Health Care Claims Pre Processing System

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Abstract: Healthcare is a field with a lot of room for improvement thanks to cutting-edge technology. Validation and identification of inaccurate claims consumes 8 to 10% of the time and money in the current Healthcare Business Process Outsourcing market. They don't have effective, quick, and direct communication between insurers and claimants. An interactive Chatbot connects insurers and claimants in the proposed Healthcare claims pre-processing system. This chatbot, which is powered by AI and runs on the cloud, will pre-validate and successfully register claims. Claimants communicate with the bot via a device connected to a messaging platform, where the bot can initiate an activity andrespond with real-time data from a database. As a result, the cost and effort required by Third-Party Agencies (TPAs) to process claims will be dramatically reduced. By capturing denials, you can limit the number of unwanted claim requests.

INTRODUCTION

The Healthcare claims pre-processing system may vary with insurance and service providers, it can be defined as a generic approach for better understanding. The claim processing is of five broad stages. Claim Filing, the process starts with thepolicyholder/nominee reporting a claim with the insurance company. Claims/Damage Assessment, depending upon the type of insurance, there is physicaland eligibility verification. Investigation, Verification, the investigationverifies the claims and assessments for fraud and eligibility under the policy terms. For certain types of insurance and claims, the insurance company may need to pay only the policyholder/nominees or, additionally, the third parties too. Evaluation & Claims Processing, this process decides the reimbursement amount, which the company conveys to appropriate stakeholders. Claims Settlement, at this final stage, the company disburses the insurance amount to the policyholder or thenominee. The payment signals the final settlement of the claim. These above steps could be resolved within a single innovative platform known as Chatbot. Chatbot is deployed into the Companies portal, where the employees could access it in orderprocess their claims. This bot can be used to view health insurance policy details and process claims by the employees. A chatbot can intelligently check already available

documents and further reduce the time and friction from the process. The chatbotcan provide anomaly detection abilities by analyzing a vast amount of data aboutprevious valid and fraudulent claims. These capabilities allow them to know if a medical report, diagnosis, or treatment is genuine or not. For a customer, this may mean fewer documents to file for each claim. While for insurance providers, it meansa reduction in data management and acquisition efforts and costs.

LITERATURE SURVEY

Performance on Fraud Detection in Medical Claims of Healthcare Data

Every year the expenditure healthcare is being exceeded by many of the countries. Due to the extreme growth of market size and their influential factors this applicationdomain requires a high-

end data analytics mechanism. The $significan_1t$ problem of this wing is fraud, waste, abuse includes improper billing, repeated claims, uncovered services, drug abuses, counterfeit drugs,

off-label marketing issues and many more. There is a series of technical challenges for data analytics. As there is massive storage of data over a period of time and from the representation point of view these all are many diverse datasets. This includes various characteristics of data, what are key steps for processing and analysing the data for classification and finding of communities methods for further fraud prevention and detection technique, the use of advanced machine learning techniques will improve the qualityof healthcare systems. These algorithms can address some potential problems, comparisons and results were substantial with their limitations.

Investigating the effects of class imbalance in learning the claim authorization process

Health insurance companies have invested in the use of data mining and machine learningtechniques to detect suspicious fraudulent patterns. However, the use of these techniques in claim authorization process is affected by the class imbalance problem, due to the fact that there are much more authorized service requests than unauthorized ones. This paper presents theinvestigation results of the effects of class imbalance in health insurance claims authorizationdomain. By means of an experiment, the performance loss of several classifiers was measured indifferent class distributions and also the performance recovery provided by treatment methods.The results show that the studied classification algorithms are affected differently by class imbalance. They also show that the recovery performance is lower the higher the classimbalance.

Pattern discovery on Australian medical claims data-a systematic approach

The national health insurance system in Australia records details on medical servicesand claims provided to its population. a clustering algorithm is used to segment thedata into classes. Then, hidden Markov models are employed to find the underlyingtemporal

behavioral patterns. These steps are applied recursively to features extracted from the data set until convergence. The main objective is to minimize themisclassification of patient profiles into various classes. This results ina hierarchical tree model consisting of a number of classes; each class groups similar patient temporal behavioral patterns together. The capabilities of the proposed method are demonstrated through the application to a subset of the Australian national health insurance data set. It is shown that the proposed method not only clusters data into various categories of interest, but it also automatically marks the periods in which similar temporal behavioral patterns occurred.

Opportunities and challenges of cloud computing to improve health careservices
Cloud computing is a new way of delivering computing resources and services. Many managers and experts believe that it can improve health care services, benefit health care research, and change the face of health information technology. However, as with any innovation, cloud computing should be rigorously evaluated before its widespread adoption. Strategic planning that could be used by a health organization to determine its direction, strategy, and resource allocationwhen it hasdecided to migrate from traditional to cloud-based health services is also discussed.

