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Patient Treatment Time Prediction

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Abstract

Due to the huge increase in population hospitals are overcrowded and because of this it becomes difficult for hospital management system to control and to minimize the patient waiting time while getting treatment done in the hospital. Doctors recommend multiple number of different tests to diagnose the disease so that proper treatment can be given. Thus, while evaluating all these tests patient must wait in a queue. The patient must wait till all the patient before him or her get treated. Unnecessary waiting waste time of the patient and increases their frustration level while waiting in queue. It would be more convenient if patient could get the predicted waiting time and treatment plan which shows the sequence of different tests, their schedule and overall predicted waiting time on real time. To increase the efficiency and to meet the patent requirement we have come up with a technique called PTTP Patient Treatment Time Prediction along with HQR i.e. Hospital Queuing-Recommendation system which is being developed. In this method PTTP algorithm predicts the treatment time on the basis, of hospital previous data collected. On the basis, of this waiting time HQR recommend the treatment plan for the patient. As the historical patient data is huge in size we are using Apache Spark to achieve the goal.

Keywords: Apache Spark, Big Data, Cloud Computing, Hospital Queuing Recommendation, Patient Treatment Time Prediction.

I. INTRODUCTION

Due to the huge increase in population hospitals are overcrowded because of this it becomes difficult for hospital management system to control and to minimize the patient waiting time while getting treatment in hospital. Management of patient queue and calculation of waiting time is very difficult task. As the waiting time calculation needs the prior knowledge of the time taken by different tasks to complete such as time taken by X-ray, CT-scan, blood test, sugar test etc. generally a patient must go through number of tests during treatment recommended by doctor which is depending on his or her medical condition. Therefore, the patient must wait in queue till all the patient before him or her get treated. Thus, unnecessary waiting for such a long time waste the patient time when the patient is in uneasy condition and increases frustration.

We present a method to reduce the waiting time of patient and to help hospital management system to efficiently manage the patient queuing system. To accomplish this task, we have considered historical patient data and studied it on the different factors such as patient age, gender, disease type, treatment start time and treatment end time. On the basis, of this data set we have calculated the predicted waiting time by using our system. The calculation for predicting time is dependent on number of factors such as age group, treatment start time and end time etc. The mentioned PTTP system uses hospitals historic data. Average waiting time is predicted by this algorithm and depending on the waiting time Hospital Queuing Recommendation system predicts the treatment plan for patient to reduce the waiting time during the number of test evaluations. Because of the large data availability from the patient history we have considered Big data and Cloud computing for flexibility and capability. To calculate the waiting time an improved version of Random Forest Algorithm is used to train the proposed PTTP system. As the waiting time is calculated on the real-time basis, patients can get the information on the overall time required for completing all the recommended tests.

II. BACKGROUND

To enhance the accuracy of data analysis with continuous features, various implementation and classification techniques are discussed. A Random Forest technique is used to effectively generate the discriminative votes from personal interest point of view and a top k search algorithm is generated to find all examples in a single search [1]. [2] Also uses the Random Forest algorithm to generate high quality image pixel quickly beside of using generative or a discriminative model to evaluate each pixel. This method is fast and accurate than the usual methods. Random Forest is a good method as it composites of multiple growing trees on a random node. But this random node some time produces noise due to which it gives error in

classification and while producing new node. To avoid above situation [3] it gives a method called Tree Weighted Random Forest. The TWRF shows the better performance than the other or traditional methods.

As the data is growing day by day, traditional data systems are not capable to handle such a big data while using in recommendation system. The problem of scalability and efficiency for recommendation system working on big data gives a technique Keyword-Aware Service Recommendation method. A recommendation technique based on the social media photos and information collected from their attributes helps to give the recommendation based on age, sex, kind of disease and based on health condition of the patient.

Based on the above background to predict the time of the waiting to the patient treatment we can use the random forest method. It is used to train the patient treatment time consumption. These build the PTTP model with help of classification and regression tree.

III. LITRETURE SURVEY

Gang Yu et.al presents the fast action detection via discriminative random voting. The action is the complex process because of the cluttered vision. There are number of variation in the detection action. To detect the action video as the characterization method is used to find the spatio-temporal point to find the actions. They used the random forest method to find the more features and fast top-k detection algorithms to efficiently detect the action. An experimental result shows the efficiency in the detection [1].

Paul A. Bromiley, et.al, proposed a model to detect the shape by using the random forest method. They studied the mostly used existing approach to find the features from the images and locating it is to generate the features and then it fit into the simple model. In the proposed system, they used the random forest algorithm to good quality images to generate the response. Compared the result of their proposed system with other approaches. The above approach shows the good results for the hand annotation and facial notes but gives outperformance for alternative methods trained on the same approach [2].

