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MediAssist: An Intelligent Medical Assistance

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ABSTRACT: In today's era, many medical search engines are available like Google health and Health Line for solving medical queries. Problem with these systems is that these systems accept only keyword based queries. Searchers find it difficult to use such search engines because they are not always familiar with medical terminology. To overcome this problem and to get more accurate medical information, we propose this system. Now a day's most of the people are browsing health care and medical information at their homes using internet. However, searching this medical information on web for them is a bit difficult. Due to the lack of knowledge about medical terms they often fail to clearly describe their medical situations. However, medical search has its own unique requirements that are not well handled by existing web search engines. In proposed system, we present MediAssist: intelligent medical web search engine that extensively uses domain-specific medical knowledge and questionnaire to facilitate ordinary Internet users/Patients to search for medical information. Based on selected symptoms patient will get appropriate results towards diagnosis of his medical situation

KEYWORDS: Google Health, Health Line, Keyword Based Queries, MediAssist- intelligent medical.

I. INTRODUCTION

"To develop a system capable of returning medical information and extract approximate suggestions on medical diagnosis from the search information" Searching for medical information on the web is becoming popular and important these days. However, medical search has its own unique requirements that are not well handled by existing medical web search engines. Searching medical information on the internet is relevant and common now. Medical search engines are developed for this purpose. Idea behind this is contextual information retrieval which deals with the representation, organization, storage and access to information items. In proposed system, we present "MediAssist", the intelligent medical web search engine that extensively uses domain specific medical knowledge and questionnaire to facilitate ordinary Internet users to search for medical information. MediAssist uses several key techniques to improve its usability and the quality of search results. MediAssist extensively uses a wide range of medical scenarios. The results show that MediAssist is effective and efficient for medical search.

As the healthcare industry is moving toward, a more consumer centric focus, searching for medical information on the web has become highly popular. On an average day, 6 % of internet users perform medical search to better prepare for doctor's appointments and to better digest information obtained from doctors afterwards. Due to the increasing lack of new doctors, the interaction time between doctors and patients keeps shrinking, and this trend is expected to last in the foreseeable near future. Since October 2005, several medical web search engines have been launched, including Health line, Google Health, SearchMedica and Medstory . They use the traditional keyword query interface, which works well when the searcher clearly knows his medical situation.

Searching for medical information on this search engine is a challenging task for ordinary internet users. Often, users are uncertain about their exact medical situations, are unfamiliar with medical terminology, and hence have difficulty in coming up with the right search keywords. An intelligent medical search engine is specifically designed to address this challenge. It uses several techniques to improve its usability and search result quality. First, it uses an interactive questionnaire-based query interface to guide users to provide the most important information about their situations. Users perform search by selecting symptoms and answering questions rather than by typing keyword queries. Second, it uses medical knowledge (e.g. diagnostic decision trees) to automatically form multiple queries from a user answers to

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the questions. These queries are used to perform search simultaneously and it generates list of results. The contents of those lists are ranked using medical knowledge and specially designed medical information retrieval techniques.

II. LITREATURE SURVEY

- 1. A Variant Architecture Design for Intelligent Medical Search Engine (iMed):** This paper presents iMed, one of the medical search engines that use medical knowledge and questionnaire for searching. iMed introduces and extends expert system technology in to the search engine domain. This search engine uses many key techniques to improve its usability and search result quality. iMed provides a questionnaire based query interface to users. But it has some issues within its design. This paper is focuses on certain issues raised during the detailed study on the search engine.

Advantage -• Questionnaire based query • Provision to input medical images and test results
Disadvantage – • Need to improve the pattern matching technique • Generation of weak queries.
- 2. Automatic Home Medical Product Recommendation:** Web-based personal health records (PHRs) are being widely deployed. To improve PHRs capability and usability, the concept of intelligent PHR (iPHR). In this paper, uses automatic home medical product recommendation as a concrete application to demonstrate the benefits of introducing intelligence into PHRs.

Advantage • High quality queries • Topic selection input interface
Disadvantage • Makes use of Knowledge Based Searching • Use must know medical terms for Querying.
- 3. iMed: An Intelligent Medical Web Search Engine:** In this paper, they present iMed, the first intelligent medical Web search engine that extensively uses domain-specific medical knowledge and questionnaire to facilitate ordinary Internet users to search for medical information. iMed uses several key techniques to improve its usability and the quality of search results.

