., & Ricci, F. (2005). Recommendation systems: do they have a viable business model in etourism. In Conference of the International Federation for IT & Travel and Tourism. 160-171.

[5]. Liu, Q., Ge, Y., Li, Z., Chen, E., & Xiong, H. (2011), Personalized travel package recommendation. In 2011 11th IEEE International Conference on Data Mining. 407-416.

[6]. Huang, Y., & Bian, L. (2009). A Bayesian network and analytic hierarchy process based personalized recommendations for tourist attractions over the internet. Expert Systems with Applications, 36(1), 933-943.

[7]. Schiaffino, S., & Amandi, A. (2009). Building an expert travel agent as a software agent. Expert Systems with Applications, 36(2), 1291-1299.

[8]. Coyle, L., & Cunningham, P. (2003). Exploiting reranking information in a case-based personal travel assistant. In Proceedings of the 5th International Conference on Case-based Reasoning.

[9]. Lorenzi, F., Bazzan, A.L.C., & Abel, M. (2007). Truth maintenance task negotiation in multi agent recommender system for tourism. In Proceedings of the AAAI Workshop on Intelligent Techniques for Web Personalization and Recommender Systems in Ecommerce (AAAI 2007). 122-125.

[10]. Z. Liao, "Real-time taxi dispatching using global positioning systems". Communications of the ACM, 46(5), 81-83, 2003.

[11]. D. H. Lee, H. Wang, R. Cheu, & S. Teo, "Taxi dispatch system based on current demands and real-time traffic conditions. Transportation Research Record: Journal of the Transpor- tation Research Board, (1882), pp. 193-200, 2004.

[12]. C. Wang, W. K. Ng, & H. Chen., "From data to knowledge to action: A taxi business intel- ligence system". In 15th International Conference on Information Fusion (FUSION), pp. 1623-1628, July 2012.

[13]. K. T. Seow, N. H. Dang, & D. H. Lee, "A collaborative multiagent taxi-dispatch system". IEEE Transactions on Automation Science and Engineering, 7(3), pp. 607-616, 2010.

[14]. B. Caulfield and M. O'Mahony, "Passenger requirements of a public transport ticketing system," in Intelligent Transportation Systems, 2005. Proceedings. 2005 IEEE, Sept 2005, pp. 119–124.

[15]. P. T. Blythe, "Improving public transport ticketing through smart cards," Proceedings of the ICE-Municipal Engineer, vol. 157, no. 1, pp. 47–54, 2004.

[16]. N. Mallat, M. Rossi, V. K. Tuunainen, and A. Öörni, "An empirical investigation of mo- bile ticketing service adoption in public transportation," Personal and Ubiquitous Compu- ting, vol. 12, no. 1, pp. 57–65, 2008.

[17]. Ferreira, M. C., Dias, T. G., & e Cunha, J. F. Anda: An Innovative Micro-Location Mobile Ticketing Solution Based on NFC and BLE Technologies. IEEE Transactions on Intelli- gent Transportation Systems, 2021.

[18]. T. Gyger and O. Desjeux, "Easyride: active transponders for a fare collection system," Mi- cro, IEEE, vol. 21, no. 6, pp. 36–42, 2001.

[19]. R. Zeller, "Trapeze renews lio operations control system in leipzig," Trapeze Computing Magazine, pp. 1–4, 2013.

[20]. Diana M. Selfa; Maya Carrillo; Ma. del Rocío Boone, "A Database and Web Application Based on MVC Architecture", Proceedings of the 16th IEEE International Conference on Electronics, Communications and Computers (CONIELECOMP), 2006.