Using Data Mining to Detect Health Care Fraud and Abuse: A Review ofLiterature
Inappropriate payments by insurance organizations or third-party payers occur because of errors,abuse and fraud. The scale of this problem is large enough to makeit a priority issue for health systems. Traditional methods of detecting health care fraud and abuse are time-consuming and inefficient. Combining automated methodsand statistical knowledge lead to the emergence of a new interdisciplinary branch of science that is named Knowledge Discovery from Databases(KDD). Data mining isa core of the KDD process. Data mining can help third-party payers suchas health insurance organizations to extract useful information from thousands of claims andidentify a smaller subset of the claims or claimants for further assessment. We reviewed studies

that performed data mining techniques for [2]detecting health care fraud and abuse, using

supervised and unsupervised data mining approaches. Most available studies have focused on
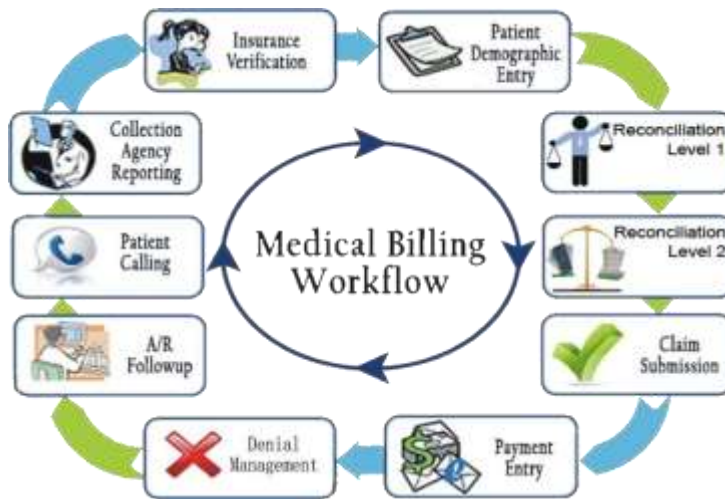
algorithmic data mining without an emphasis on or application to fraud detection efforts in the context of health service provision orhealth insurance policy.

EXISTING SYSYTEM

According to the existing claims pre-processing, the claims processes may vary withinsurance and service providers, we can define a generic approach for betterunderstanding. Each claim passes through five broad stages.

First Notice of Loss (FNOL)/Claim Filing

The process starts with the policyholder/nominee reporting a claim with the insurance company. You may have to fill up a detailed form and attach the requireddocuments. Traditionally, after the initial claim report, an agent gets assigned to thecase. The agent would help you perform further process steps until the claim's settlement.

Claims/Damage Assessment

Depending upon the type of insurance, there is physical and eligibility verification. For example, for vehicle accident insurance, the assessment might involve inspection of the damage. The damage verification determines any liabilities depending upon the context.

Investigation & Verification

The investigation verifies the claims and assessments for fraud and eligibility under the policy terms. For certain types of insurance and claims, the insurance company may need to pay only the policyholder/nominees or, additionally, the third parties too.

Evaluation & Claims Processing

This process decides the reimbursement amount, which the company conveys to appropriate stakeholders. For example, in a medical claim, the company may informthe sanctioned amount to the customer's healthcare provider. After the intimation, the final reimbursement process begins.

Claims Settlement

At this final stage, the company disburses the insurance amount to the policyholder or thenominee. The payment signals the final settlement of the claim.

Fig Current Existing System Work flow

CONSTRAINTS

- The traditional way involves many step-by-step processes to file a claim.
- Cost involved is high, as the Third-Party agencies paly a vital role in processingclaim.
- There is no tracking system to update the status of the claim being
- submitted.This methodology includes a large work force.
- This system lacks cutting edge technologies for processing claims in an efficientway.

PROPOSED SYSYTEM

As per the proposed Health care claims pre-processing system, the chatbot cuts downthe significant time of filling lengthy claim forms and submitting documents and images. Customers can easily do it from their mobile devices based on guidance from the chatbots. But that's not all. A chatbot can intelligently check already available documents and further reduce thetime and friction from the process. For a customer, this may mean fewer documents to file for each claim. While for insurance providers, it means a reduction in data management and acquisition efforts and costs.

The Chatbot system is developed based on the five steps as follows

- Compile and Pre-process
- dataAnalyse Data
- Develop the Model
- Evaluate the results and
- Pilot the approach

The first step, compiling and pre-processing suitable data, is anything but trivial given the vast amounts of data that health insurers have to process (with volumes at"big data" proportions). A key element here is the diligent cleansing and transformation of data that the cognitive system will later draw on; completeness and consistency are essential.

The test data set should comprise historical patient data and data of claims where theamount of money paid was successfully lowered in the past. Various statistical models are then used to analyse data on patients, diagnoses, and claims. At this stage, it is already possible to determine correlations between certain diagnoses andsuccessful reductions. This analysis provides a basis for developing a valid model for tagging claims anomalies. The test data is then used to train the cognitive system.By feeding in additional insurance data and external information – e.g., on the regional distribution of providers – the model is

gradually enhanced until it eventually starts to independently learn new data and case patterns.