Advantage • Reduction of the number of rounds needed for finding the correct diagnosis • Suggest related medical phrases to help searchers quickly digest search results and refine their queries

III. RESEARCH METHODOLOGY

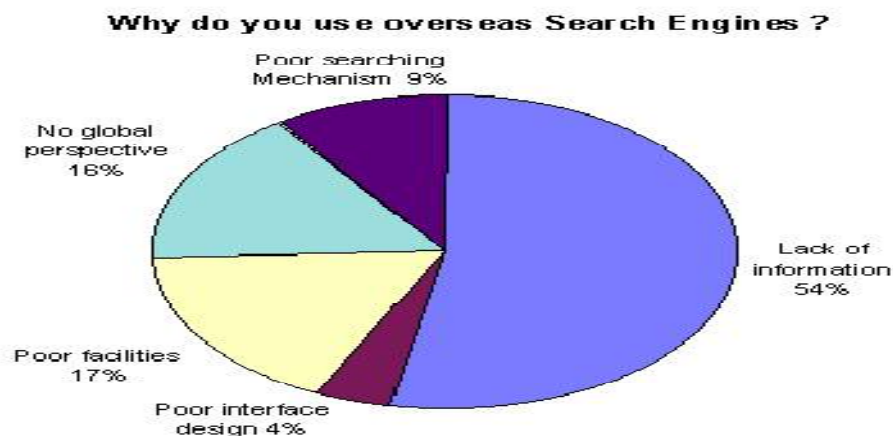


Figure 1: Need of Overseas Search Engines

- Ariadne Web Magazine for Information Professionals**
www.ariadne.ac.uk/issue6/survey
An electronic survey (based on a WWW questionnaire)

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Questionnaire Based Search: In this system, we should guide the searcher to describe his situation appropriately so that MediAssist can collect enough useful information without receiving much inappropriate information that conflict the search process. The key understanding for the design of a medical search interface comes from our observation. Questionnaires can easily guide the searcher to provide the most important information about his situation. A fixed questionnaire is too rigid. Based on this observation, we design our query interface as the combination of a questionnaire and traditional keyword based. The searcher answers questions in the questionnaire and selects inputs using checkbox. The searchers answer to the questions should not be directly used as query keywords to perform medical search. In fact, straightforward keyword matching using these answers often leads to undesirable search results. Medical diagnosis makes heavy use of medical knowledge and is a complex reasoning process. For generating questions here, we are using predefined diagnosis tree available in the Collins book.

Forming Medical Queries: MediAssist navigates the corresponding diagnostic decision trees and automatically forms multiple queries with different weights based on the searchers answers to the questions. Formed query is used to retrieve some related Web pages. MediAssist combines the search results for all these formed queries together and returns them to the searcher in multiple passes. All those Web pages are sorted in the same order as their corresponding queries. In general, for a given symptom or sign, multiple diagnostic decision trees exist in different medical textbooks.

Suggestion of Medical Diagnosis Information: In the output interface the entire search results are structured into a multi-level hierarchy that has explicitly marked medical meanings. More specifically, all the search results are organized into multiple categories according to their topics (e.g., disease names). Within each category, the corresponding search results are further divided into multiple sub-categories according to their aspects (e.g., symptom, diagnosis, treatment). This hierarchical search result output interface is intelligent in the sense that it automatically offers searchers what they want instead of waiting until they ask explicitly

IV. EXPERIMENTAL TESTS

System Testing

Compatibility testing: Compatibility Testing is a type of software testing to check whether your software is capable of running on different hardware, operating systems, applications, network environments or Mobile devices. Compatibility Testing is a type of the non-functional testing let's look into compatibility testing types

- Hardware
- Operating Systems
- Network
- Browser: Google chrome or Firefox
- Devices

Unit Testing: Unit testing is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of software. It usually has one or a few inputs and usually a single output

Integration testing: Software integration testing is performed according to the software development life cycle (SDLC) after module and functional tests. The cross-dependencies for software integration testing are: schedule for integration testing, strategy and selection of the tools used for integration, reusability of modules. Some different types of integration testing are top-down, and bottom-up. Bottom-up testing is an approach to integrated testing where the lowest level components are tested first, then used to facilitate the testing of higher level components. The process is repeated until the component at the top of the hierarchy is tested. All the bottom or low-level modules, procedures or functions are integrated and then tested. After the integration testing of lower level integrated modules, the next level of modules will be formed and can be used for integration testing. This approach is helpful only when all or most of the

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modules of the same development level are ready. This method also helps to determine the levels of software developed and makes it easier to report testing progress in the form of a percentage.

