Vehicle Insurance Policy System through UML

Vipin Saxena, Deepa Raj, and Vishal Verma

***Abstract*—Unified Modeling Language known as UML is widely accepted around the globe as an object oriented modeling language which is used to construct the software designs. It is independent to the object-oriented programming languages and designed UML models can be easily implemented by any object-oriented programming language. In the present paper, UML model is proposed for the Vehicle Insurance Policy System (VIPS). A real case study of BAJAJ Company of India is considered and proposed model is applicable for all the types of the vehicles available in the world. UML class, sequence and activity diagrams are designed and the model has also been validated by performing several queries on the designed sample database.**

***Index Terms*—UML, class, sequence, activity, query**

I. Introduction

Unified Modeling Language (UML) is a well known recognized, powerful and leading diagrammatic modeling language which is used to model the software research problems. It is a very popular for analysis of the research problems and easily compatible to the object oriented programming language. Nowadays, UML becomes a standard modeling language for the Software Industries which is used by the various software designers. Modeling plays an important role for any system and contributes the understanding of the source inputs and outputs but from the literature it is observed that UML is not much used for the object-oriented databases. Let us first describe some of the important references related to the UML. Booch et al. [1-3] described the important diagrams of the UML which are widely used for the development of the software designs. After the development of the UML, Agrawal et al. [4] first time applied UML for the multidimensional large database and used the concept of UML aggregation. With the help of UML they described the theoretical approach of the data cubes. In 1998, Paulo and Norman [5] designed a User Interface (UI) through UML. The strength and weaknesses of the UI are also explained in the paper. OMG is an active group released various versions of UML and these are listed in [6-8]. Lopez-Sanz et al. [9] explained modeling of various service-oriented architectures with UML. They study the architectural properties of the SOA paradigm and on the basis of this; developed the MDA approach for abstraction. Saxena et al. [10-12] has also applied the UML in the field of computer architecture, dataware housing; proposed a protocol for mutual exclusion for the distributed operating system; also proposed UML modeling and protection of domain based system and developed the data cubes for the domain of credit card system which consists of large amount of database. Due to rapid increase of database, the structured design methodology has been failed and software professionals are converting all those old designs into the object-oriented designs. Therefore, the present work is an attempt to model Vehicle Insurance Policy System (VIPS) which is applicable for all the types of the vehicles available in the world. In the model, Unified Modeling Language is used to construct the object-oriented database. UML class, sequence and activity diagrams are also designed and validated through several queries.

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II. UML Class Diagram

UML class diagram shows the static representation of the research problem which combines the object oriented databases and the operations applied on the databases. In this present work, a case study of Vehicle Insurance Policy System is considered and real manual database has been collected from the Uttar Pradesh region of India and observed that for large amount of old databases; it is very difficult the keep the old data in safe custody. Therefore, authors proposed a UML class model as shown in the Fig. 1.

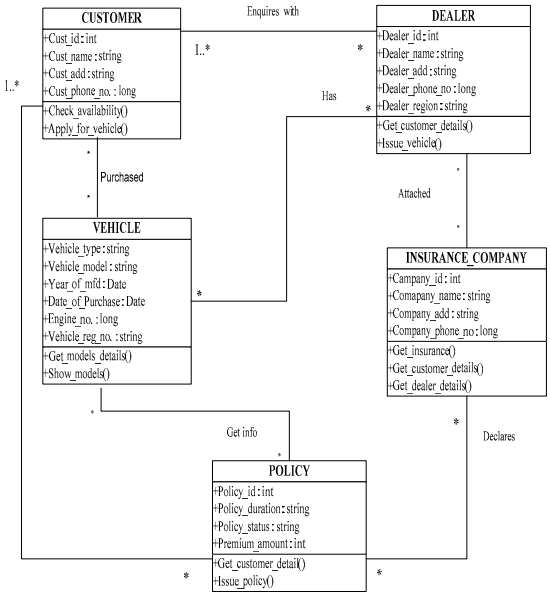

Fig. 1. UML class diagram for VIPS.

VIPS contains five major classes along with attributes as shown above. In the above model, CUSTOMER class associates with DEALER class and this is designed for Customer who goes to dealer (showroom) for purchasing of the vehicle. Before this, first customer takes the enquiry about vehicle model and selects the model. After purchasing

the vehicle then dealer sends the paper of vehicle to insurance company for insurance of the vehicle. Insurance company takes the necessary information and documents of the customer. This is handled by INSURANCE_COMPANY class and after verification finally company provides the policy to the customer. This system is reliable and flexible for customer. Let us implement the above class model on a Vehicle_type considered as a Motorbike. The Table I consists of sample database of various kinds of bike models with date of purchase and policy number. The attributes are taken as Policy-id, Date_of_Purchase and Bike_Model.

