Auto insurance claims chatbot

1.Overview

Compared with staff service, chatbot has many advantages such as 24/7/365 uninterrupted service, fast response speed and is directly applied to social media sites or apps. At the same time, it will also create a "young, technological sense" image for the company, which is closer to the preferences of young people. Therefore, more and more insurance companies regard it as an important part of user services, especially in the auto insurance claims service. On the one hand, the auto insurance claims process is a fixed and standardized process. Also, more attention is paid to the efficiency of handling claims events, saving customers waiting time. On the other hand, chatbot is very suitable for repetitive work with a high degree of mechanization. It helps companies liberate human resources from repetitive work and invest them in flexible and innovative jobs that require manual processing.

2 Hong Kong Prudential Insurance claims chatbot

2.1 Current Status

In June 2018, Prudential Insurance Company of Hong Kong launched two digital solutions, "Hospital to Prudential" (H2P) medical insurance claim service and Chatbot claim service. Specifically, through cooperation with hospitals, H2P automatically obtains and submits users' medical insurance claims-related electronic files, which simplifies the claims process and file submission processing speed to the greatest extent. The Chatbot claim service serves financial advisors rather than customers. In other words, financial consultants upload documents and electronic materials required for claims through chatbot chat function to shorten the time for submitting documents. After investigation, submitting documents through the chatbot claims platform, the submission time can be controlled within 3 minutes (a 75% reduction).

At present, in order to help customers check their physical health at home during the new coronary pneumonia and reduce the possibility of infection in the hospital, Prudential extends the scope of chatbot's services to customer health consultation and evaluation. Through the Pulse one-stop health application, chatbot will collect user body data in interactive chats, use

artificial intelligence algorithms to analyze the current health information and the possibility of illnesses of customers, and propose relevant health recommendations; analyze the existing health of customers Symptoms, determine the condition, and make recommendations for medical treatment or drug treatment; according to the location of the customer, recommend the nearby hospital and display the waiting time of the emergency room, so that users can go to the hospital for treatment.

2.2 Potential problems

However, at present, Chatbot of Hong Kong Prudential Insurance Company does not provide claim services to users for auto insurance. In addition, generally, Prudential Hong Kong's chatbot is used as an assistant to financial consultants in order to assist financial consultants to understand the customer's insurance policy and help financial consultants submit information, rather than tracking customer usage like Spixii and lemon's chatbot solutions which provide customers with answer servieces and information submission services. Although, during the epidemic, Prudential extended the service scope of chatbot to customers, it does not mean that Prudential's chatbot will continue to provide services to customers after the epidemic.

3 Auto insurance chatbot design

3.1 chatbot function module and UI

(1) User login module

If the user enters "hi", chatbot will determine the user's name based on the customer's line ID and automatically reply the corresponding greeting. Then, chatbot sends the terms of service to the customer to read and determine whether the customer agrees to the terms. At this time, we use the form of picture + button to provide users with interactive options. Users can click the "Terms of Service" or "Agree" button to automatically start the claims process without entering text. Of course, after proficiency, the user can directly replace the corresponding function by entering a keyword. Then, if the customer agrees to the terms, the customer is required to enter a valid insurance policy number. If the ticket number does not

match the database, chatbot will return an error prompt, prompting the user to re-enter the correct insurance ticket number. After completing user authentication, the next step is to determine the insurance budget type.