Graphical user interface testing: In software engineering, graphical user interface testing is the process of testing a product’s graphical user interface to ensure it meets its specifications. This is normally done through the use of a variety of test cases. To generate a set of test cases, test designers attempt to cover all the functionality of the system and fully exercise the GUI itself. Some functionality of the system may only be accomplished with a sequence of GUI events.

Test Cases

Test Case ID: 01

Description: User should be able to select type of user interface.

Prerequisites: Role should be selected.

Test Data: Choice Keyword Based Interface

Test Scenario: User properly Navigated to the Keyword Based Interface

Step	Input	Expected Result	Actual Result	Status
1	OpenMediAssist System	System should open.	As expected	Pass
2	Select Keyword Based Interface	Keyword Based interface should available.	As expected	Pass

Table 1: Test Case - 01

Test Case ID: 02

Description: User should be able to use Questionnaire Based Interface.

Prerequisites: User is connected to internet.

Test Data: Choice Questionnaire Based Interface.

Test Scenario: User properly Navigated to the Questionnaire Based Interface.

Step	Input	Expected Result	Actual Result	Status
1	Open MediAssist Website	Website should open.	As expected	Pass
2	Select Questionnaire Based Interface	Questionnaire Based interface should available.	As expected	Pass

Table 2: Test Case – 02

Test Case ID: 03

Description: Symptom table should be displayed in Questionnaire interface and symptoms are able to select.

Prerequisites: User is in Questionnaire interface.

Test Scenario: Proper symptoms are displayed and are able to select.

Step	Input	Expected Result	Actual Result	Status
1	Select Questionnaire Based Interface.	Questionnaire Based interface should available.	As expected	Pass
2	Display Symptom table.	Should display Symptom table.	As expected	Pass
3	Select Symptom from symptom table.	Should be able to select.	As expected	Pass

Table 3: Test Case – 03

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Test Case ID: 04

Description: Questions are asked on the basis of symptom selected.

Prerequisites: Symptoms are selected.

Test Scenario: Verifying proper questions are generated.

Step	Input	Expected Result	Actual Result	Status
1	Select symptom from table.	Should be able to select.	As expected	Pass
2	Display Questions.	Should display Questions.	As expected	Pass

Table 4: Test Case – 04

Test Case ID: 05

Description: Query is generation on the basis of given answers

Prerequisites: Query formed.

Test Scenario: Verifying proper query is generated.

Step	Input	Expected Result	Actual Result	Status
1	Select answers using checkbox.	Checkbox selected.	As expected	Pass
2	Forming query.	Query Formed	As expected	Pass

Table 5: Test Case –05

Test Case ID: 06

Description: Retrieving web pages.

Prerequisites: Medical query.

Test Scenario: Verifying Relevant web pages are retrieving.

Step	Input	Expected Result	Actual Result	Status
1	Generated query is fired on dataset	Relevant documents retrieved	As expected	Pass
2	Applying Conflation algorithm	Stop words and nonwords removed using conflation algorithm	As expected	Pass
3	Generating document representative	Using conflation algorithm document representatives are generated	As expected	Pass
4	Applying single pass clustering algorithm	Relevant documents are clustered	As expected	Pass
5	Redirecting to snippet generation	Forwarded to snippet generation	As expected	Pass

Table 6: Test Case –06

Test Case ID: 07

Description: Snippet generation and result analysis.

Prerequisites: Retrieved relevant web information Document representative.

Test Scenario: Analysis of result.

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Step	Input	Expected Result	Actual Result	Status
1	Generation of snippet.	Using document representative and retrieved web pages snippets are generated.	As expected	Pass

Table 7 Test Case -07

V. EXPERIMENTAL RESULTS

In the following Pictures you will see how a patient can go through the site to get the right treatment for his disease.

