# A

# Project Report

# on

# Automatic Medical Treatment Using Data Mining

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*By*

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## Abstract

In our proposed system is identifying reliable information in the medical domain stand as building blocks for a health care system that is up-to date with the latest discoveries. By using the tools such as NLP, ML techniques. In this research, focus on diseases and treatment information, and the relation that exists between these two entities. The main goal of this research is to identify the disease name with the symptoms specified and extract the sentence from the article and get the Relation that exists between Disease Treatment and classify the information into cure, prevent, side effect to the user.This electronic document is a “live” template. The various components of your paper [title, text, heads, etc.] are already defined on the style sheet, as illustrated by the portions given in this document.

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# Chapter 1
# Introduction

## 1.1 Research Motivation

People care deeply about their health and want to be, now more than ever, in charge of their health and health care. Life is more hectic than has ever been, the medicine that is practiced today is an EBM in which medical expertise is not only based on years of practice but on the latest discoveries as well. Tools that can help us manage and better keep track of our health such as Google Health and Microsoft Health Vault are reasons and facts that make people more powerful when it comes to health care knowledge and management. The traditional health care system is also becoming one that embraces the Internet and the electronic world. EHR are becoming the standard in the health care domain. Researches and studies show that Decision support— the ability to capture and use quality medical data for decisions in the work flow of Health care; and Obtain treatments that are tailored to specific health needs— rapid access to information that is focused on certain topics.

## 1.2 Research Objective

The second task is focused on three semantic relations: Cure, Prevent, and Side Effect. The tasks that are addressed here are the foundation of an information technology framework that identifies and disseminates health care information. People want fast access to reliable information and in a manner that is suitable to their habits and work flow. Medical care related information (e.g., published articles, clinical trials, news, etc.) is a source of power for both health care providers and laypeople. Studies reveal that people are searching the web and read medical related information in order to be informed about their health. Ginsberg  show how a new outbreak of the influenza virus can be detected from search engine query data.

## 1. 3 Present Scenario

Health care providers need to be up-to-date with all new discoveries about a certain treatment,in order to identify if it might have side effects for certain types of patients. We envision the potential and value of the findings of our work as guidelines for the performance of a framework that is capable to find relevant information about diseases and treatments in a medical domain repository. The results that we obtained show that it is a realistic scenario to use NLP and ML techniques to build a tool, similar to an RSS feed, capable to identify and disseminate textual information related to diseases and treatments. Therefore, this study is aimed at designing and examining various representation techniques in combination with various learning methods to identify and extract biomedical relations from literature. The contributions that we bring with our work stand in the fact that we present an extensive study of various ML algorithms and textual representations for classifying short medical texts and identifying semantic relations between two medical entities: diseases and treatments. From an ML point of view, we show that in short texts when identifying semantic relations between diseases and treatments a substantial

improvement in results is obtained when using a hierarchical way of approaching the task (a pipeline of two tasks). It is better to identify and eliminate first the sentences that do not contain relevant information, and then classify the rest of the sentences by the relations of interest, instead of doing everything in one step by classifying sentences into one of the relations of interest plus the extra class of uninformative sentences.

### 1.4 Opinion

World need better, faster, and more reliable access to information. In the medical domain, the richest and most used source of information is Med line database of extensive life science published articles. All research discoveries come and enter the repository at high rate , making the process of identifying and disseminating reliable information a very difficult task. one task is automatically identifying sentences published i medical abstract.

# Chapter 2
# Brief Literature Survey

## 2.1 Algorithms Used

### 2.1.1 Nueral Network

An artificial neural network (ANN), often just called a "neural network" (NN), is a mathematical model or computational model based on biological neural network. In other words, it is an emulation of biological neural system. A Multi layer Perceptron Neural Networks (MLPNN) is used. It maps a set of input data onto a set of appropriate output data. It consists of 3 layers input layer, hidden layer output layer. There is connection between each layer weights are assigned to each connection. The primary function of neurons of input layer is to divide input xi into neurons in hidden layer. Neuron of hidden layer adds input signal xi with weights wji of respective connections from input layer. The output Yj is function of Yj = f ( wji xi) Where f is a simple threshold function such as sigmoid or hyperbolic tangent function.