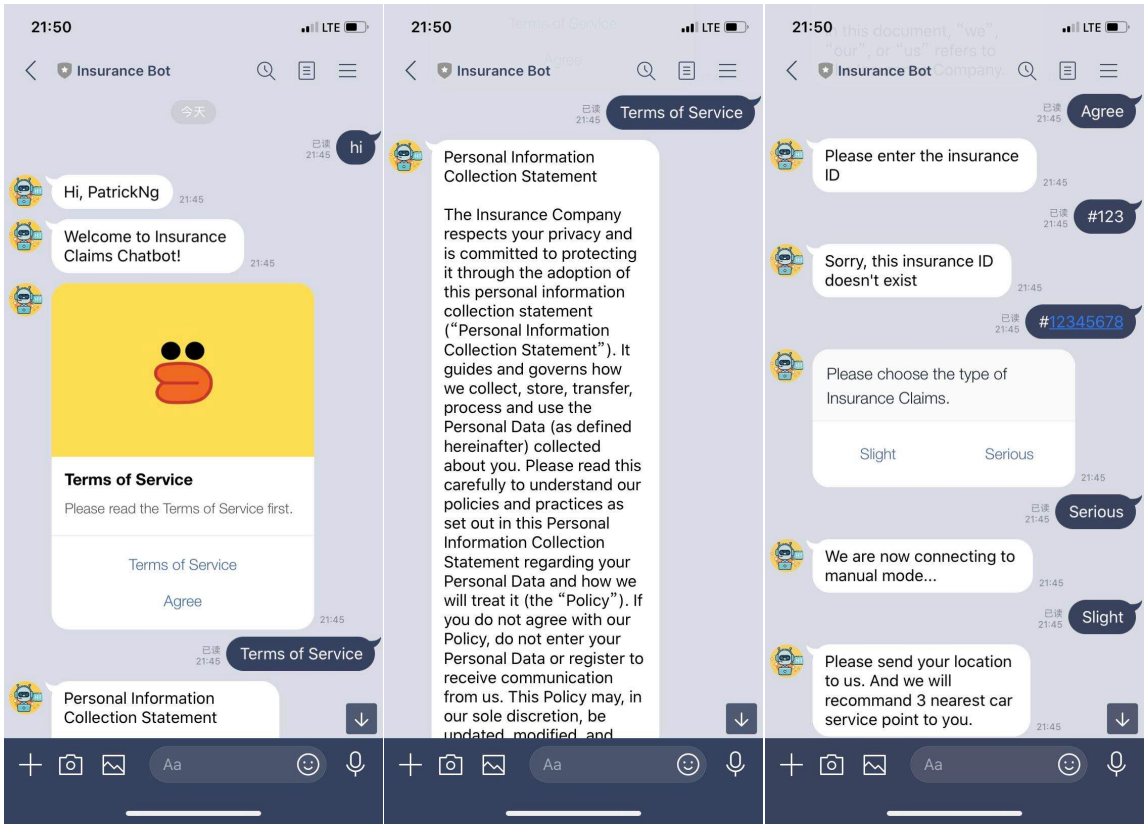

Figure 1 User login module

(2) Claim module

First of all, financial consultants explain to users the criteria for classifying accidents: distinguish between light and heavy accidents based on the number of casualties. If no one is injured, the user needs to select a light accident and use the map app to send the location. Chatbot will push the three car repair points and telephones closest to the accident location in the form of card-type information display according to the user's location. Customers can call the repair shop directly through the "call" button to reserve a repair time. Then, the user describes the detailed process of the accident and related information to Chatbot, such as photos about the damage to the vehicle and the repair price list. Chatbot will store pictures of related claims in the database. If there are casualties, Chatbot will automatically switch to manual customer service, requiring the customer service staff to take over complicated medical insurance claims.