Wei Wang et.al, addressed the excellence of the random forest algorithm in the various aspects of the programming means in the different domains for the classification and in the generalization. While they raised point over the random forest features called the noisy trees it generated when the data is trained which affects accuracy of the classification and results in the wrong decision making. Proposed the new methodology called the weighting the tree based on the classification ability Trees Weighting Random Forest (TWRF). This approach

generates the bagging of the training data, this data used to build the tree [3].

Wanchun Dou et.al gives a Keyword-Aware Service Recommendation Method on Map Reduce for Big Data Applications. As the data on internet growing day by day it becomes difficult for the systems analyze the data and give recommendation for the system. As the existing recommendation system is having problem for such a big data like data analysis, scalability and inefficiency it is necessary to have a system to efficiently handle such a big data and give proper recommendation for the system. To challenge this problem, they proposed the environment by using the big data to improve efficiency and performance. Proposed the method called Keyword-Aware Service Recommendation (KASR) to recommend the products personally. In this approach key words are used to shows the user preferences. In this method for the proper recommendation they used user based collaborative filter method for the recommendation. For the further improvement, they implement the system on the Hadoop using a MapReduce parallel processing technique [4].

Yan-Ying Chen et.al proposed a technique called Recommendation by Mining People Attributes and Travel Group Types from Community-Contributed Photos. As the increase use of social networking on internet lots of people are uploading their photos and information associated to those images. Based on this approach they mentioned that we can use this data available on the internet to give the recommendation. in this they extracted the information associated with each image such as age, group. Sex and soon to give the recommendation. A probabilistic Bayesian framework used to exploit the user information [5].

Yang Guo et.al proposed the Bayesian inference recommendation policy on the social networking sites. Author given example of the user who share the rating of any content with his friend. Then the rating similarity measured by the using probabilistic model based on the mutual rating. Propagation considers the direct and indirect friend rating about content. Proposed approach is used for the recommend the content to the user [6]. Experimental result compared with the collaborative filtering technique. The disadvantages of this methods is that due to small dataset network topology is associated to this technique also as the experiment shows the MAP based method gives better recommendation for new user, but how it utilize the system if he don't know the interface.

Xingquan Zhu et.al. studied the data mining approach and the factors where we can use the data mining with big data. A Big Data is consisting of large volume of complex data. Due to the tremendous growth in internet, data present over internet is related to different fields and work on such a large data is very difficult. To overcome the problem based on this they presented the algorithm HACE theorem to extract the features from the various ways of data mining perspectives [7].

Longxin Zhanget al. proposed a revised version of hybrid CRO method called HCRO

method. In different application on heterogeneous platform it becomes essential to reduce the make span to reduce this it is necessary to properly schedule the task and to map the task-to-processor mapping. In this approach to improve the old CRO method a CRO method is combining with the new heuristic approaches to produce a new selection approach. A Gaussian random walk is used in this to search for optimal local user's solution [8].

Keqin Li, studied the problem in the constrained stochastic scheduling tasks. Generally, a parallel processing consist of previous task and the inter task communication time depending on some probabilistic distribution condition. Reducing parallel processing time on different cluster on different processor machine is very difficult task. Task processing time inter communication time are the probability in the task. To overcome the above problem, they proposed the model based on the heterogeneous cluster scheduling the stochastic applications. To solve the problem is the scheduling the tasks stochastic dynamic level scheduling (SDLS) method proposed. Discussed the stochastic attributes and the methods to deal with the random variables [9].

Devendra Dahiphale et.al gives a Cloud MapReduce technique for enhancement of the application. Now a day's cloud based computing attracted number of fields because of its configurable computing resource. A Map Reduce technique is good for the data intensive of batch jobs. As the Map Reduce technique is suffers from drawbacks such as in sequential process, in scope, also is does not support stream data processing. To eliminate all this problem related to Map Reduce technique they proposed a cloud based map reduce technique called CRM. They illustrate that parallelizing Map Reduce technique using pipeline technique to supports stream data processing in addition to batch data. The experimental results show the proposed method improves the performance over the traditional Map Reduce technique. In addition to this they also give two algorithms to increase the speed [10].

Marlon Nunez et.al proposed the model for the induction of the regression trees self–adaptively SAIRT. It adapts the induced model for facing the data streams. It handles the symbols and the numeric data. It automatically adapts and monitors the usefulness of nodes and leaves of trees [11].

IV. CONCLUSION

In this paper, we have studied different approaches for scheduling the different treatment tasks in efficient way to manage the queues in hospitals using apache spark and big data. Studied the Random Forest algorithm which can be used to train the data and time. PTTP algorithm can be used to calculate the prediction time for the patients to get the treatment done which includes various medical tests and techniques. The HQR system gives recommendation based on the waiting time calculated by the PTTP

algorithm to suggest user to perform the specific task in specific time to limit the user time based on the dataset available in the hospital.

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