### 2.1.2 Decision Tree

The decision tree approach is more powerful for classification problems. There are two steps in this techniques building a tree applying the tree to the data set. There are many popular decision tree algorithms CART, ID3, C4.5, CHAID, and J48. From these J48 algorithm is used for this system. J48 algorithm uses pruning method to build a tree. Pruning is a technique that reduces size of tree by removing over fitting data, which leads to poor accuracy in predication.
The J48 algorithm recursively classifies data until it has been categorized as perfectly as possible. This technique gives maximum accuracy on training data. The overall concept is to build a tree that provides balance of flexibility accuracy.

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### 2.1.3 Naive Bayes

Naive Bayes classifier is based on Bayes theorem. This classifier algorithm uses conditional independence, means it assumes that an attribute value on a given class is independent of the values of other attributes. The Bayes theorem is as follows: Let X=x1, x2, .....,xn be a set of n attributes. In Bayesian, X is considered as evidence and H be some hypothesis means, the data of X belongs to specific class C. We have to determine P (H—X), the probability that the hypothesis H holds given evidence i.e. data sample X. According to Bayes theorem the P (H*kX*) *is expressed as P*(*HkX*) = *P*(*XkH*)*P*(*H*)/*P*(*X*).

#### 2.2 Related Work

In order to embrace the views that the EHR system has, the potential benefits of having an EHR system are: Health information recording and clinical data repositories immediate access to patient diagnoses, allergies, and lab test

results that enable better and time - efficient medical decisions; Medication management—rapid access to information regarding potential adverse drug reactions, immunizations, supplies, etc. World need better, faster, and more reliable access to information. In the medical domain, the richest and most used source of information is Med line database of extensive life science published articles. All research discoveries come and enter the repository at high rate , making the process of identifying and disseminating reliable information a very difficult task. one task is automatically identifying sentences published in medical abstracts (Med line) as containing or not information about diseases and Treatments and automatically identifying semantic relations that exist between diseases and treatments.

Bunescu R, Mooney Ret. Al proposed supervised machine learning methods have been used with great success in this task but they tend to suffer from data sparseness because of their restriction to obtain knowledge from limited amount of labeled data. We use feature coupling generalization (FCG) – a recently proposed semi-supervised learning strategy – to learn an enriched representation of local contexts in sentences from 47 million unlabeled examples and investigate the performance of the new features on AIMED corpus. The approach provides theoretically well-founded solutions to the problems of under- and over fitting. Secondly it allows learning from structured data, and has been empirically demonstrated to yield high predictive performance on a wide range of application domains. However, this approach is critical challenging problem to develop user friendly natural language to computer interface. M. Craven examined the problem of distinguishing among seven relation types that can occur between Chapter II. *Brief Literature Survey* 5 the entities "treatment" and "disease" in bioscience text, and the problem of identifying such entities. They compare five generative graphical models and a neural network, using lexical, syntactic, and semantic features, finding that the latter help achieve high classification accuracy. The scheme was the correct management of word position information, which may be critical in identifying certain relationships. In this approach that facilitates the automatic recognition of relationships defined between two different concepts in text. However, this task involves the manual tuning of domain-dependent

linguistic knowledge such as terminological dictionaries, domain specific lexico -semantics, and extraction patterns, and so on. Razvan C et. al says that a new method for joint entity and relation extraction using a graph we call a "card-pyramid." This graph compactly encodes all possible entities and relations in a sentence, reducing the task of their joint extraction to jointly labeling its nodes. We give an efficient labeling algorithm that is analogous to parsing using dynamic programming. These approaches assume that relations only exist within document, and classify them independently without considering dependencies between entities. However, this assumption does not hold in practice, and ignoring dependencies between entities may lead to reduced performance. Implicit relations can hardly be discovered in these models since they generally exist in cross document and they are only implied by the text. The task of relation extraction or relation identification is previously tackled in the medical literature, but with a focus on biomedical tasks: sub cellular location (Craven), gene-disorder association (Ray and Craven), and diseases and drugs (Sri nivasan and Rind flesch). In these works , tasks often entail identification of relations between entities that co-occur in the same sentence.