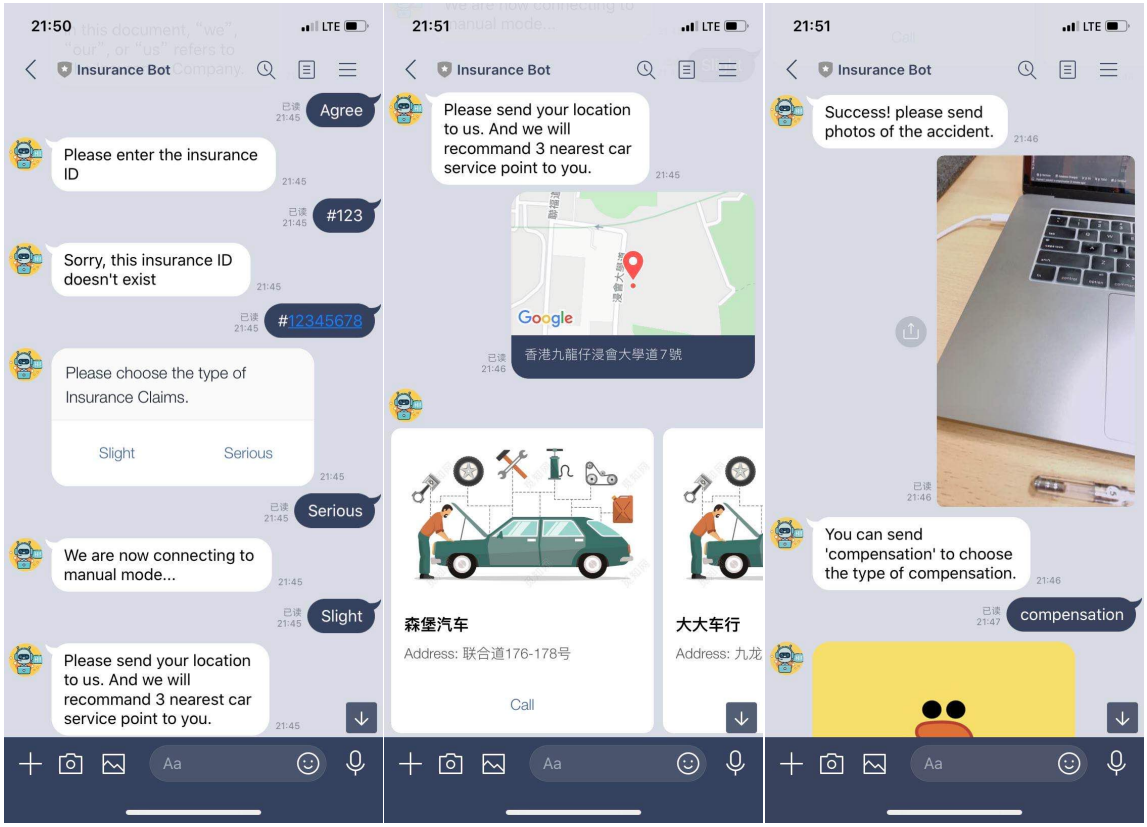

Figure 2 Claim module

(3) Compensation module

After the insurance claim operation is completed, Chatbot will return the claim record for inspection. The user can then enter the status by viewing the current claim receipt or scan the QR code to understand the progress of the claim application.

After the review is completed, the user needs to select the compensation method. The three methods are mailing checks, electronic checks and bank transfers.

a. Electronic check transactions: In this model, payer banks, payee banks and clearing centers all need to have electronic check processing equipment. The specific operation process is as follows: the insurance company generates an electronic check and sends it to the customer through the network.

b. The insurance company mails a check: "Commission", indicating unconditional payment, determining the amount, determining the name of the customer, determining the date of ticket issuance, and signing with the drawer.

c. Bank card to bank card: insurance company initiates transfer, identity verification, risk control before payment, limit verification, payment request, fast payment using bank card, get deduction results, get business results and bookkeeping.

