International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 09 | Sep 2019 www.irjet.net p-ISSN: 2395-0072

Automated Medical Diagnosis for Colon Cancer & Chronic Kidney Disease

Miss.P.Ooha[1], Mrs.Dr.Nara Kalyani[2]

[1]M.Tech (CSE), G.Narayanamma Institution of Technology and Science, Hyderabad
[2]Proffesor, Department of CSE, G.Narayanamma Institute of Technology and science, Hyderabad

---

Abstract - *Health problems are becoming more common than ever in world today. Early detection of health abnormalities helps to improve the lifestyle. The project aims to design a "Automated Assistance for Medical Diagnosis" which is a tool developed by using Rule based matching algorithm to predict illness based on patient symptoms and test results. Various Machine learning algorithms are implemented to get accurate results in detection of level of disease. This project aims at identifying the chronic kidney disease & Colon Cancer based on Patients Symptoms and test results. After the diagnosis it will finally generates a report, containing the results of analysis.*

***Key Words*: PythonQT, SQLite server, Pyuic(UI).**

1. INTRODUCTION

Healthcare is a formidable challenge and therefore a significant opportunity of the century. Access to human expertise in the field of healthcare is clearly unable to scale up to the need. There is a huge world population segment that does not have access to proper healthcare. World medical infrastructure is unfortunately not able to meet this primary humanitarian objective. One of the primary ones for its failure is the cost and availability of medical expertise. We therefore need an automated way of supplementing the healthcare system. Chronic kidney disease [CKD (also called chronic renal disease)] is a condition in which kidneys gradually lose their function. If the kidney does not function properly, this could cause waste and excess fluid accumulation in the body, affecting its functionality, and potentially leading to complications. The illness can advance to end-stage renal disease (complete kidney failure). This occurs when function of the kidney is worsened to a point Where dialysis or renal transplantation is necessary for survival.

Chronic kidney disease (CKD) is the gradual and permanent loss of kidney function over time, usually over the course of months or years. The most common causes of chronic kidney disease also known as chronic renal disease — are diabetes and high blood pressure. Approximately 2.6 million individuals in US have chronic kidney disease, and millions of others are at risk of developing the disease.

Colon cancer, also known as colorectal cancer, is the second-leading cause of cancer deaths in both men and women. Colon cancer is cancer of the big intestine (colon), which is the final part of your digestive tract. Most cases of colon cancer begin as small, noncancerous (benign) clumps of cells called adenomatous polyps. Over time some of these polyps can become colon cancers.

According to the Centers for Disease Control (CDC), 51,783 Americans died from colon cancer during last year.

2. LITERATURE SURVEY OF VARIOUS PAPERS

As per Elizabeth Palermo, Chronic kidney disease (CKD) is the gradual and permanent loss of kidney function over time, usually over the course of months or years. Kidneys are responsible for filtering waste from the body. When these organs stop functioning properly, waste builds up to high levels in the blood, which can make a person feel sick[4]. Over time, other health complications can develop as a result of decreased kidney function, including high blood pressure, anemia (decreased red blood cells), weak bones, poor nutritional health and nerve damage, according to the National Kidney Foundation. The most common causes of chronic kidney disease — also known as chronic renal disease — are diabetes and high blood pressure, which are responsible for up to two-thirds of all cases of the disease, according to Dr. Joseph Vassalotti, chief medical officer for the National Kidney Foundation (NKF)[5]-[7]. These health conditions damage the kidneys' small blood vessels, diminishing that organ's ability to filter metabolic waste from the blood. "As kidney disease advances and kidney function declines, the likelihood of high blood pressure increases. So kidney disease can be caused by high blood pressure, but high blood pressure can also complicate kidney disease from other causes," as per Vassalotti.

