Smart Hospitalization and Patient Review Analysis

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Abstract— for the health and care we always need a hospital but in real life it is complicated to go to the doctor and carry all records of our previous treatment. In case of emergency, If a patients doesn't have his own record with him, it will be troublesome for him. Think, all these becoming easy we do not need to carry our records in hard copy format using smart hospitalization technique. With so many hospitals and no. of doctors it is difficult to find one who is best for a particular treatment. So it could be easy to find one doctor based upon the patients review. In this paper we are implementing the smart hospitalization in which patient can login using unique id and can see all previous history of his own diseases, which can be useful for the doctor, patient as well as chemist .In case of emergency user can find ambulance which is near by user. We find nearest ambulance using reverse geocoding algorithm and Google map direction API, we can obtain user location using reverse geocoding which convert geographic point into human readable address. It will be accessible either by an administrator, only they can add data into the database. The interface is going to be user-friendly. This will help to reduce the paper work at a greater extent. Based on doctors treatment patient can give his feedback on the website or using their smart phone. On the basis of patients feedback doctors can be rated as per their treatment and charges. This could help others to find good doctors based upon the patients rating. We will be analyzing patient's comment using sentiment analysis Algorithm, which referred to as opinion mining, although the emphasis in this case is on extraction using keywords like, dislike/like, good/bad this sentiment analysis algorithm can be used for the priority wise listing of the doctor.

Key words: Sentiment Analysis, Opinion mining, Patient Review, Reverse geocoding, Google map direction API

I. INTRODUCTION

All previous hospital management system for storing the patient record uses the files in hard copy format. But it is not convenient way because sometimes patient's files may lost. In any emergency if patients records are not with him then it will be troublesome for them.

This application is aimed to automate the Smart Hospitalization. This paper is mainly to develop for patient, doctor, chemist and pathologist. Purpose of the paper is to develop an application which is user friendly, simple, fast and effective. Its deals with the collection of patient's information, doctor's information, chemist information, pathologist information, medicine Detail, and lab detail and with the help of patient review we recommended the doctor who is best for particular disease in particular area. Traditionally, it was done manually. In this patient can find ambulance location. The main function of the system is to register and store patient details, doctor details, chemist detail and pathologist detail and retrieve these details as and when required.

Now a days we always need a hospital for health and care and we need do carry our old records with us .but in this paper whole paper work can be reduced and we don't need it to carry with us. Patient can login using unique ID can get all previous history of our diseases. We can find best doctor for particular treatment, using the sentiment analysis.

II. LITERATURE REVIEW

A. *Existing System*

Now a day's every person needs a doctor. So we need to carry our records in hard copy format which is complicated. Whenever we go to the doctor we always need to carry our records in paper format. In any emergency if our records are not with us then it will be troublesome for patient and doctor. Doctor also need to give his treatment and write the medicines and patients records in paper format. Sometimes les are missed by patient so doctor cannot able to give a particular treatment to the patient. This is so much time consuming. In this whole process patients time as well as doctor's time can be waste and also increase paper work so too much work has to be done Patient also cannot be able to give his information to the doctor in any emergency. Doctor give his medicines to the patient in paper format and then patient have to go to the chemist and buy the medicines Sometimes that receipt may lost and patient can't buy his particular medicines for a particular disease. Sometimes doctor tells to the patient to perform particular tests and the result of his previous treatment can be missed by a patient. So it will be also troublesome for patient as well as pathologist. So in this existing system there are number of a problem which is suffered by patient, doctor, chemist and pathologist. If patient go somewhere like in any city and he suffers from an illness then it will be also to much difficult task to and a particular doctor for a particular disease. He need to ask anyone or any another person that where should I go? And the decision given by another person may not be correct and patient can be suffered a lot due to his wrong decision. In existing system to and ambulance nearby patient is difficult task ambulances are having necessary equipment for life support as provided by Government India, the provider would man these ambulances with trained persons. On receipt of instructions from call centre, ambulance corm's the location of the incident and starts immediately, after reaching the location, the ambulance persons should be ensure scene safety before reaching the victim. After attending the patient, the emergency medical technician would assess the need for ambulance transport. In case no emergency exists, or inter facility request, would inform the call centre for further instructions, and proceed according to instructions of call centre. It is a time consuming process.