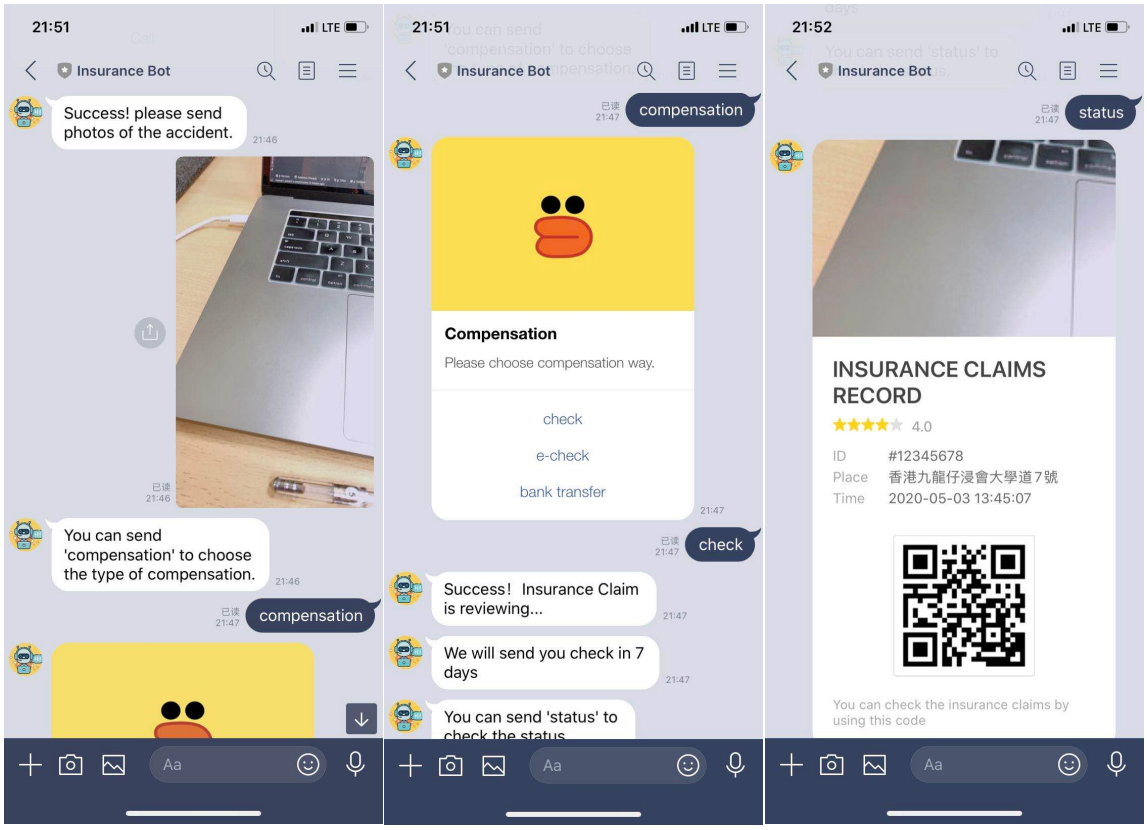

Figure 3 Compensation module

(4) Database module

We use a relational database to store user information through different data tables, so that managers can quickly retrieve relevant information through SQL language, improve retrieval efficiency, and reduce data redundancy. In addition, in the future, we will collect user and chatbot interactive content, use it as user interaction data in a large-scale corpus, and train chatbot to interact with users in a more humanized manner.