Heart disease is the leading cause of death all over the world. They have identifies gaps in the research on heart disease diagnosis and treatment and proposes a model to systematically close those gaps to discover if applying data mining techniques to heart disease treatment data can provide as reliable performances that achieved in diagnosing heart disease[14]. Various learning algorithms have been used for the statistical learning approach with kernel methods being the popular ones applied to Med line abstracts (Li et al).There are three major approaches used in extract in relations between entities: co-occurrences analysis, rule based approaches, and statistical methods. The co-occurrences methods are mostly based only on lexical knowledge and words in context, and even though they tend to obtain good levels of recall, their precision is low. Good representative examples of work on Med line abstracts include Jenssen et al. and Stapley and Benoit. Syntactic rule-based relation extraction systems are complex systems based on additional tools used to assign part of speech tags or to extract syntactic parse trees. It is

known that in the biomedical literature such tools are not yet at the state-of-the-art level as they are for general English texts, and therefore their performance on sentences is not always the best in Bunescu et al.
There is no reliable information.

# Chapter 3

# Proposed Work

Proposed system consists of the Client Interface, Identify the Disease, Sentence Extraction and Classification. Proposed system consists of the Client Interface, Identify the Disease, Sentence Extraction and Classification.
The tasks that are available in the proposed system:
1. First task is automatically identifying sentences published in medical abstracts.
2. The second task is focused on three semantic relations: Cure, Prevent, and Side effect.
Client Interface: In this Module, develop a user page using Graphical User Interface which will be a media to connect User and Media Database and login screen where user can input his/her user name, password and password will

check in database, if that will be a valid username and password then he/she can access the database . Identify the Disease: In this module user is going to give the symptoms as an input and get the desired disease name. In this it will search as semantic word and give the output to the user. Sentence Splitting: n this stage user has to enter the symptom in a short text. Then taking out the human errors from the sentence typed by the user like comma, dot with space and without space.

Client Interface: In this Module, develop a user page using Graphical User Interface which will be a media to connect User and Media Database and login screen where user can input his/her user name, password and password will check in database, if that will be a valid username and password then he/she can access the database . Identify the Disease: In this module user is going to give the symptoms as an input and get the desired disease name. In this it will search as semantic word and give the output to the user. Sentence Splitting: n this stage user has to enter the symptom in a short text. Then taking out the human errors from the sentence typed by the user like comma, dot with space and without space. Effect. For classification navies bays an algorithms are used. Self-Diagnosis with Advanced Hospital Management System will be helpful to the people who are far away from the hospitals. This system mostly useful in the homeopathy and the patients can get suggestions from the doctors by using discussion form, patients can put their queries and doctor replies to the patient problem.

### 4.1 Stochastic Gradient Descent with Restarts

Stochastic Gradient Descent and its accelerated variants have become the de fact approaches for optimizing deep neural networks. The popularity of SGD can be attributed to its ability to avoid and even escape spurious saddle-points and local minim. Although avoiding these spurious solutions is generally considered positive, these local minim contain useful information that may in fact improve model performance. Although deep networks typically never converge to a global minimum, there is a notion of "good"and "bad" local minim with respect to generalization. If the learning-rate is sufficiently large, the intrinsic random motion across gradient steps prevents the optimizer from reaching any of the sharp basins along its optimization path. However, if the

learning rate is small, the model tends to converge into the closest local minimum. These two very different behaviors of SGD are typically exploited in different phases of optimization. Initially the learning rate is kept high to move into the general vicinity of a flat local minimum. Once this search has reached a stage in which no further progress is made, the learning rate is dropped(once or twice), triggering a descent, and ultimately convergence, to the final local minimum. In contrast to traditional ensembles, the training time for the entire ensemble is identical to the time required to train a single traditional model. During testing time, one can evaluate and average the last (and therefore most accurate) models.Stochastic Gradient Descent with restart .