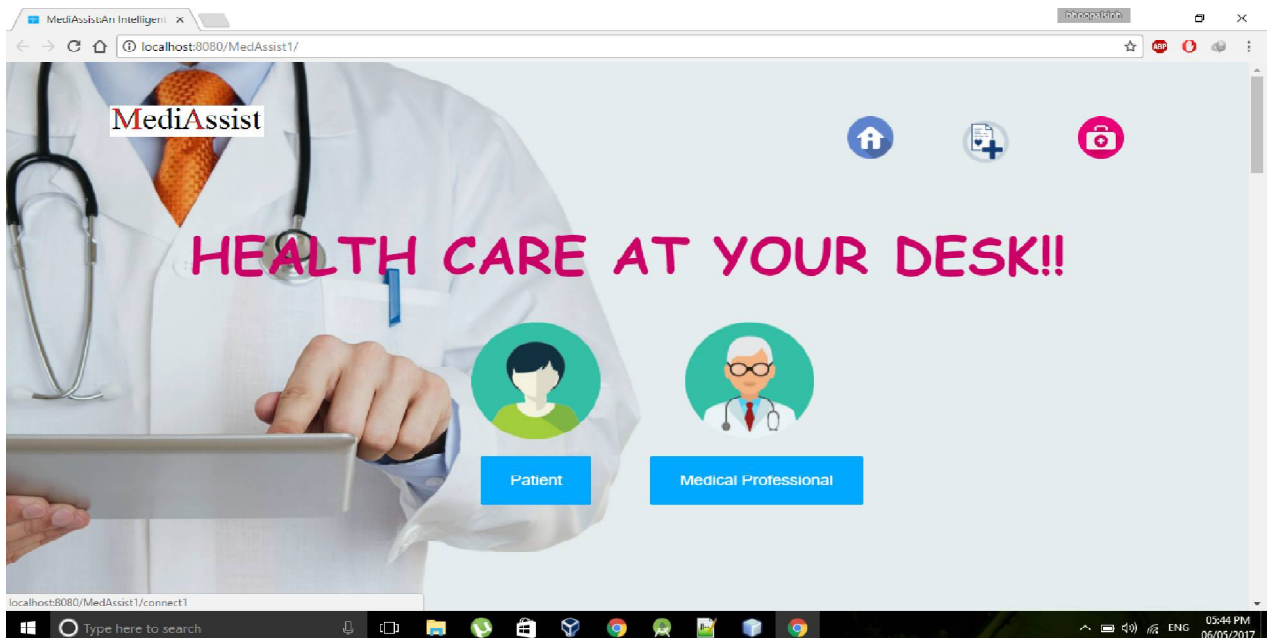


Figure 2: Home Page

This is the home page of system where searcher can select type of interaction towards system.

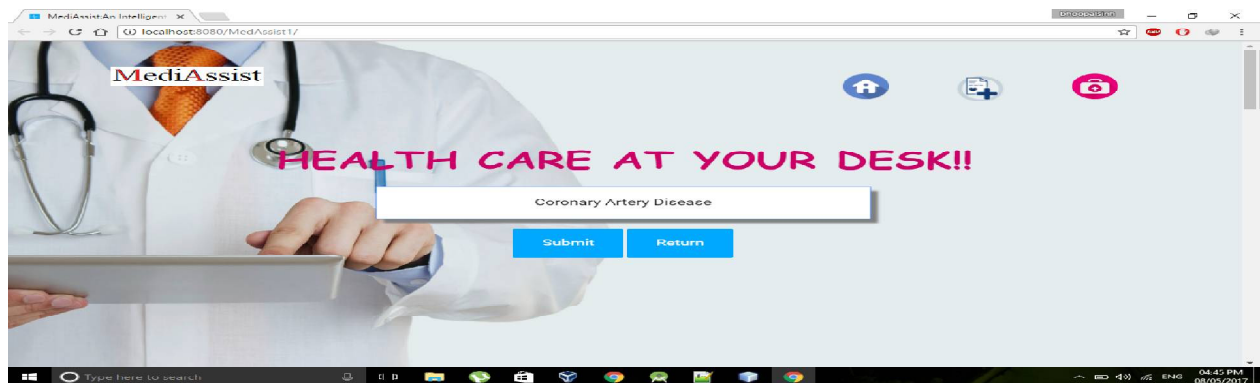


Figure 3: Keyword Based Search

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If the searcher has knowledge of medical phrases than searcher can select this type of interaction.