III. PROPOSED METHOD

In our proposed system, to overcome all this problem smart hospitalization can be done, we can store all information

about patient in digital format on centralized database and user can see that information at any time form anywhere.
Doctor, Chemist, Pathologist can also see required data on his screen. Our paper covers this entire problem related to patients health. Which provide improved an secure health care quality and doctor can be recommended as per his feedback given by a patient using sentiment analysis[1] We take all the words and phrases that imply positive or negative sentiment, and apply rules that consider how context might affect the tone of the content. Carefully crafted rules help our application. With the help of user feedback we can and the best doctor for particular treatment using opining mining[3]. In our proposed system user can see ambulance location near by user. In case of emergency user can find ambulance which is near by patient. We can find nearest ambulance using reverse geocoding [4] and Google map direction API [9], which convert geographic point into human readable address and by using Euclidean distance formula we can calculate the distance form user location to ambulance. Online hotel services such as food panda [6], Uses the customers review to rate a particular restaurant. Similar rating method would be adopted in rating Doctors in our Implemented system. For ambulance services the concept of OLA Cabs [7] would be implemented.
The proposed system will give you output as follows:

1) Using the sentiment analysis doctor rating can be done as follows:

Fig. 1:

2) for ambulance services location can be traced as follow: It will give the correct direction of ambulance

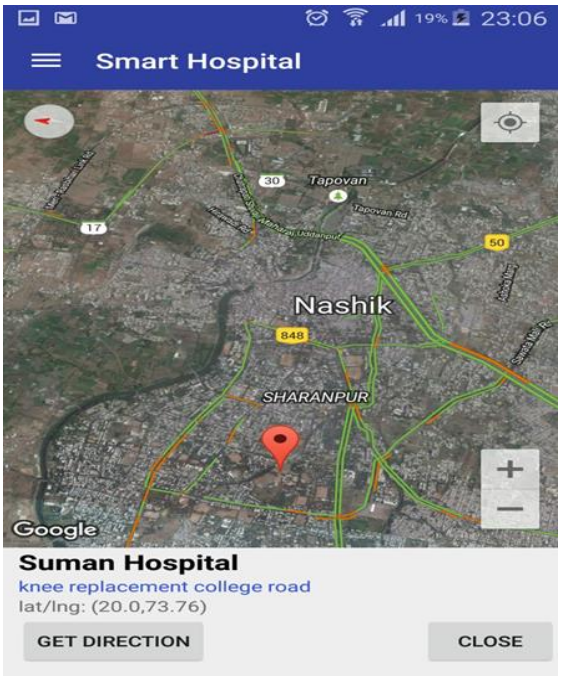

Fig. 2:

A. Architectural Design

The system architecture describes about system architecture of Smart Hospitalization. User will login using the ID and password then he/she will get the the own information, previous medicine, lab file, patient review, recommended doctor, can trace ambulance location and can get ambulance.

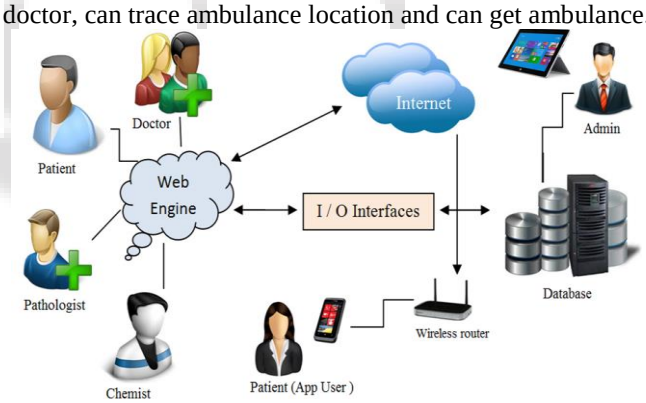

Fig. 3: System Architecture for smart Hospital

Fig. 4: System Architecture for Ambulance

1) Sentiment Analysis

This paper proposes an algorithm for identifying the polarity of remarks. In the existing work polarity of remarks word by word in a sentence was not considered. The proposed work has been explained with help of a case study. A case has been

Considered where in a set of patient give their remarks about a particular doctor. The algorithm is applied on every remark to identify the polarity of each remark. The algorithm generates a numeric value for the opinion. If the opinion value are high the opinion are considered positive. Lower opinion value represents negative remarks. The algorithm analyses the remarks word by word [1]. Sentiment words are identified and a combined value is given to each sentence. A database is maintained to identify the sentiment words. The database along with the sentiment word saves an associated value for the opinion word. The value assigned to each sentiment word is based on how much strong or weak sentiment is being used. The value ranges from zero to ten. If a sentiment word emotes strongly positive opinion higher is its value in the database. A sentiment word that represents strong negative opinion lower is its value in the database. When a sentence is analysed, for each sentiment word found in the sentence, its opinion value is fetched from the database. Then the collaborated opinion value of that sentence is estimated. If there is negation in a sentence the value of opinion score is decreased/ increased by a certain amount [3]. The following is the algorithm that is being used.