## 4.2 Cosine Annealing

The most common way of decaying the learning rate is by hand. One can train the network for some time and based on the results you make a decision whether to increase or decrease the learning rate. The whole process relies on intuition and it takes time to try things out.Recently however a new method of decaying the learning rate was proposed. In it we provide an initial learning rate and over time it gets decayed following the shape of part of the cosine curve. Upon reaching the bottom we go back to where we started, hence the name cosine annealing with restarts.

## 4.3 Transfer learning

Dating from the raising of its notion in the last century, transfer learning (also known as, cross domain learning, domain transfer, and domain adaptation) has a long history of being studied as a particular machine learning technique. In recent years, with the information explosion on the Internet, (e.g., audio, images, and videos) and the growing demands for target tasks in terms of accuracies, data scales, and computational efficiencies, transfer learning approaches begin to attract increasing interests from all research areas in pattern recognition and machine learning. When regular machine learning techniques reach their limits, transfer learning opens the flow of a new stream that could fundamentally change the way of how we used to learn things and how we used to treat

classification or regression tasks. In the past few years, the computer vision community has witnessed a significant amount of applications in video search and retrieval, surveillance, robotics, and so on. Regular machine learning approaches have achieved promising results under the major assumption that the training and testing data stay in the same feature space or share the same distribution. However, in real-world applications, due to the high price of human manual labeling and environmental restrictions, sufficient training data belonging to the same feature space or the same distribution as the testing data may not always be available. Given the gigantic geometric and infra class variabilities of objects, humans are able to learn tens of thousands of visual categories in their life, which leads to the hypothesis that humans achieve such a capability by accumulated information and knowledge. It is estimated that there are about 10–30thousands object classes in the world and children can learn 4–5 object classes per day [13]. Due to the limitation of objects that a child can see within a day, learning new object classes from large amounts of corresponding object data is not possible. Thus, it is believed that the existing knowledge gained from previous known objects assists the new learning process through their connections with the new object categories. For example, assuming we did not know what a watermelon is, we would only need one training sample of watermelons together with our previous knowledge on melons-circular shapes, the green color, and so on, to remember the new object category watermelon.Transfer learning mimics the human vision system by making use of sufficient amounts of prior knowledge in other related domains when executing new tasks in the given domain. In transfer learning, both the training data and the testing data can contribute to two types of domains: 1) the target domain and 2) the source domain. The target domain contains the testing instances, which are the task of the categorization system, and the source domain contains training instances, which are under a different distribution with the target domain data. In most cases, there is only one target domain for a transfer learning task, while either single or multiple source domains can exist.

## 4.4 Learning Rate Finding

While there are some good guidelines for estimating a reasonable starting point for choosing a learning rate, they don't provide a general algorithm for finding it and mostly are situation specific or have other limitations and can't be applied to all use-cases. Leslie N. Smith [22] in his paper "Cyclical Learning Rates for Training Neural Networks." Section 3.3 proposes a definitive way to estimate a good learning rate. In order to do this one needs to run training with very low learning rate and linearly(or exponentially) increase it every iteration. Training should be stopped when loss function starts to drastically increase. Record the learning rate and loss(or accuracy) at each iteration. If plotting the learning rate against loss function, you should see the following. When learning rate is too small, loss does not change much, but as learning rate goes higher, your loss should decrease faster and faster until a point where it doe not decrease anymore and eventually starts increasing. It might be intuitive to think that the learning rate we want is the one that corresponds to the lowest loss(0.1 on the left plot). However, at this point loss stopped decreasing and we most likely would not see any improvements using this value. We want the one that's a little bit to the left and corresponds to the point where loss is still decreasing(the faster the better).