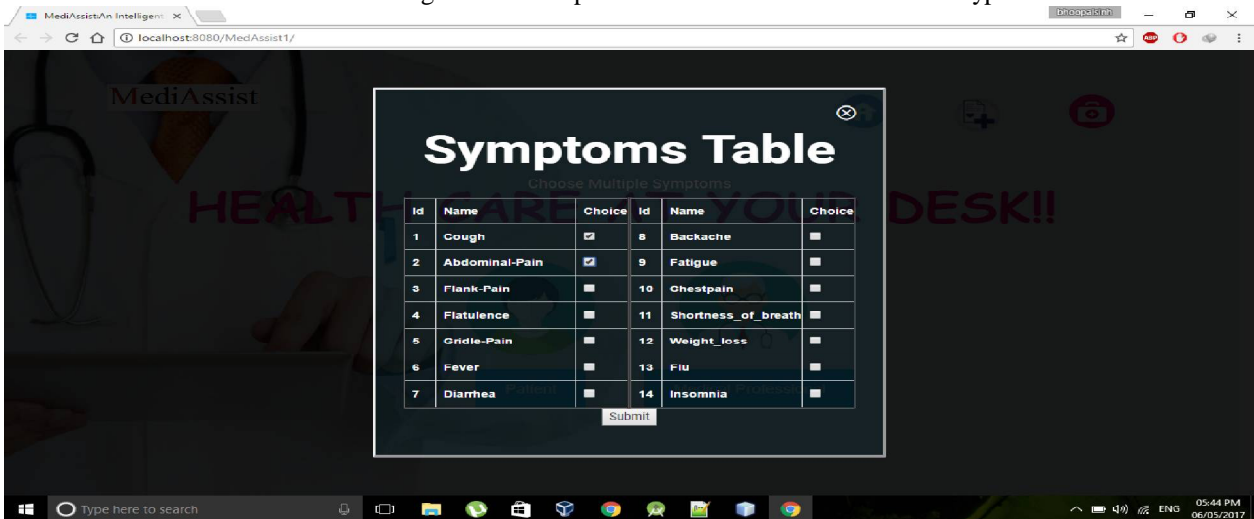


Figure 4: Symptoms Table

Here searcher can select one or more symptoms according to the require information.

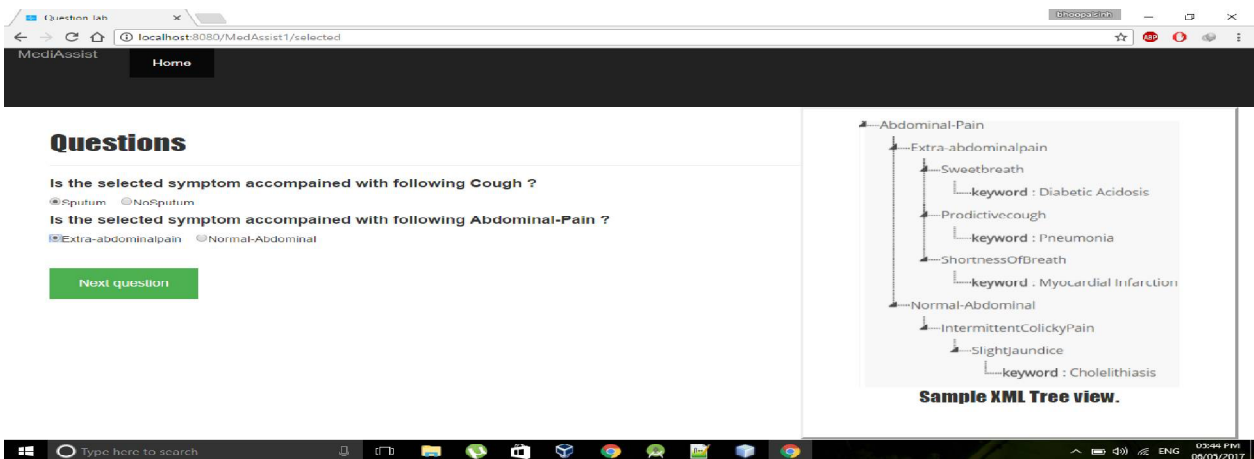


Figure 5: Question Page 1

Question Page 1, system ask questions to searcher and searcher selects only one answer out of the choices from list to particular question.

