Artificial Conversational Entity for Health Insurance Sector

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Abstract—Chatbots are computer programs that interact like humans using natural language, processing. A chatbot could answer a user in the same way that a human responds. Health insurance are types of insurance policies which cover the surgical and medical expenses of the policy holder. Health insurance policies are a good strategy to secure our health related issues. The policies will offer us with a certain amount of coverage depending upon our personal data. There are private and public health care existing in India. This work comprises of developing an artificial conversational entity for the health insurance sector in Indian scenario. There exists health insurance chatbots which are industry based. The insurer has to provide the medical risk factors to the chatbot. On the basis of the personal details of the insurer the chatbot will suggest the best insurance plans that can be given to that person. It helps in finding the best health insurance plans by evaluating the given past health insurance data. The data structure includes both the private and public health insurance schemes.

Keywords—chatbot, natural language processing, health insurance, risk factors.

I. INTRODUCTION

Health of a person is the complete mental, physical and social well-being. It is not merely the condition of absence of injury and illness of a person. Health insurances meant to be the type of insurances that covers the medical expenses. It helps the insurer to get the best treatment and medical care and also financial protection in need of emergency. Health insurance policy is similar to the other insurance policies were it is a contract between insurer and a policy holder. In a health insurance policy the insurer agrees to provide a specified health insurance cover which includes a premium subject to different terms and conditions. Health problems may arise due to our life style, job, food habits or it can be even hereditary or it can even be caused by accidents. The health problems or related expenses always struck the normal life of people. And it is hard to meet that unexpected expenses by the common people. This is the point where comes the importance of insurances. If the people have any health insurance covers that scheme will help them to meet the unexpected expenses. In this case of emergencies people could get that insurance benefits. Now a day there are a number of insurance policies available in the market. They are available as general insurances or private insurance schema and their facilities also include private and public health care sectors. One can take any insurance schema which will secure them and their family.

Chatbots are computer programmes that are used for communication. Chatbots are also known as talkbot, chatterbot, interactive agent and artificial conversational entity. Chatbots functioning is based on artificial intelligence. Chatbot conversations are of two types as text and voice. Chatbots are also capable in doing operations like sales, marketing, education, customer service, help desk tools, business etc. The health care sector of India is also taken in to account. There is private and public health care. The private health care is mainly concentrated in the urban areas of India were as the public health care is mainly concentrated to the rural areas in India. There are so many inflations in the medical sector and one or another way it all influence the insurance packages. These advancement of chatbots is used in the health insurance sector in order to develop a chatbot which will help the consumer to select the health insurance scheme. The chatbots are much intelligent that they respond like humans. By this a person can get an insurance scheme. There are mainly two types of health sectors in India. They are namely private health care and public health care. The policies lists a package of medical benefits. There are existing health insurance chatbots in India which works for the industries. This work deals on making a chatbot which is a consumer based one.

Health care is one of the leading sectors in India. Health sectors have to be adequate with best insurance plans. The rural population in India is unaware about the benefits of health insurance plans. The people have to be aware about the various health insurance policies and its benefits. The objectives of the project work are: To know about the health care systems in India to compare the various health insurance plans. To know about the chatbots and their role in health insurance. To measure the role of customer based health insurance chatbots.

Health Insurance Premium: It is the amount of money that a policy holder should pay for the insurance policy. It is also said as the income for the insurance company. In other words it’s a form of liability that the insurer must provide the coverage to the policyholder.

Reimbursement: There are cases were the policyholder have to take medical checkup in case of emergencies. Reimbursement is the process of giving back those amount of money spent by the policy holder, ie the out-of-pocket expenses are covered. This is very relevant in health
insurances due to urgency, high cost and administrative procedures.

A. Literature Review

The health insurance in India is one of the growing sectors in market. The health expenditure of health insurances is accomplished by private or public health care. And in that about 79% of the health expenditures are borne by the private healthcare [4]. This works suggest for the betterment of the private health care the health insurance has to be considered as a separate line of business. The author also says that that the health insurance has to be separated from the other insurances. There is a clear comparison of the per capita expenditure of the private and public health care systems in the selected Asian countries. The regulatory authority of the insurances is Insurance Regulatory and development authority (IRDAI) of India. They must take more strategic movements to keep the insurances in a more organized manner. A substantial population o India is living below the poverty line and the access of health care is not much appreciable in this economy. General Insurance Corporation have put forth the Private health insurance in India. [8] Describes that there are conversational bots which works for company benefits were they helps in saving time and they introduce good customer service and engages more wisely. Vector space modeling was another major type of technology adopted by bots. The question answering system is that system which could give an answer to the people with a very short description. This is mainly happens with the social media and all. The problems arise here is that the language. By using Natural Language Processing the problem of various languages can be solved. In this method the words are converted into vectors. The answer of a question is taken from the previous memory. This work about supervised learning by [6] describes about another method of creation of conversational agents. Machine learning is one of the advanced subparts of artificial intelligence. There are classifiers also assigning the data used in this case of supervised learning. There is testing and training of data related to this method. This methods finds application in fraud detection, analyzing customer behavior, analyzing past sales data etc.

The Insurance regulatory and development authority has passed the bill about the privatization in health care in 1999. It always works with risks. The premium calculation is dependent on factors like the probability of falling ill or income loss[3]. Cream skimming is the techniques adopted by the insurance companies were they selectively insure people who are very healthy and only a less chance of falling ill and treatment. Private insurance based on profit motive is theoretically difficult, if not impossible, to operate in health care market in view of problems of information asymmetry leading to adverse selection, moral hazard and supplier-induced demand. The private health insurance makes dealings with the urban based corporate hospitals which are always higher in cost[2].