# Chapter 4

# Problem Formulation

The system aimed to the Self-diagnosis with advanced hospital management system is to provide a self test to the patient, if hospitals are not available in near places. This application is developed by using one of the heuristic search techniques in artificial intelligence i.e. greedy local search. This system provides an additional facility, that is patient can interact with an appropriate doctor through online chatting or Discussion forum. patient can get appropriate suggestions to his problem. Actually, in the self-diagnosis this application generates a report regarding patient's health condition. That report may contain patient disease name, his symptoms intensity level and the suggestion provided

by system. This suggestion may be in the two forms. First suggestion may be an appropriate medicine based on symptom Intensity level; second suggestion may be a specialized doctor meeting that means his disease may be in a critical state. This system can be helpful to the hospital management, because it consists of patient billing system from the time of admission in the hospital. Patient billing means the payment for the doctor, rooms, dispensaries, servants. In our project the system is identifying consistent information in the medical field places as building blocks of a health care system that is updated with all the latest discoveries. Using tools such as Nero Linguistic Programming, Machine Learning techniques. This research, mainly focus on the type of diseases and treatment information by entering the symptoms and the relation present between these two entities. The main objective of this research is to categorize name of the disease with the symptoms specified and extract it from the database and get the relation that exists between the Disease-Treatment and classify the information into whether it is curable, preventable and any side effect to the user.

# Chapter 5
# Experimental Setup

algorithm (iris, gnb predit)
store the feature matrix (X) and response vector (y)
X = iris.data
y = iris.target
splitting X and y into training and testing sets
from sklearn.model selection import train test split
X train, X test, y train, y test = train test split(X, y, test size=0.4, random state=1)
training the model on training set
from sklearn.naive bayes import GaussianNB
gnb = GaussianNB()
gnb.fifit(X train, y train)
making predictions on the testing set

y pred = gnb.predict(X test)
comparing actual response values (y test) with predicted response values
from skl earn import metrics print("Gaussian Naive Bayes model accuracy(in
metrics.accuracy score(y test, y pred)*100)
Algorithm ():
Na¨ıve Bayes(Test Data Dir, Training Data Dir)
For(each test fifile in test data directory)
For each class
Map¡class, probability¿ Probability Map;
For each disease in test file
Disease probability=Probability of occurance of that disease in the class
Probability Map.put(class Name,probability*Disease probability)
Classified class=Key of Max probability value

## 5.1 Python

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed. Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python

programs is easy: a bug or bad input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple
approach very effective.

## 5.2 Anaconda

Anaconda is a free and open-source distribution of the Python and R programming languages for
data science and machine learning applications (large-scale data processing, predictive analytics, scientifific computing), that aims to simplify package management and deployment. Package versions are managed by the package management system conda. The Anaconda distribution is used by over 6 million users and includes more than 250 popular data-science packages suitable
for Windows, Linux, and MacOS. Anaconda distribution comes with more than 1,000 data packages as well as the Conda package and virtual environment manager, called Anaconda Navigator, so it eliminates the need to learn
to install each library independently. The open source data packages can be individually installed from the Anaconda repository with the conda install command or using the pip install command that is installed with Anaconda. Pip packages provide many of the features of conda packages and in most cases they can work together. You can also make your own custom packages using the conda build command, and you can share them with others by uploading them to Anaconda Cloud, PyPI or other repositories.

## 6.3 PIP

pip is a package management system used to install and manage software packages written in Python. Many packages can be found in the default source for packages and their dependencies — Python Package Index (PyPI). Python 2.7.9 and later (on the python2 series), and Python 3.4 and later include pip

(pip3 for Python 3) by default. pip is a recursive acronym for "Pip Installs Packages".

# Chapter 6
# Implementation

## 6.1 Preprocessing

In this step all data was converted into spectro grams and put into a data directory. This data directory contains 3 sub directories-train, test, val/valid(depending on the library used). Each of the train, test and valid directories further contain directories based on names of classes(this will vary from data set to data set). This structure is required for the classifier to make data set and data loaders. This process was carried out for each of the data sets in the following ways.