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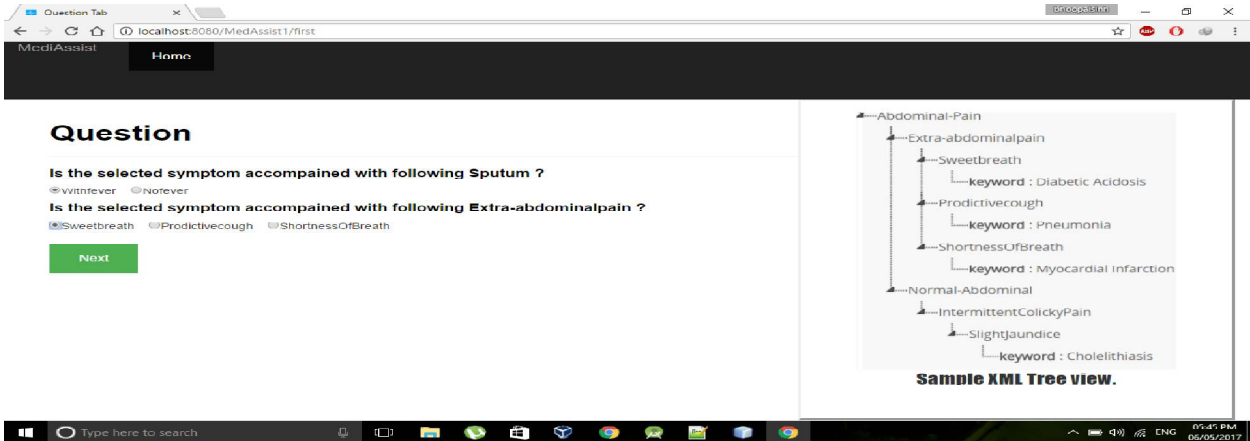


Figure 6: Question page 2
Question Page 2, based on previous answers next questions are asked.

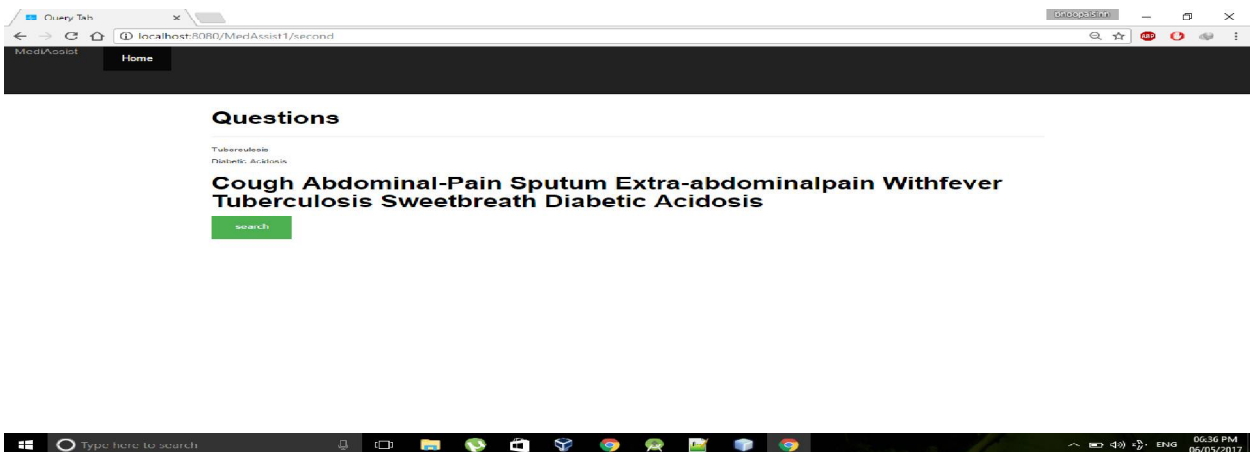


Figure 7: Query Page
System forms query from answers.

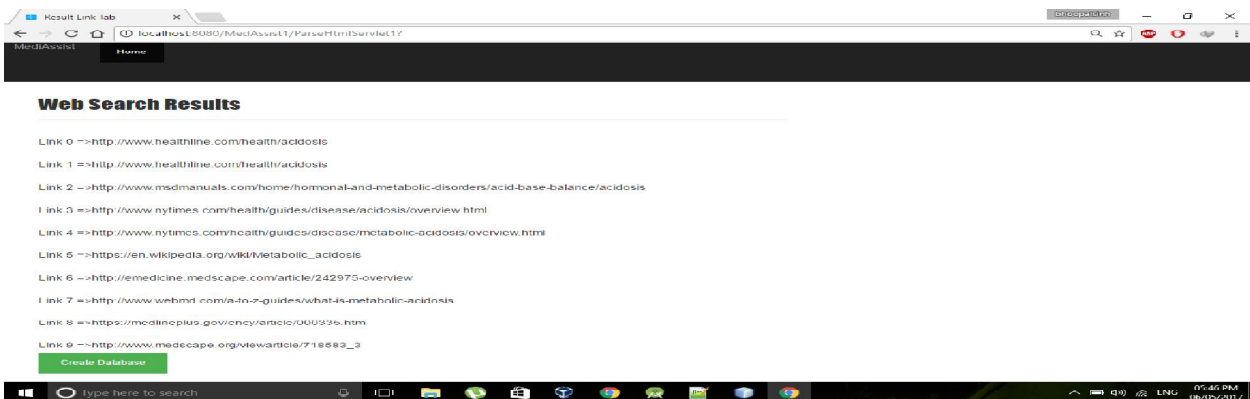


Figure 8: Search Results Page
System extract the links from search engine based on search query.