2) Sentiment Algorithm

1) For each word.
2) Check whether it is negation or sentiment word.
3) Every sentiment word is given a value (in the database). A value less than 5 represents negative opinion (e.g. bad). A value greater than 5 represents positive opinion.
4) How much low or how much high value may be decided using thesaurus.
5) If negation is present before sentiment is increased or decreased by 2 depending upon whether the sentiment value is high or low respectively.
6) Now an average is calculated for all the opinion scores calculated for each remark given by teachers. The range of value is 0 to 10. The collaborated opinion score is evaluated as shown:

If value less than 2
Very low
If value greater than 2 but less than 4.5
Low
If value greater than4.5 but less than 5.5
Moderate
If value greater than 5.5 but less than 8
High
If value greater than 8
Very high

3) Implementation

This algorithm can be implemented using positive Word such as good, best, very good, better, and so on. Negative words are not, never, worst, bad etc.

For positive words it consist of P value count, and for negative words it is having Nvalue count, according to the pvalue count and Nvalue count total count can be calculated, then it is compared with particular value .If that total count is less than Particular it will be consider as the negative comment. If greater then consider as positive value. Actual implementation of algorithm is explained in example which is given below:-

– Sentiment word

Positive word:

	Good	Very Good	Best	Awesome	Fabulous	Fantastic
Sentiment word	2	4	4	4	5	5

Table 1.

Negation word:

	Bad	Worst	Not	Pathetic	Third class	none
Negation Word	-2	-4	-2	-5	-4	-2

Table 2.

B. Review for Dr. Madhavi Datar

1) Dr. Madhavi Datar is best at treating the Migraine , I was reliefed from the pain within 4 days. But the expenditure was more than estimated.
   sentiment word= best
   pcost=4
2) Bad treatment ,not satisfied result from Dr. Madhavi . Even after a long week of treatment did not have satisfactory effect on me.
   sentiment word=0
   negation word =bad,not,not
   ncost=(-2)+(-2)+(-2)
   ncost= -6
3) Awesome experience from Dr. Madhavi Datar. Liked the treatment.
   Fully satisfied
   sentiment word= Awesome, satisfied
   pcost=4+3
   pcost=7
4) Doctor Madhavi Datar is good for the treatment of Migraine. Earlier have Consulted two Doctors but didn't workout for me. But thanks to Madhavi Datar .Helped me in recovering within a week.
   sentiment word=good
   pcost=2
5) Best Doctor For Migraine and Headache Related Problems. Her treatment is effective and Results are very good.
   sentiment word= best, very good
   pcost=4+4
   pcost=8
   Total cost = (pcost + ncost)/5
   = 21 + (-6)/5
   = 15/5
   = 3

Here total cost is 3 so system gives rating as 2 star

C. Reverse Geocoding

It is the process of converting geographic coordinates into a human-readable address. The Google Maps Geocoding API's reverse geocoding [2] service also lets you find the address for a given place ID. The Google Maps Geocoding API provides a direct way to access these services via an HTTP request.

Geocoding (Latitude/Longitude Lookup) Required parameters in a geocoding

1) Address: The street address that you want to geocode, in the format used by the national postal service of the

country concerned. Additional address elements such as business names and unit, suite or floor numbers should be avoided.

2) Components: A component filter for which you wish to obtain a geocode. The components filter will also be accepted as an optional parameter if an address is provided.
3) Key: Your application's API key. This key identifies your application for purposes of quota management. All Google Maps Geocoding API applications require authentication using an API key. Including a key in your request allows you to monitor your application's API usage in the Google Developers Console; enables per-key instead of per-IP-address quota limits; and ensures that Google can contact you about your application if necessary.

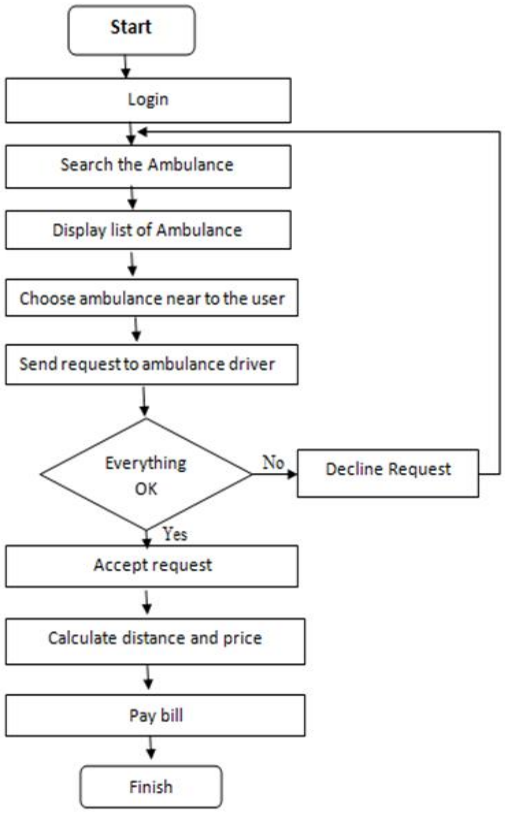

Fig. 5: Flow chart for ambulance

D. Google Map Direction Api

The Google Maps Directions API is a service that calculates directions between locations using an HTTP request.