### 6.1.1 EMODB

The wave files were contained in a single directory. The LibROSA library along with matplotlib and pylab was used to create the spectro grams of the audio files. Then these spectro grams were put in their respective class directories in in test, train and valid directories. The identification of the classes could be done by the name of the file as the second last letter of the file name apart from extension represented the class that the file belonged to.
The classes could be identified as-

1. Anger-W
2. Boredom-L
3. Disgust-E
4. Anxiety/Fear-A
5. Happiness-F

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6. Sadness-T
7. Neutral-N

A 60%-20%-20% split was kept between training, validation and training data.

### 6.1.2 EMOVO

The .wav files were contained in a different directories based on the speaker. First all the files were transferred to a single directory then the LibROSA library along with matplotlib and pylab
was used to create the spectrograms of the audio files. Then these spectrograms were put in
their respective class directories in in test, train and valid directories. The identification of the
classes could be done by the name of the file by the first 3 letters of the file name apart from
extension represented the class that the file belonged to.
The classes could be identified as-

1. Anger-rab
2. Surprise-sor
3. Disgust-dis
4. Fear-pau
5. Joy-gio
6. Sadness-tri
7. Neutral-neu

A 60%-20%-20% split was kept between training, validation and training data.

### 6.1.3 SAVEE

The .wav files were contained in a different directories based on the speaker. First all the files were transferred to a single directory then the LibROSA library along with matplotlib and pylab was used to create the spectro grams of the audio files. Then these spectrigrams were put in their respective class directories in in test, train and valid directories. The identification of the classes
could be done by the name of the file by the first or the first two letters of the file name apart from extension represented the class that the fifile belonged to.
The classes could be identifified as-

1. Anger-a
2. Surprise-su
3. Disgust-d

4. Fear-f
5. Happiness-h
6. Sadness-sa
7. Neutral-n

A 60%-20%-20% split was kept between training, validation and training data.

## 6.2 Training

The training loop for the models was written in 2 libraries-fastai and pytorch. In both cases first the data set was created by setting the batch size, transforms and method of extraction. Then data loaders were created and data was fed into models. The detailed explanation of the the process can be found in 7.2.2 and 7.2.3.

### 6.2.1 PyTorch

PyTorch is more verbose of the two libraries and hence it required more fifine tuning. Firstly the transformations to the image were defined(flipping, zooming, rotating etc) along with conversion to tensor. Then the data loaders were created and the device on which computation was to be done was selected. After this a res net model trained on the image net data set was taken and its last layer was removed and replaced with a layer with 7 units.

The model was then migrated to the computation device and the optimizer and loss criterion was initialized. For training, the model was put into training mode and then for every iteration in an epoch a mini batch was taken from data loader and forward pass was done. After the forward pass, the loss was calculated and based on this the backward pass was done. In each epoch the network was also put in evaluation mode for the validation set results. This process was repeated till the accuracy leveled for many epochs or the model over fit the data.

### 6.2.2 Fast.ai

Fast.ai has many functionalities so more features were utilized here, ex cyclic learning rated, learning rate annealing, differential learning rates, stochastic

gradient with restarts, differential learning rates etc. First the transforms and batch size were initialized. Then a data bunch was created form a data generator would later be created. Then the model was created by taking the resnet34 pre trained on the image net data set. After this the the model was trained keeping cycle length 1 and after that learning rate finding was done. Based on the learning rate obtained all layers of the model were unfreezed and differential learning rates were set.

# Chapter 7

# Conclusions

The system is used by the people who in remote areas.and also this system also used by the people who are far away from hospitals.The system also provides computerized self test to the users and suggesting the appropriate medicines / suggestions ton their problems. This system can be helpful to the hospital management, because it consists of patient billing system from the time of admission in the hospital. Patient billing means the payment for the doctor, rooms, dispensaries, servants. DOCTORS MODULE:- This module is accessed by doctors to see the online reports by executing different services defined in this module. Doctors can instantly know the status of clinical tests, pharmaceutical Prescriptions immediately and they can diagnose, treat the patient as early as possible. Various Services in the module are