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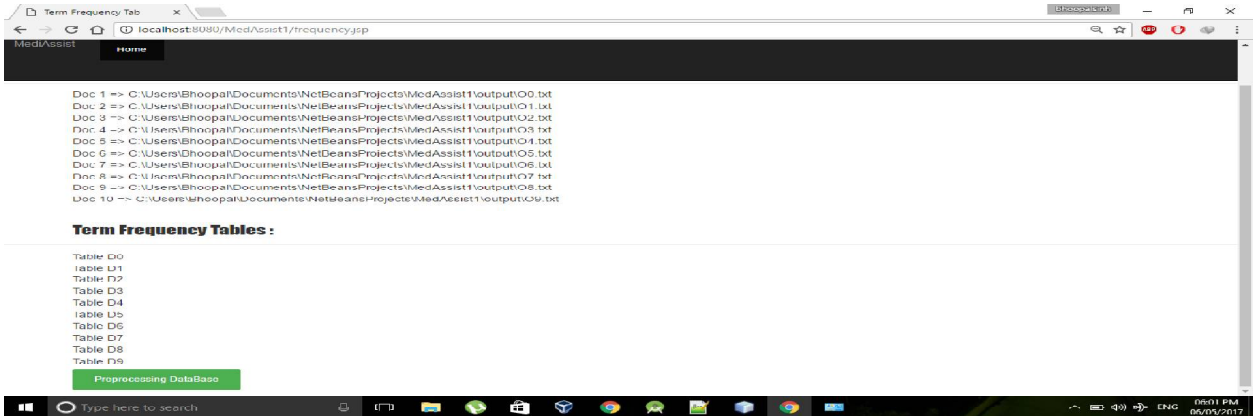


Figure 9: Term Frequency

From extracted links HTML parsing is done and given as input to conation algorithm, then term frequency tables are created and stored into Database.

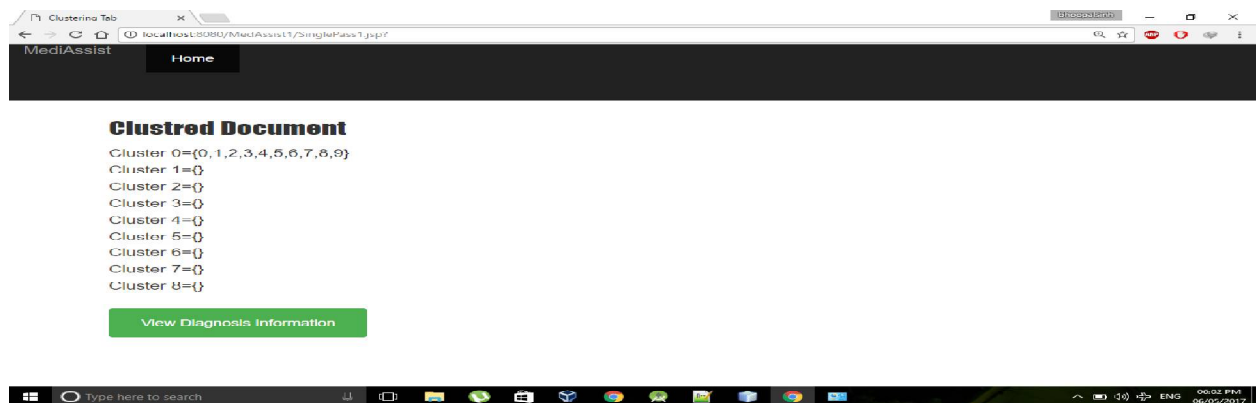


Figure 10: Clustering Page

Using Single Pass Clustering algorithm retrieved documents are clustered.