However, early detection can help prevent the progression of kidney disease to kidney failure, according to the National Kidney Foundation. With good care, fewer than 10 percent of diabetics develop CKD, according to the National Institutes of Health (NIH). Signs & symptoms CKD is sometimes called a "silent disease." Patients rarely feel sick until their kidney disease is advanced, While diabetes and high blood pressure are the leading causes of CKD, natural aging also puts people at an increased risk of developing this chronic disease, according to Vassalotti. "As we age, we tend to lose kidney function — especially over age 50, and usually in men more so than in women. Also as we age, we're more likely to develop Type 2 diabetes and high blood pressure," Vassolotti said. Most kidney diseases do not have a specific drug treatment, according to Vassalotti, who said that the first goal in treating kidney disease is to address the underlying causes of the disease and stop the disease from progressing. This

means treating conditions like diabetes and high blood pressure. Patients with hypertension, or high blood pressure, should take blood pressure medications and adopt a healthy diet and exercise routine. Those with acute infections, such as a urinary tract infection, should be treated with antibiotics or have any obstructions in the urinary tract removed, according to the Mayo Clinic. As patients undergo treatments for kidney disease or begin taking new medications, they need to keep all of their doctors in the loop about what medications and therapies they are using, according to Vassalotti. "Many drugs are cleared by the kidney, so that drug may need to be dose-adjusted because of decreased kidney function or even avoided," Vassalotti said. Even over-thecounter drugs can cause progression of kidney disease, he added. Another important component of treating kidney disease is screening patients with CKD for cardiovascular disease. Though kidney and cardiovascular diseases affect different parts of the body, many of the risk factors for these conditions are the same and are also common, according to Vassalotti, who said that high blood pressure, type-2 diabetes and smoking are risk factors for both conditions. Many studies have been published on the link between CKD and cardiovascular disease, Vassalotti said. A recent overview of the subject was published in the Journal of Nephropathology.

Colon Cancer: "Colon cancer is a growth in the colon that usually arises from a polyp. Sometimes the polyps look like stalks of cauliflower, sometimes they're flat," said[1]-[2] Dr. Richard Goldberg, the physician-in-chief and a professor of medicine at The Ohio State University Comprehensive Cancer Center – James Cancer Hospital and Solve Research Institute. "When they spread that's when [people] have life threatening issues." Colon cancer, also known as colorectal cancer, is the second-leading cause of cancer deaths in both men and women. According to the Centers for Disease Control (CDC), 51,783 Americans died from colon cancer in 2011 (the most recent year for available data)[3]. The disease affects slightly more men than women, and risk increases with age. Excluding very rare types, colon cancer develops in the cells lining the inside of the colon and/or rectum. The colon, or large intestine, is a curving structure that continues the digestion of food from the small intestine, absorbs liquid out of the stool and carries it down to the rectum for elimination. These factors include genetics, diet and health. Individuals with a family history of colon cancer, especially if more than one relative has had the disease, are at increased risk. Also, two genetic syndromes, familial adenomatous polyposis and Lynch syndrome, have been associated with colon cancer.

A diet rich in fat and red meat may increase disease risk. Colon cancer is rare in countries where red meat is less common on the menu. For instance, "Colon cancer is quite rare in Japan, although it's becoming more common as their diet becomes Westernized," Goldberg said. First-generation Japanese immigrants who move to Hawaii notice an uptick in colon cancer rates, and "after a generation, the immigrants adopt the incidence of their adopted country," Goldberg said[9]-[11]. In addition, heavy alcohol use as well as smoking may contribute to a colon cancer diagnosis. Health factors such as obesity, diabetes and lack of exercise are associated with increased risk. Moreover, inflammatory disease such as other types of cancer or conditions such as ulcerative colitis can increase the likelihood of developing colon cancer. These risk factors, however, do not guarantee a diagnosis of colon cancer. As with many cancers, colon cancer develops from the complex interplay of many factors, and no two individuals are the same.In other words, earlier stages in which the cancer is small and localized may require less intervention.

Typically, surgery can effectively remove small tumors and chemotherapy is prescribed to kill any remaining cells. Chemotherapy drugs commonly used for colon cancer include irinotecan, oxaliplatin, capacitabine and 5-fluorouracil. More advanced cancers in which the disease has metastasized, or spread, throughout larger areas of the colon or to other parts of the body may require removal of whole sections of the large intestine. Often, the remaining colon can be reconnected to the rectum, but if the cancer has also reached the rectum, a colostomy may be needed[12]. In this procedure, a surgeon creates an opening in the abdomen and attaches a colostomy "bag." Waste collects in the bag instead of passing through the rectum. Chemotherapy and radiation are then prescribed to kill remaining cancer cells, and control as much as possible the spread of the disease.