In order to conduct a subsequent assessment and select the system that will ultimately be used, several cognitive systems are programmed and then benchmarked in terms of specific metrics. Finally, the system is chosen that can most reliably predict the likelihood that a claim can be reduced successfully. The final piloting phase serves to audit new claims received in real-world conditions and refine the algorithm further.

SYSTEM IMPLEMENTATION

A software application in general is implemented after navigating the complete lifecycle method of a project. Various life cycle processes such as requirement analysis,design phase, verification, testing and finally followed by the implementation phase result in a successful project management. System implementation is an important stage of theoretical design is turned into practical system. Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus, it can be considered to be the most critical stage in achieving a successful newsystem and in giving the user, confidence that the new system will work and be effective. The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods. Each program is tested individually at the time of development using the data and has verified[4] that this program linked together in the way specified in the programs specification, the computer system and its environment is tested to the satisfaction of the user. The system that has been developed is accepted and proved to be satisfactory for the user and so the system is going to be implemented very soon. A simple operating procedure is included so that the user can understand the different functions clearlyand quickly. The final stage is to document the entire system which provides components and the operating procedures of the system.

MODULE IMPLEMENTATION

Employee Portal:

This is a very first module of the system, where once an Employee decides to use tothe portal forHealthcare claims he/she will land on this page as a first step process.The Chatbot is deployed onthis portal. The Portal has the options such as about, contact us and articles.

About- When you click on this option, the portal redirects you to a webpage. Whichshows the information about Healthcare Claims and how it is being processed.

Contact us- In case if the Claimants face any problem with the Chatbot they are allowed to write quires here. The support team will resolve them. Articles- Here the Employees can find articles related to Health Insurance Claims.

View Policy Details:

In this Module, in case the Claimants can check their Health Insurance Policy Details. The details will be mailed to their respective mail id. Employee Id is taken as a security check parameter.

Process Claims:

Here the claimants can process their claims by filling the adequate information required. The employee id is taken as a security check parameter.

Type of Claim:

The Healthcare claims are broadly classified into two categories as follows,

Pre-planned Claim

This is for cashless transaction, based on the location and network hospital this claim will be processed. The claim amount is directly paid to the health care centers.

Post Incidental Claim:

This is for reimbursement purpose, where the claim amount is sanctioned to therespective employees account based on the billing papers.

Claim Verification:

In this module the information given by the claimants is processed, by the system atback end andthe respective step is taken based on the requirement.
Here the claimants will get to know whether their claim is submitted or not.

ARCHITECTURE DIAGRAM

A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a
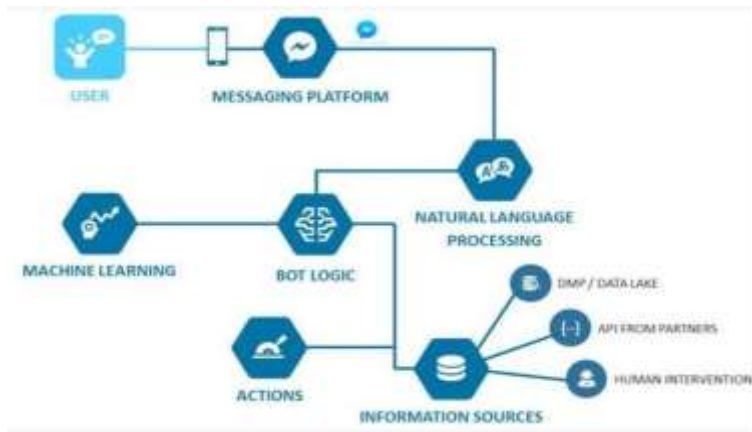way that supports reasoning about the structures and behavior of the system.5

Fig Architecture Diagram

CONCLUSION
A better consumer experience translates into better revenues. The Healthcare claimspreprocessing system allows for more cost-effective operations. From a monetary perspective, chatbots are useful strategic tools for the Health insurance industry. A chatbot can intelligently check already available documents and further reduce the time and friction from the process. The chatbot can provide anomaly detection abilities by analyzing a vast amount of data about previous valid and fraudulent claims. These capabilities allow them to know if a medical report, diagnosis, or treatment is genuine or not. For a customer, this may mean fewer documents to file for each claim. While for insurance providers, it means a reduction in data management and acquisition efforts and costs.

FUTURE ENHANCEMENTS
Embedding artificial intelligence in the process of hospital claims management offers multiple benefits at once, not just for insurers but also for patients, given the saving potential. In short, theshift away from claims management based on rigid rule books in favor of smart algorithms leads togreater efficiency and valid decisions
– thus relieving the burden on all stakeholders and delivering savings. Chatbots when powered with AI and integrated with healthcare systems can perform repetitive and routine tasks in an intelligent and cost-effective manner. Only a few health insurers in Germany have so far ventured into the new field of artificial intelligence. The reasons for this slow adoption vary: uncertainty about practical use cases, gaps in technology expertise within organizations, or a lack of transparency regarding the available data. However, any health insurer can benefit from the use of artificial intelligence – provided it establishes the requisite conditions. So, it pays to start investing in suitable IT architecture now and create the agile framework needed to fully exploit the opportunities afforded by the new technologies.

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