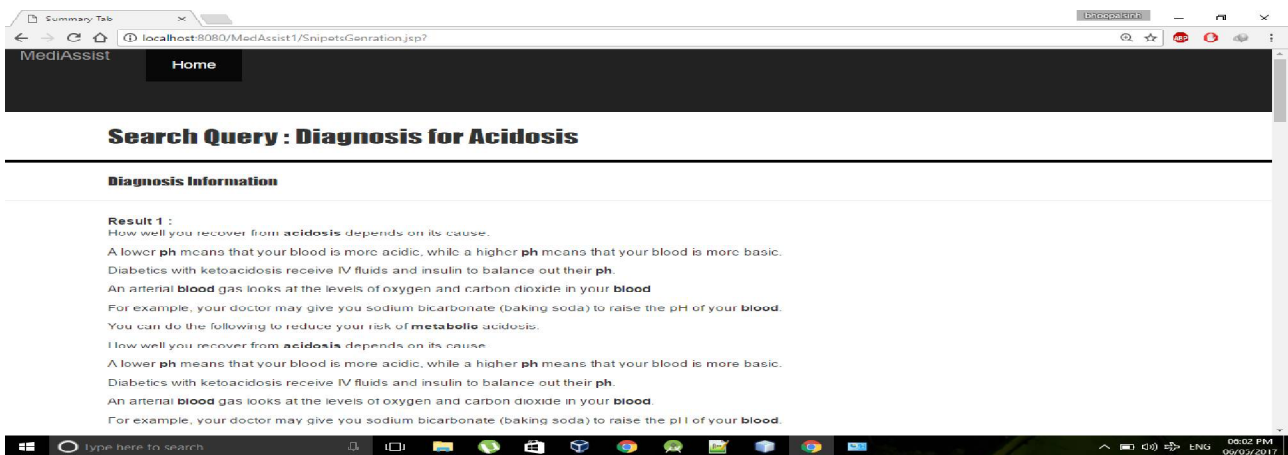


Figure 11: Snippets Summary Page

System will give diagnosis summary of search related to disease.

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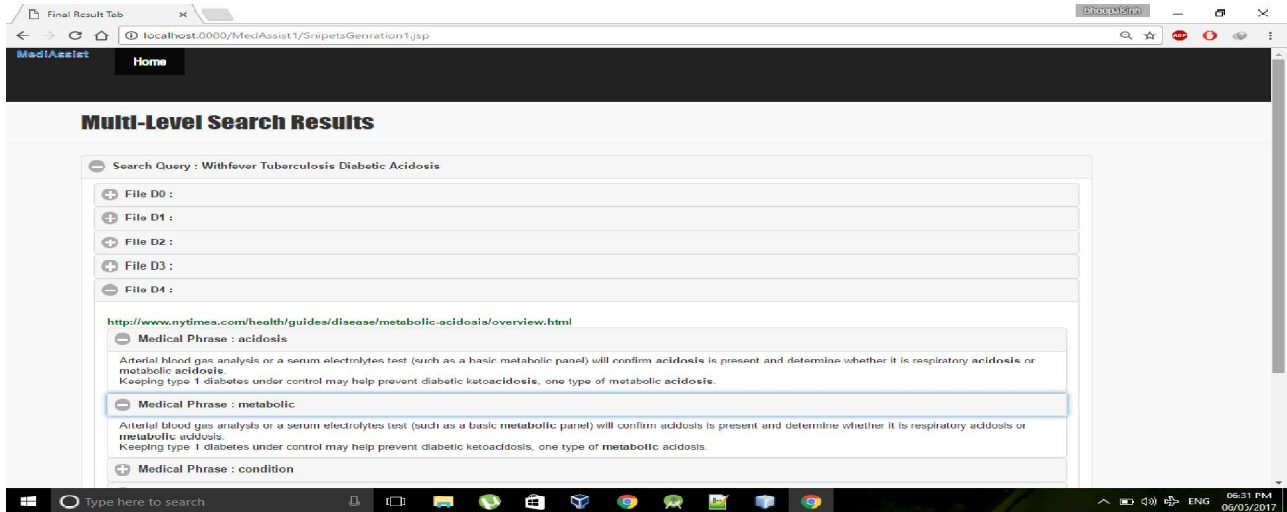


Figure 12: Final Results
Final results of the system are shown here as Multilevel Hierarchy.

VI. CONCLUSION & FUTURE SCOPE.

Conclusion

MediAssist improves the way of searching medical information on web search engines with less efforts of searcher by knowing searcher's medical situation well and gives more approximate medical diagnosis knowledge s compared to existing System. The proposed system makes use of questionnaires based medical query formation interface to reduce efforts of mankind who are not familiar with medical terms.

Future Scope

We have implemented our project as web application, in future we will implement our application on android device. Also we have plan to build a 3D model of human body. The user having discomfort in his body part will select the particular body part of the Designed 3D Model. After that system will guide to the user for more appropriate diagnosis information.

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