CLINICAL MODULE:- This module is accessed by lab technicians in order to store the details of clinical tests of the patient into database. PHARMACY MODULE:- It can be accessed by both doctors and pharmacists. By using this module doctors can send messages to requirements to the patients. Accordingly by accessing the automated system pharmacist know the doctors request and send the requested medicine. The different services of this module are as follows: Message sending by doctor Message receiving by pharmacist Selling of Medicine This module also generate patient bills of patients bill in the hospital. ADMIN MODULE: - THIS module is accessed by administrative users of Hospital system for storing Hospital details, details of various departments of the hospital, details of the wards, details of the patients including inpatients and outpatients. REPORTS: - This is accessed by front office for billing purpose.In-Patient and Out-Patient can take report. 15 Open Discussion Forum: User is logging into the system and post different queries on discussion form if any doctor is logged into the system the doctor will give suggestions for user problem.User can click on button for posting the queries. The doctor will click on reply button for giving reply to the user problems. Along with reply given by doctors the system also displays Id of the doctor who are gives the reply to the problems .

# References

[1] Mrs. D.M.Chitra, Mrs. J.Renugadevi, "SMART HEALTH CONSULTING SERVICES", Padmavani Arts Science College for Women, Salem, India
[2] F. Burkhardt, A. Paeschke, M. Rolfes, W. F. Sendlmeier, and B. Weiss, "A database of German emotional speech." in Inter speech, vol. 5, Lisbon, Portugal, 2005, pp. 1517–1520
[3] O. Martin, I. Kotsia, B. Macq, and I. Pitas, "The eNTERFACE'05 audio- visual emotion database," in 22nd International Conference on Data Engineering Workshops, Atlanta, GA, USA, 2006, pp. 8–8
[4] Busso, Carlos, et al. "IEMOCAP: Interactive emotional dyadic motion capture database." Language resources and evaluation 42.4 (2008): 335.

[5] Zadeh, Amir, et al. "Multimodal sentiment in- tensity analysis in videos: Facial gestures and verbal messages." IEEE Intelligent Systems 31.6 (2016)
[6] S. Zhalehpour, O. Onder, Z. Akhtar, and C. E. Erdem, "BAUM-1: a spontaneous audo visual face database of affective and mental states," IEEE Transaction on Affective Computing, 2016.
[7] Y. Wang and L. Guan, "Recognizing human emotional state from audiovisual signals*,"IEEE Transactions on Multimedia, vol. 10, no. 5, pp. 936–946, 2008.
[8] P. Har´ar, R. Burget and M. K. Dutta, "Speech emotion recognition with deep learning,"
2017 4th International Conference on Signal Processing and Integrated Networks (SPIN), Noida, 2017,pp.137-140. doi: 10.1109/SPIN.2017.8049931
[9] Chernykh,Vladimir; Prikhodko, Pavel , "Emotion Recognition From Speech With Recurrent Neural Networks", 01/2017
[10] W. Lim, D. Jang and T. Lee, "Speech emotion recognition using convolutional and Recurrent Neural Networks," 2016 Asia-Pacifific Signal and Information Processing Association Annual Summit and Conference (APSIPA), Jeju, 2016, pp. 1-4.
[11] Lee, Chan Woo; Song, Kyu Ye; Jeong, Jihoon; Choi, Woo Yong, "Convolutional Attention Networks for Multimodal Emotion Recognition from Speech and Text Data", 05/2018.*References* 29
[12] Tripathi, Samarth; Beigi, Homayoon, "Multi-Modal Emotion recognition on IEMOCAP Data set using Deep Learning", 04/2018.
[13] S. Zhang, S. Zhang, T. Huang and W. Gao, "Speech Emotion Recognition Using Deep Convolutional Neural Network and Discriminant Temporal Pyramid Matching," in IEEE Transactions on Multimedia, vol. 20, no. 6, pp. 1576-1590, June 2018.
[14] Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton "Image net classification with deep convolutional neural networks." Advances in neural information processing systems. 2012.
[15] A. Graves, S. Fernandez, F. Gomez, and J. Schmidhuber. Connectionist temporal classification: Labeling unsegmented sequence data with recurrent neural networks. Proceedings of the 23rd International Conference on Machine Learning, 2006.