3.2 Swimming lane diagram

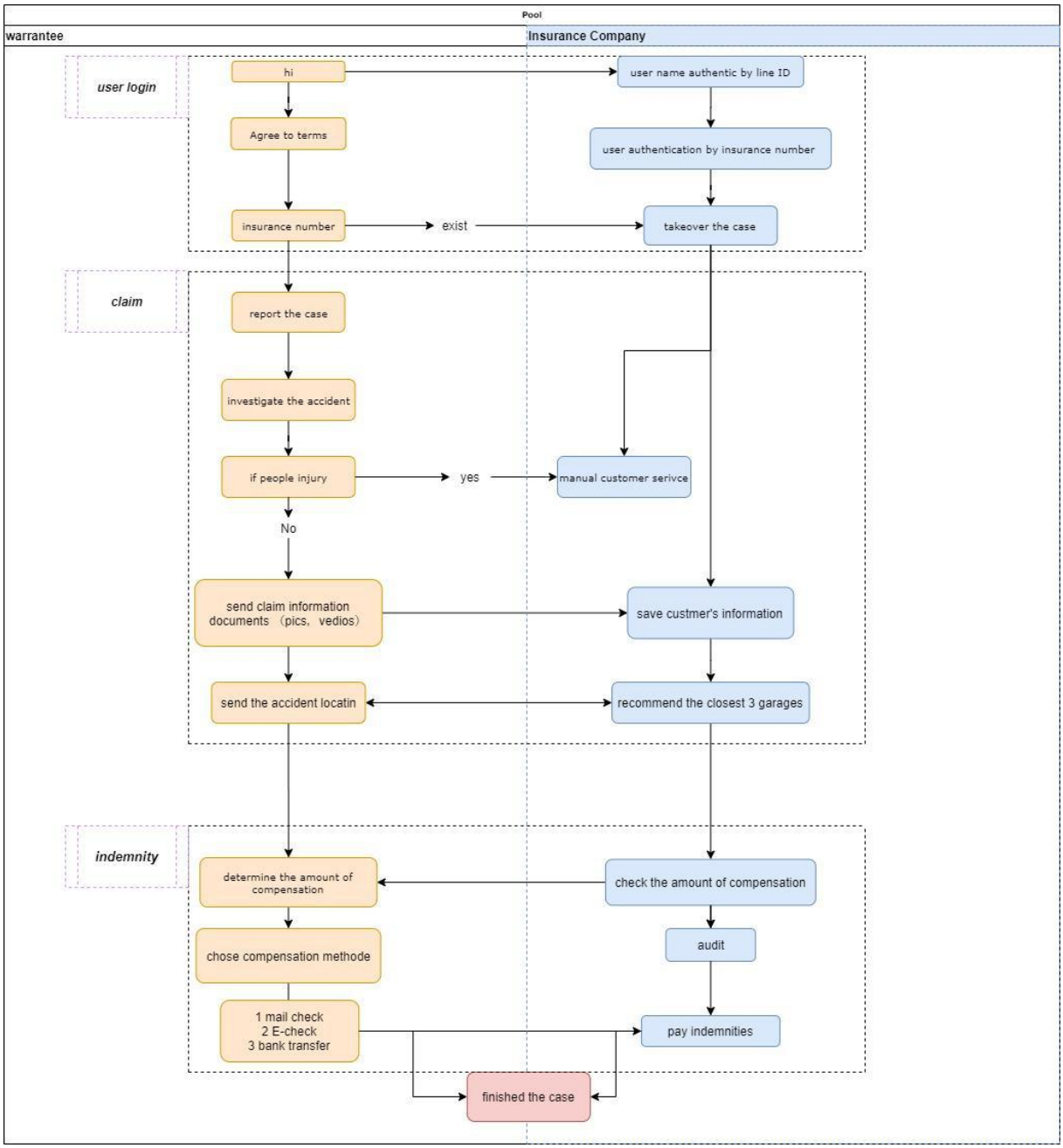

Figure 4 Swimming lane diagram

3.3 LINE chatbot system working mechanism

(1) The whole Line Bot system framework is made up of three parts:

a. Line Client, the terminal interface used by the users. Usually it can be a LINE Channel;

b. Line Server, it is used to receive the receive an interactive request from the Line Client;

c. Webhook Server, it is where the business logic, pass back component plan and the Line Bot SDK works.

Figure 5 Line Bot system framework

When Line Client receives a message from the user, it will pass it to Line Server who act like a translator. Then the server will send this request to Webhook Server, where we have deployed our code solutions already. After getting the results, the results will be passed back to client through the server again. Each passing represents a HTTPS protocol transmission (a HTTPS Request + a HTTPS Response).

Inside the Webhook Server, has deployed our code already. In order to enrich the query analysis ability and the decision making capability, some external service are necessary. Such as Google Dialogflow, Microsoft Azure Bot Service…

(2) The usage of external service: AMap API

There is a module/function call the “Recommend the 3 nearest car service points” in our chatbot design. Since this function needs getting user’s location then recommend the nearest car service points, we can call the Amap API to equip with that capability. It is an easy and efficient way to accomplish this module. And here are the main steps of calling the AMap API:

a. The first step is to apply for the "Web services API" Key.

b. The second step is to splice the HTTP request URL. The Key applied in the first step should be sent together as a required parameter.

c. The third step is to receive the data returned from the HTTP request (in JSON or XML format) and parse the data.

