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# A Review on Disease Prediction and Consultation Using Machine Learning

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**ABSTRACT**: The medical industry deals with massive amounts of data on a regular basis. Using traditional approaches to handle large amounts of data can have an impact on the outcome. Machine learning algorithms can be used to discover facts in medical research, particularly for disease prediction. For the analysis of patient medicines and specialists, early disease recognition is critical.To diagnose various disorders, machine learning algorithms such as Decision trees, Support vector machines, Multilayer perceptrons, Bayes classifiers, K-Nearest Neighbors Ensemble classifier techniques, and others are utilised. Machine learning algorithms can help predict diseases quickly and accurately.This study looks at how machine learning techniques are used to forecast various diseases and their forms. This study looked at research publications on chronic renal disease prediction, machine learning, heart disease, diabetes, and breast cancer, among other topics. The hybrid technique, which improves the performance of individual classifiers, is also investigated in the research.

**KEYWORDS:** Dynamic policy, patient preference learning, physician recommendation

## I. INTRODUCTION

Machine Learning is an area of artificial intelligence that tries to give computer methods for accumulating, changing, and updating the knowledge of intelligent systems. Artificial intelligence (AI) enables computers to analyse their surroundings, execute certain functions, and improve their chances of solving real-world problems. With technical advancements and scientific progress, AI is proving to be a fascinating field. As a result, ML approaches are receiving more attention. Machine learning (ML) is a powerful data analysis technique that uses learning algorithms to iteratively learn from existing data. For example, in primary care, model and evaluate electronic visits, and research They-based appointment systems. They-based or mobile-based healthcare applications like as ZocDoc, Quest Diagnostics, and WeDoctor and HaoDF in China are well-known, and these systems are assemblages of a big number of resources, especially doctors, from many hospitals in various places.

According to several industry findings, patients are unable to discover the most suited physicians for their illness condition due to a lack of medical understanding. To that end, physician advice, which is the basis for this research, becomes an effective tool for web- or mobile-based applications for allocating suitable resources to patients.
In general, these apps offer patients appointment services through physician selection recommendations, from which they can choose one for medical services. Patients must first choose their preferred hospital location and appointment time before beginning the service.

## II. LITERATURE SURVEY

1) Paper Name- Combining Traditional Learning and the E-Learning Methods in Higher Distance Education: Assessing Learners' Preference

Author: Gloria C. Alaneme\ Peter O. Olayiwola2, Comfort O. Reju3

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Description:
Distance Education is a system where learners are separated from the teachers or educational institution both in time and space for a reasonable period of their learning. It may include contact, no contact and part-time education (Federal

Republic of Nigeria, FRN 2004). The concept of Distance Education in higher institutions is no longer new to most nations around the world. It has been found as a viable and pragmatic alternative in the educational delivery process especially at the tertiary level. In Nigeria, it has been accepted and integrated into the mainstream of the Nigerian educational system (Akpan, 2008). What is new however is that different strategies and methods of instructional delivery for meaningful learning kept evolving.Concepts like blended learning, flexible learning, and virtual learning amongst others abound. The question on the lips of practitioners becomes 'is there one best method of delivery?' This we opine may meet divergent views depending on the sociocultural factors predominant in a particular region or nation.

2) Paper Name- Considering data-mining techniques in user preference learning
Author- Peter Vojtáš1,2, Alan Eckhardt1,2{vojtas, eckhardt}@ksi.mff.cuni.cz

Description-
Preference learning has been of major interest in past years. A lot of attention was focused in the developing of user models and preferences. However, the use of classical machine learning methods, especially data mining methods, has not been widely discussed. In this paper we present a simplified model, which abstracts from user inconsistencies and gradual changing his/her preferences. As a motivation example, we consider an example of a user looking for a notebook. We present him/her with a small sample of notebooks (we do not discuss the problem of the sample creation here; it was discussed in [1]). We ask him/her to evaluate notebooks with the following five values (they can be numeric, linguistic, pictorial choices – we do not discuss HCI aspects here):

3) Paper Name- Discriminative apprenticeship learning with both preference and non-preference behavior
Author- DingshengLuoa,b, Yi Wanga,b, XihongWua,b,c,∗ Email: {dsluo, wangyi, wxh}@cis.pku.edu.cn