3. PROPOSED MODEL

”Automated Assistance for Medical Diagnosis” is a tool developed using symptom based rule matching algorithm. It is used to identify nature of an illness by examination of symptoms and test results. Develop an automated tool to diagnose the two diseases that is Chronic Kidney disease & Colon Cancer, based on the symptoms and the results of corresponding tests. Using Automated tool, it helps patients to identify the disease at the early stages itself. Using Automated tool patients can store the details in database and also the test results of the disease. Generates the report, to provide the suggestions to the patients.

The project aims to design a “Automated Assistance for Medical Diagnosis” is a tool developed using symptom based rule matching algorithm to give suggestion to patient based on his symptoms and test results. The main objectives of this project are as follows: a. Collection of data from dataset which is taken from the patients end point and processing the gathered data. b. Machine learning algorithms are implemented to get a productive and faithful detection of level of disease. c. Analyze the data as Data analysis can able to figure out multiple facets which indeed leads to better results d. Generating the report and evaluate the performance.

Modules:

Implementation of modules deals with prediction and analysis. Hospital dataset used in the process. It performs statistical observation on the dataset. Finally, prediction is performed on the training dataset.

The methodology contains the description about the modules identified to fulfill the objectives.

1. Data Collection: Collecting the data required for symptoms and test results of chronic kidney disease and colon cancer to detect the disease by using Symptoms permutation dataset.

2. Diagnose module:" Automated Assistance for Medical Diagnosis" is a tool developed using symptom based rule matching algorithm. It is used to identify nature of an illness by examination of symptoms and test results.

3. Report module: It is used to generate the report and provide suggestions to the patients.

4. ARCHITECTURE

"Automated Assistance for Medical Diagnosis" is a tool developed using symptom based rule matching algorithm. It is used to identify nature of an illness by examination of symptoms and test results.

Rule based matching algorithm:

1. Start

2. Connect to database

3. Initialize the variables

4. Insert the data and compare them.

5. Check the test result if count > 0 consult specialist immediately as +ve test results are present.

6. Check the test result if count == 0 and symptoms count > 5 consult specialist immediately as +ve symptoms are present.

7. Check the test result if count == 0 and symptoms count <5 consult specialist not immediately.

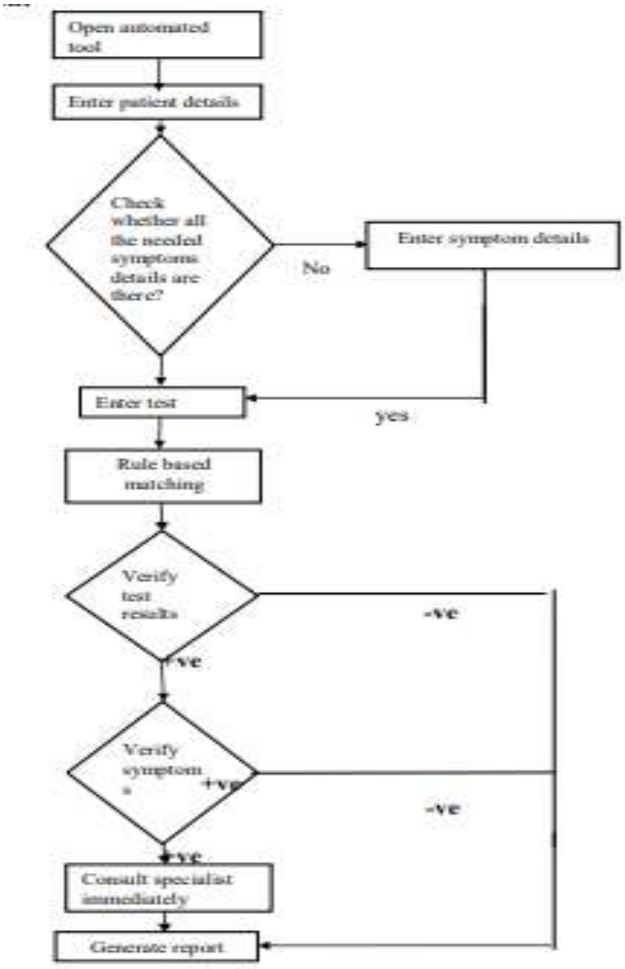

Fig1: Flowchart for prediction

Random forest model:

Random forests or random choice forests are an ensemble training program for classification, regression and other activities that work by building a variety of decision trees at training moment and producing a class that is the mode of classes (classification) or mean prediction (regression) of individual trees. Random decision forests are right for decision trees' habit of overfitting to their training set.