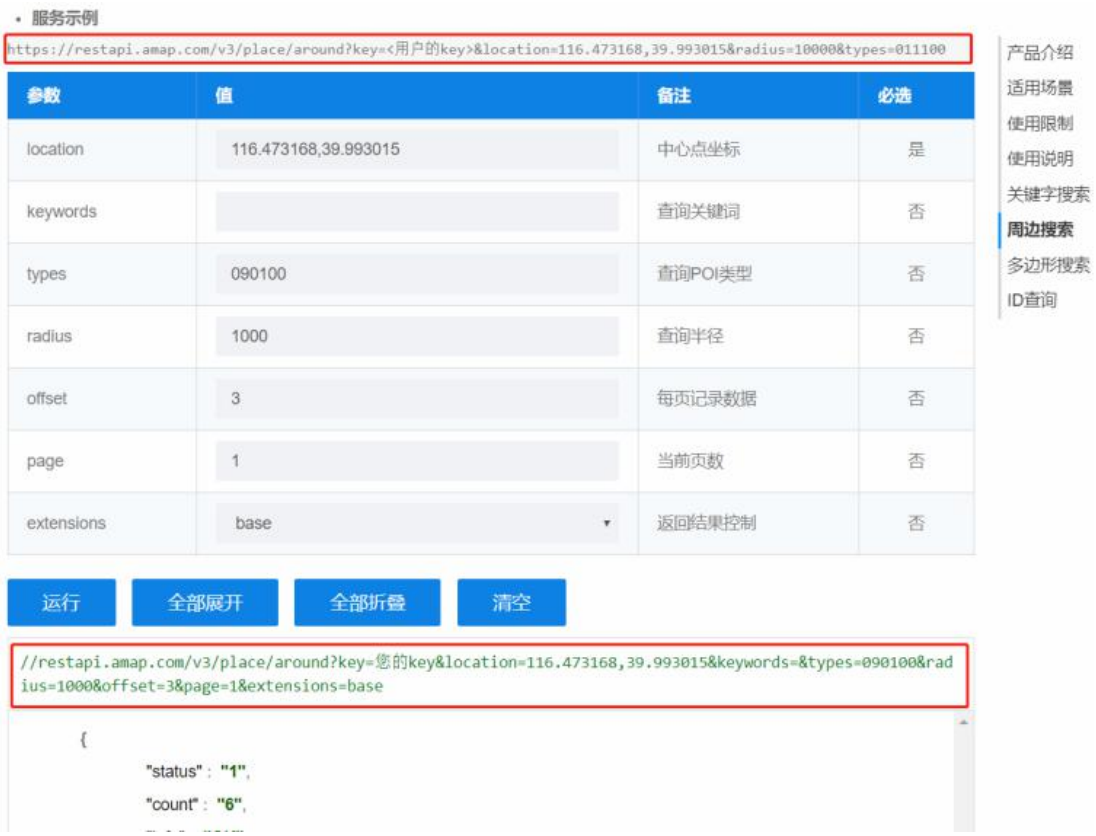

Figure 6 Sample code

4. Database Design

4.1 Database environment

(1) Database name: db_fintech

(2) Database management system: MySQL 8.0.19

4.2 Database convention

Name	Description
db_fintech	Insurance declaration chatbot database
tb_users	User information table
tb_insurance	Insurance information table
tb_records	Incident record table

Table 1 Database Description

(1) Database relationship table

1. Database relationship table

In the insurance claims chatbot database, we have three tables, tb_users, tb_insurance and tb_records. These tables record user data, insurance information and claims record information separately. For example, the tb_users mainly records user-related data, including user ID, user avatar URL and username. The tb_insurance is a table which record the user's purchase of insurance and user ID. Besides, the tb_record is a table that records the user's claims information through the insurance claims chatbot. The data includes the user's ID, Insurance ID, location of the incident, picture of the incident and the record time. According to the database relationship diagram below, we specify three relationships. These are user to insurance, insurance to record and user to record all belonging to one-to-many relationship. In addition, Tables are linked to each other by foreign keys, so we can inserts relevant data via SQL statements.