Description-
 In traditional framework of learning from demonstration, an apprentice just attempts to mimic a demonstrator's behavior inflexibly without understanding the inner mechanism underlying demonstrated behavior. This leads to one problem in robotics that while modern robots are physically capable of performing many useful tasks, they are only able to perform the same tasks repeatedly in constant environment. To achieve adaptive ability, reinforcement learning (RL) is widely used in robotics area, and turns out to be a suitable technique under a given reward that is usually constructed manually in advance. In many cases, however, constructing such a reward remains to be not only tedious but also difficult to encode explicitly. Faced with such a problem, taking the goal of recovering the reward function according to the demonstrated behavior, inverse reinforcement learning framework is then studied. An widely cited work that first formalizing the inverse reinforcement leaning was carried out by Ng & Russell [1], based on which, the apprentice first recoveries the reward function from demonstrations and then uses it to find a desired behavior. However, it is ill-posed, since a large class of reward functions might lead to the same optimal behavior, meanwhile many optimal behaviors could be found under the same reward function. Most works have been proposed to alleviate this problem, including Maximum Margin Planning (MMP) [2], Bayesian approach [3] and Maximum Entropy algorithm [4], etc.

4)  Paper Name- Pairwise Kernel-Based Preference Learning for Multiple Criteria Decision Making
Author- Leonid Lyubchyk, Galina Grinberg, lyubchik.leonid@gmail.com, glngrinberg@gmail.com

Description-
One of the main problems in the theory and practice of decision-making is to construct a complex generalized index, combining the set of particular criteria [1, 2]. This problem occurs in the problems of multi-criteria optimization based on different ways of aggregating the particular criteria [3], in optimal ordering or ranking of objects based on their features [4, 5] and a number of other practical applications. It is assumed that a set of features describes the objects performance or quality according to some criteria. The most common and effective approach to solving such problems is based on the so-called preference or utility functions, a scalar real-valued function which reflects a decision-making preference with respect to particular criteria or features [6]. In decision making processes preference function may be used for construction of aggregate performance index of objects (alternatives) over for all criteria, which, in fact, is an expert measure of object's performance.

5) Paper Name- Electronic Visits in Primary Care: Modeling, Analysis, and Scheduling Policies

Author- Xiang Zhong, Jingshan Li, *Senior Member, IEEE*, Philip A. Bain, and Albert J. Musa

Description-
The rapid development of information technology has made the delivery of healthcare over a distance possible, which introduces substantial opportunities. Many healthcare organizations have introduced online electronic visit programs, referred to as e-visit (or e-portal, e-service, and so on), to provide the patient–physician communication through securing messages [5]. Recent studies demonstrate that by introducing e-visits, significant savings can be obtained with improved access to care, and increased provider efficiency and patient satisfaction [6]–[10]. To better understand and implement e-visits, a mathematical model of primary care delivery through both the office and the e-visits is aspired. It can provide the care delivery process a fresh look from an integrated systems' engineering perspective. However, few quantitative models on e-visits are available in the current literature. How primary care physicians manage their operations in response to the introduction of e-visits is still an open question. Therefore, this paper is devoted to developing an analytical tool to investigate e-visit's impact on physician's practice, and identify the conditions that e-visits can improve patient accessibilility.

E-visit, as a novel alternative to the traditional office visit, has aroused growing attention in recent years. Many healthcare organizations, such as Henry Ford Health

## III. PROBLEM STATEMENT

In hospital system they have their own doctors team for disease prediction . But in case they not able to  handle the patient then they refer the another hospital .So this activity can consume a lot of time and money so we are avoiding such things in this project and providing web base application which can check patients diseases and recommend the doctor according to their requirements

## IV. EXISTING SYSTEM

In existing system patient has to visit the hospital for checkup and  after that doctor gives tablets and prescribes tests. So this process takes time and money.Some diseases cannot be identified in short period of time and they require tests.As time span increases disease may be expaned. So we are trying to reduce this process and prefer doctor according to patient diseases.

## V.CONCLUSION AND FUTURE WORK

In this project, an analytical model of primary care delivery with e-visits is developed. Formulas to evaluate the mean and variance of lengths of visit for both the office and e-visit patients are derived. Three scheduling policies coordinating the office and the e-visits are compared and the impact of e-visits on primary care delivery is investigated. The model provides a quantitative tool for primary care physicians and clinic managers to apprehend e-visits and design effective care delivery policies. Future work can be directed to the following
avenues.

• The current model assumes the Poisson arrivals that may be too strict. Thus, extending the model to general arrivals is essential. Moreover, incorporating the waiting time for office visit appointments and patientsavailability or preference, and investigating their impacts are desirable

.• In addition to the three scheduling policies discussed in this paper, other policies, such as blocking (i.e., assign a block time to process e-visits) or alternative (i.e.switching between office and e-visits) are optional. Evaluating and comparing other scheduling policy

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