Random Forests decrease the variance that may cause mistakes in Decision Trees by aggregating the distinct outputs of the individual Decision Trees. Through majority voting, we can discover the average profit provided by most of the individual Trees, thus smoothing out the variance so that the model is less likely to produce outcomes further away from the true values.

5. RESULTS AND DISCUSSIONS

"Automated Assistance for Medical Diagnosis" is a tool developed using symptom based rule matching algorithm. It is used to identify nature of an illness by examination of symptoms and test results.

Algorithms	Number of samples used for training	Number of samples used for test set	Disease identified and recognised True Positive	Disease identified and not recognised True negative	Disease not present but recognised as passed False Positive	Disease present and recognised as passed False negative
Random forest algorithm	700	300	200	60	20	20
Rule based matching algorithm	280	150	80	30	25	15

Table 1: Comparison of algorithms

Accuracy for Random forest algorithm: 220/300=0.73

Accuracy for Rule based matching algorithm: 95/150=0.63

By comparing random forest and rule based matching algorithms it is clear that random forest algorithm generate accurate results.

6. CONCLUSIONS & FUTURE SCOPE

This project entitled "Automated system for the identification of Chronic Kidney disease & Colon Cancer" is useful to predict the diseases based on patient symptoms and test results. The project use random forest algorithm and rule based matching algorithm by comparing both the algorithms Random forest algorithm generate accurate results. This is very useful to the poor patients who can't go for regular medical checkups, because of high medical expenses. As of now the system is considering only 10 symptoms and two test results for analyzing each disease. This project can be improved further by considering more machine learning algorithms and symptoms to detect the disease accurately.

REFERENCES

[1] Maree,R.,Geurts,P.,Piater,J.,&Wehenkel,L(2005).Random subwindows for robust image classification. Proc. IEEE International Conference on Computer Vision and Pattern Recognition (CVPR).

[2] Matas, J., &Obdrzalek, S. (2004). Object recognition methods based on transformation covariant features. Proc. 12th European Signal Processing Conference (EUSIPCO 2004). Vienna, Austria.

[3] Mikolajczyk, K., &Schmid, C. (2005). A performance evaluation of local descriptors. PAMI, to appear.

[4] Mikolajczyk, K., Tuytelaars, T., Schmid, C., Zisserman, A., Matas, J., Schaffalitzky, F., Kadir, T., &Gool, L. V. (2005). A comparison of affine region detectors. International Journal of Computer Vision,to appear.

[5] M. Goldbaum, S. Moezzi, A. Taylor, S. Chatterjee, J. Boyd, E. Hunter, and R. Jain. Automated diagnosis and image understanding with object extraction, object classi_cation, and inferencing in retinal images. In Proc.IEEE International Conference on Image Processing (ICIP), volume 3,pages 695-698, 1996

[6] Mohammed, O., Benlamri, R., & Fong, S. (2012, December). Building a diseases symptoms ontology for medical diagnosis: An integrative approach. In Future Generation Communication Technology (FGCT),2012 International Conference on (pp. 104-108). IEEE.

[7] Pendyala, V. S., Fang, Y., Holliday, J., Zalzala, A., (2014, October).A Text Mining Approach to Automated Healthcare for the Masses.In Global Humanitarian Technology Conference (GHTC), 2014 IEEE.

[8] Akay, M. F. (2009). Support vector machines combined with featureselection for breast cancer diagnosis. Expert systems with applications, 36(2), 3240-3247.

[9] Croft, D. J. (1972). Is computerized diagnosis possible?. Computers and Biomedical Research,5(4),351-367.

[10] Pendyala, V. S., & Shim, S. S. (2009). The Web as the Ubiquitous Computer. IEEE Computer, 42(9), 90-92.

[11] Stanton, I., Ieong, S., & Mishra, N. Circumlocution in Diagnostic Medical Queries. Microsoft Research.

[12] Rodrguez, A., Mencke, M., Alor-Hernandez, G., Posada-Gomez, R.,Gomez, J. M., & Aguilar-Lasserre, A. A. (2009, February). Medboli: Medical diag- nosis based on ontologies and logical inference. In eHealth, Telemedicine, and Social Medicine, 2009. eTELEMED'09.International Conference on (pp. 233-238). IEEE.