TABLE I: A SAMPLE DATABASE OF MOTORBIKE MODELS

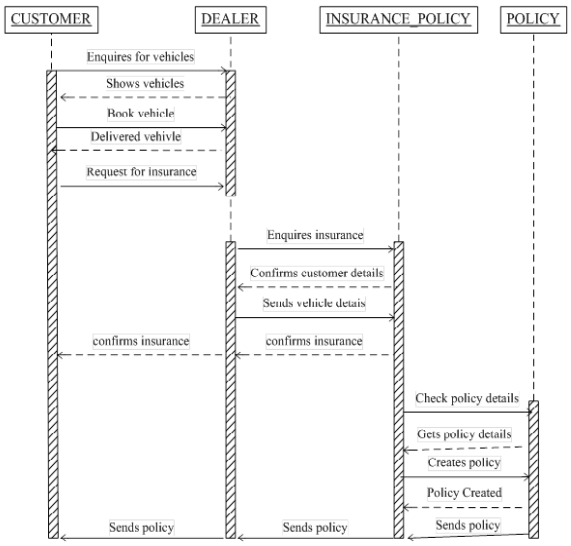

Fig. 2. UML sequence diagram for VIPS.

III. UML SEQUENCE DIAGRAM

A sequence diagram shows the life span of the object during execution of the system. For VIPS a UML sequence diagram is designed and depicted in Fig. 2 with major four objects. These objects are CUSTOMER, DEALER, COMPANY & POLICY. The communications of the information between two objects are represented by arrow with message at the top of the arrow. Customer takes the information about the motorbike from the dealer. Dealer shows the various kinds of model of motorbike and customer selects the model and paid the amount of motorbike to the dealer for purchasing the bike. Now customer requests for insurance of the motorbike to the dealer. Further in the next phase, dealer requests to company for insurance of the motorbike, then company takes the model details and other necessary documents related to the policy. After clarification, the company issues insurance policy to the customer. At the last company sends the policy to the customer.

IV. UML ACTIVITY DIAGRAM

The activities of VIPS system can also be represented by UML activity diagram which is given below in Fig. 3. This diagram shows the complete VIPS for outdoor customer of the showroom. Customer arrives to dealer showroom for purchase of the motorbike. Dealer entertains with customer and shows the various models of motorbike. If customer is interested; he/she will select the model and purchase the motorbike. Company takes the enquiry of the model & informs to the customer about the type of policy. All these are represented by the various activities as shown in the figure

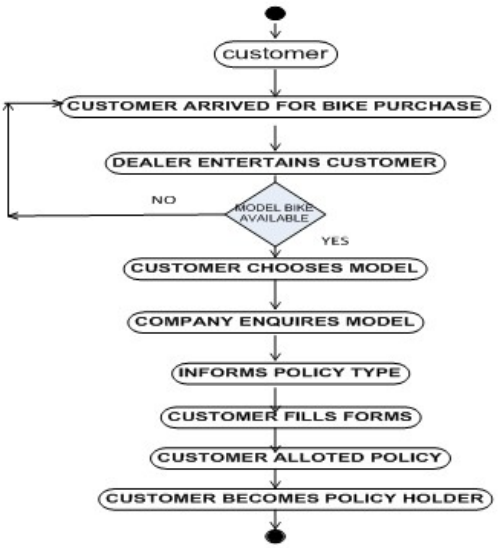

Fig. 3. UML activity diagram for VIPS.

V. VALIDATION OF MODEL

Sample queries have also been performed to extract the right information from the above designed UML class model and some of the queries are given below:

Sample Query I

```
insert into table1 values(33468522,'03/18/2010','DISCOVER');
select * from table1 where policy_id=33468523;
```

The output of the above query is shown below:

33468523 2010-03-18 PLATINA

Sample Query II

```
select data_of_purchase from table1 where policy_id=33468523;
```

The output of the above query is shown below:

data_of_purchase 2010-03-18

VI. Concluding Remarks

From the above work, it's concluded that UML is a modeling language for construction of the object-oriented models as depicted above for a case study of Vehicle Insurance Policy System. The designed system is flexible, reliable and reusability properties and one can develop object-oriented software for the said system. The above work can be extended in the field of data mining where large amount of database of various kinds of vehicles are available on the system.

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