B. Methodology and Data Analysis

The methodology adapted to build the prediction model is as shown in Figure 1, in which design of the system is depicted.

Fig. 1. Work Flow Diagram

1. Data collection

For the generation of the insurance chatbot the health insurance data was collected. The dataset consist of the factors related to the health insurance. The main factors physical and medical risk factors and lifestyle and personal risk factors. They include age, gender, body mass index, drugs usage, pre-existing medical condition, family history, profession, zip code, marital status, previously uninsured. Personal details regarding all these are collected. These dataset is trained and tested and the resulting insurance scheme was taken. There are two types of insurances private and public insurance schemes. Each of the insurance policies offer different coverage to the policy holders.

2. Health Care systems in India

There is a universal health care system in India. There is difference in quality and coverage of medical treatment in India. Health care in the rural and urban areas are different. The health care system in the rural areas is less adequate. The rural and urban have diversified life style and facilities. Health insurance policies provides with best medical care and treatment and make us financially secure. In case of emergencies, the mediclaim policies guarantees with security. Policy holders can avail multiple benefits. The health insurance premium depends upon the number of members covered under the health insurance policy. In India there is a vast health care system comprising of private and public and it is mixed up with the urban and rural areas of the country. Health Insurance is the best way to get a cover in all expenses like:

- Post hospitalization charges
• Hospitalization charges
• Medical tests and doctor fees
• Costs of the ambulance

3. Types of Policies

Health insurance companies in India normally pay for the inpatient services not for out-patient services. Liberalization in Insurance field was in 2000 that the private insurers came in to market. IRDAI has created health circles to promote competition. Health Insurance plans can be categorized as:

Hospitalization: These policies normally don’t pay any cash benefit. These policies pay the hospitalization cost and medical cost of the insured subject to the sum insured. Family Floater health insurance: This plan covers the whole members of a family. It is based on the assumption that not every member in the family will be affected by any illness or injury at the same time.

Pre-Existing disease cover plans: This plan covers against any pe existing diseases; example like diabetics, kidney failure etc.

Senior Citizen Health Insurance: These are insurance types for the older member in the family. The chance for age related health issues are more for elder people. IRDAI suggest the cover the policies up to 65.

Maternity Health Insurance: These covers the expenses regarding the maternity. It consists of both pre and post care.

Hospital Daily Cash Benefit Plans: These plans provide defined sum of money for every day of hospitalization. The payment will be defined for particular number of days

Critical Illness Plans: This policy benefits are based on lump-sum benefits amount.

These are more specific to critical disorders such as heart attack, cancer, stroke etc.

Pro Active Plans: This insurance plans takes to consider the Indian market based on medical behavioral and lifestyle factors that may be related to chronic conditions. Disease specific special Plans: Some of the companies offer special care such as for Dengue care. These plans help the customers to manage the unexpected health expenses

4. Existing health insurance chatbots in India

The insurance sector is also adopting technologies to better their services like the other financial services. The existing bots are industry based and hence they can answer about only the specific company.

The following are the existing chatbots:

• Bajaj Allianz General Insurance Chatbot

BOING is the artificial intelligence chatbot introduced by the Bajaj Allianz Insurance. It has been introduced in the Amazon cloud based voice service Alexa. These bot helps the customers in many ways such as to claim registration, for the soft copy of policy, check policies status, for checking status of claim, to locate the branch of the company, nearest empaneled hospitals and workshops.

• ICICI Lombard General Insuance’s chatbot MyRA

This was introduced in December 2016, and from that time it has been used by around 60000 customers and has sold 750 insurance policies without human intervention.

• HDFC Life:AI- based insurance email bot SPOK

HDFC has introduced the first insurance email bot named SPOK. It is AI based and it is claimed that it can automatically read, understand, categorize and prioritize and respond to customer emails.

C. Results and Discussion

There are number of private and public health insurance schema available in the market. There is so many policy benefits offered by the companies. Customers are often confused to select any of the schema from the collection. For each of the insurance policy taker have to get through the same set of enquirers to select the policy. For that the factors are analyzed and we could get a particular health insurance schema. The personal data of individual were given as the input to the bot and the corresponding insurance suggestion is considered. Different age group data were given as the input to the chatbot. According to the personal details given to the chatbot it suggests an insurance scheme. And for the validation the same details were given to the insurance brokers and their suggestion was taken. Both the results were analyzed and could find 0.66% accuracy.

II. CONCLUSIONS

India a country with a huge population lacks in adequate healthcare. The loopholes by the public healthcare are being a positive mark for private healthcare with world-class quality healthcare. A big part of the rural population is still unaware of the vast health insurance services. The insurance data set is trained and tested and have reached in this conclusions. Apart from the normal human interactions the artificial agents are always faster and time saving. They can be updated easily and they could deal with a wide range of dataset. As the amount of the dataset is increased it will always improve the accuracy of the result. From the collected health insurance dataset

A chatbot is created and the following conclusions were:

• Artificial conversational agents are always more time saving than human interactions.
• Along with NLP shows various results but he accuracy increases with the dataset.
• The introduction of such a consumer based bot makes it easier for the customer to select a product from a vast number of existing insurance products in the market.
III. LIMITATIONS AND FUTURE WORK

The insurance dataset consist of data regarding 22 health insurance schemes in India. Dataset consists of both private and public insurance schemes. For the pre-existing medical condition & family history only parental case is considered. There is a chance for hereditary disease concerns, but for this work only parental history is considered. It is challenging to have a specific insurance plan because of the complexity of natural language processing.

Even though there exists a lot of insurance schema; premiums of each insurance vary in amount and we can chose it accordingly as with ease of service and security. It can be much more helpful if the bot could calculate the premium for the customer. The health care system must be updated to adequate and hence these advantages should also reach up to the common people of the country.

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