You can search for directions for several modes of transportation, including transit, driving, walking or cycling. Directions may specify origins, destinations and waypoints either as text strings (e.g. "Nashik" or "Mumbai, India") or as latitude/longitude coordinates. The Directions API can return multi-part directions using a series of waypoints.

This service is generally designed for calculating directions for static (known in advance) addresses for placement of application content on a map; this service is not designed to respond in real time to user input, for example. For dynamic directions calculations (for example, within a user interface element), consult the documentation for the Google Maps JavaScript API Directions Service.

Calculating directions is a time and resource intensive task. Whenever possible, calculate known addresses ahead of time (using the service described here) and store your results in a temporary cache of your own design.

1) Implementation

– Directions Requests

A Google Maps Directions API request takes the following form:

https://maps.googleapis.com/maps/api/directions/output?parameters where output may be either of the following values:

Json (recommended) indicates output in JavaScript Object Notation (JSON) Xml indicates output as XML To access the Google Maps Directions API over HTTP, use:

http://maps.googleapis.com/maps/api/directions/output?parameters

HTTPS is recommended for applications that include sensitive user data, such as a user's location, in requests.

Google Maps Directions API URLs are restricted to approximately 2000 characters, after URL Encoding. As some Google Maps Directions API URLs may involve many locations along a path, be aware of this limit when constructing your URLs.

– Request Parameters

Certain parameters are required while others are optional. As is standard in URLs, all parameters are separated using the ampersand (&) character. The list of parameters and their possible values are enumerated below.

– Required parameters
– Orign

The address, textual latitude/longitude value, or place ID from which you wish to calculate directions.

If you pass an address, the Directions service will geocode the string and convert it to a latitude/longitude coordinate to calculate directions. This coordinate may be different from that returned by the Google Maps Geocoding API [9], for example a building entrance rather than its center.

If you pass coordinates, they will be used unchanged to calculate directions. Ensure that no space exists between the latitude and longitude values.

Place IDs must be prefixed with place_id:. The place ID may only be specified if the request includes an API key or a Google Maps APIs Premium Plan client ID. You can retrieve place IDs from the Google Maps Geocoding API and the Google Places API (including Place Autocomplete

– Destination

The address, textual latitude/longitude value, or place ID to which you wish to calculate directions. The options for the destination parameter are the same as for the origin parameter, described above.

– Key

Your application's API key. This key identifies your application for purposes of quota management.

– Directions Response

Directions responses are returned in the format indicated by the output flag within the URL request's path.

– Directions Response Elements

Directions responses contain the following root elements:
Status contains metadata on the request.

Geocode waypoints contains an array with details about the geocoding of origin, destination and waypoints.
Routes contains an array of routes from the origin to the destination.

– Transit Details

Transit directions return additional information that is not relevant for other modes of transportation. These additional properties are exposed through the transit details object, returned as a field of an element in thesteps[] array. From the Transit Details object you can access additional information about the transit stop, transit line and transit agency.

A transit_details object may contain the following fields:
Arrival_stop and departure_stop contains information about the stop/station for this part of the trip. Stop details can include: name the name of the transit station/stop. eg. "Union Square".

location the location of the transit station/stop, represented as a lat and lng field.

Arrival_time and departure_time contain the arrival or departure times for this leg of the journey, specified as the following three properties: text the time specified as a string. The time is displayed in the time zone of the transit stop.

value the time specified as Unix time, or seconds since midnight, January 1, 1970 UTC.

time_zone contains the time zone of this station. The value is the name of the time zone as defined in the IANA Time Zone Database, e.g. "America/New_York".

IV. CONCLUSION

By implementing this paper there would be improved efficiency and reduce the waste in the process of medical services. The importance of making correct decisions based on obtaining the right information at the right time is absolutely critical in healthcare services for user. In our system we develop facility for the user in which user can find best doctor to particular treatment, for that purpose we used sentiment analysis. Using that we can obtain user reviews and according to that we can categorized the doctor. It would be beneficial to the patients and would help in saving preciously life, by providing timely ambulance driving emergency. It would ease the process for finding appropriate doctor for particular treatment. This would help in serving people with better medical facilities in timely manner.

V. FUTURE SCOPE

Thus we can overcome the problems in existing system. We proposed new service in medical field that is Ambulance finder, using this user can search the ambulance from any location. We also introduce the concept of finding best doctor, in that we accept comments from the patients and according to that we can suggest best doctor for that treatment. So by considering all these feature our application make most user friendly, and also efficient and easy to us.
This paper will be more beneficial for future work in medical field Health & care this paper will be more beneficial.

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