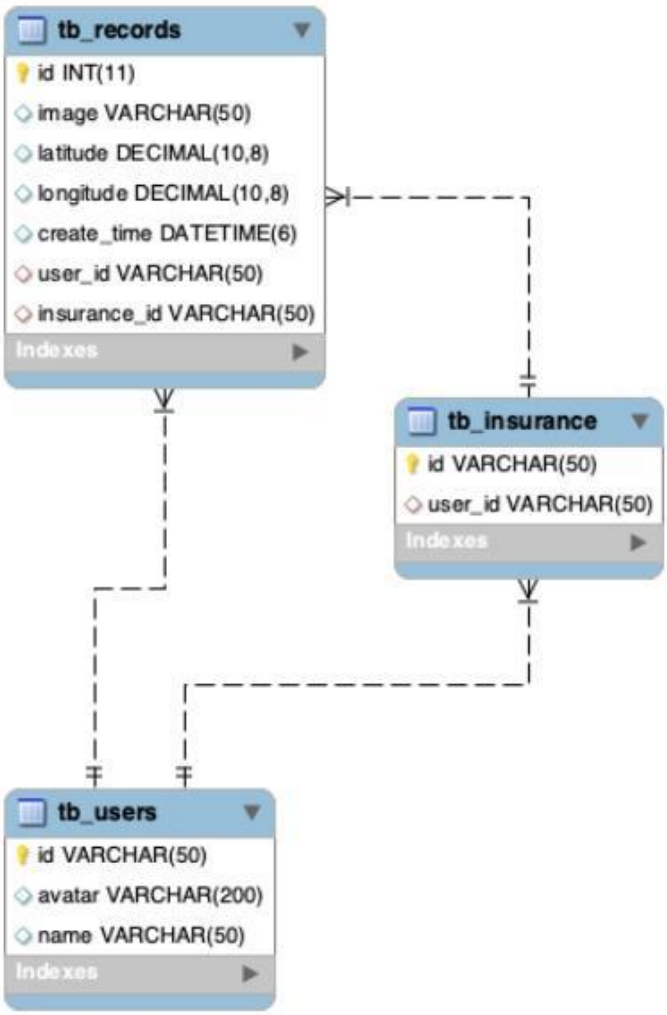

Figure 7 Database relationship table

(2) Table field description

Table name	User information table – tb_users					
Field Name	**Data Type**	**Length**	**Null**	**Constraints**	**Description**	**Notes**
id	varchar	50	No	Primary key, unique	User ID	
name	varchar	50	Yes		Username	
avatar	varchar	200	Yes		User avatar URL	

Table 2 User information table

Table name	Insurance information table – tb_insurance					
Field name	**Data type**	**Length**	**Null**	**Constraints**	**Description**	**Notes**
id	varchar	50	No	Primary key, unique	Insurance ID	
user_id	varchar	50	Yes	Foreign key	Username	

Table 3 User information table

Table name	Incident record table – tb_records					
Field name	**Data type**	**Length**	**Null**	**Constraints**	**Description**	**Notes**
id	int	11	No	Primary key, unique	Record ID	
image	varchar	50	Yes		Incident image	
latitude	decimal	10,8	Yes		Incident location latitude	
longitude	decimal	10,8	Yes		Incident location longitude	
create_ time	datatime	6	No		User upload incident time	
user_id	varchar	50	Yes	Foreign key	User ID	
insurance_id	varchar	50	Yes	Foreign key	Insurance ID	

Table 4 User information table

5 Job Division

Team member	Job
HE TIANXIN	1. Chatbot code : claims module 2. Document: system working mechanism
LEI CHUYUE	1. Chatbot code : compensation module 2. Document: Prudential insurance model information; function module
LIU GUANTING	1. Chatbot code : compensation module 2. Document: swim lane diagram function module
WU PEICONG	1. Chatbot code : user login and database 2. Document: database design description