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Research Report

on

Diagnostics and Treatment

with Artificial Intelligence and Machine Learning

“And whoever saves one - it is as if he had saved mankind entirely.”

Al-Quran [5:32]

by

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Abstract

COVID19 is a hot topic of year 2020. As the entire health industry is seeking urgent solutions to halt the race of spread of COVID19. (Walter & Jones, 2020) Crucial solutions are still to find to control the expansion of the virus. The major strength of AI is that it can systematically analyze the infection caused by the virus. It can predict and monitor the spread of infection based on current and previous data, contributing significantly to developing a vaccine for COVID19. However, pitfalls coming up in implementing AI is due to lack of data, and sometimes data found with missing values, noisy and has outliers. To overcome these problems is a challenge for researchers and concerned health experts. Nonetheless, AI can ascertain viral load dynamics for the prevention and control of the pandemic. Thus, a more comprehensive study on datasets must understand the virus's pathogenesis and put a crucial stop to the problem. (Arima, Washio, Tsutsui, Baba, & Kawai, 2020). Diseases never come with prior intimation. In real-world scenarios reporting such diseases is a real challenge. We are proposing a new idea to automate this process of disease prediction and effective treatment. Through this app, people will be able to get one more way to properly medical checkup without visiting hospitals. We have developed an expert system named “Al-Shaafi” that provides medical facilities to the patients in the minimum possible time. This system may diagnose the patient. This diagnosis will inform the patients about their disease they are suffering with. This expert system also facilitates the patients in the treatment for the respective illness they are suffering with. In this system, a team of dedicated and expert doctors would be available if a patient needs medical consultancy. Emergency services like Ambulance and Rescue are available 24/7. This expert system also facilitates women in obstetrical and gynaecological treatment. It has been observed that when the patient visits the doctor for the next time, the medical history of the patients is usually overlooked. Al-Shaafi provides the facility to record the patient's history. This expert system virtually connects a patient to the doctor for medical consultancy.

1. Introduction

The system is named “Al-Shaafi” means “The Healer”; and is the Holy name of Allah Almighty. This is an expert system for computerized diagnostics and treatment. This system is the solution for a long queue of patients in almost every hospital and clinic. This is an important issue that should be resolved. We may increase the number of doctors against the number of patients. To increase the number of doctors is not possible in the developing countries due to lack of resources. Health is vital, does not matter what country we are from or what race we are, or what age or gender we are; we all strive for a healthy life. It is crucial for everyone, and it costs more than anything. We are living in an era of the internet and information technology. Diseases never come with prior intimation. In real-world scenarios reporting such diseases is a real challenge. We are proposing a new idea to automate this process of disease prediction and effective treatment. Through this app, people will be able to get one more way to properly medical checkup without visiting hospitals. We have developed an expert system named “Al-Shaafi” that provides medical facilities to the patients in the minimum possible time. This system may diagnose the patient. This diagnosis will inform the patients about their disease they are suffering with. This expert system also facilitates the patients in the treatment for the respective illness they are suffering with. In this system, a team of dedicated and expert doctors would be available if a patient needs medical consultancy. Emergency services like Ambulance and Rescue are available 24/7. This expert system also facilitates women in obstetrical and gynaecological treatment. It has been observed that when the patient visits the doctor for the next time, the medical history of the patients is usually overlooked. Al-Shaafi provides the facility to record the patient's history. This expert system virtually connects a patient to the doctor for medical consultancy.

2. Research Work

COVID19 is a hot topic of year 2020. As the entire health industry is seeking urgent solutions to halt the race of spread of COVID19. (Walter & Jones, 2020) Crucial solutions are still to find to control the expansion of the virus. The major strength of AI is that it can systematically analyze the infection caused by the virus. It can predict and monitor the spread of infection based on current and previous data, contributing significantly to developing a vaccine for COVID19. However, pitfalls coming up in implementing AI is due to lack of data, and sometimes data found with missing values, noisy and has outliers. To overcome these problems is a challenge for researchers and concerned health experts. Nonetheless, AI can ascertain viral load dynamics for the prevention

and control of the pandemic. Thus, a more comprehensive study on datasets must understand the virus's pathogenesis and put a crucial stop to the problem. (Arima et al., 2020)

Main Point of focus:

Pitfalls coming up in implementing AI is due to lack of data, and sometimes data found with missing values, noisy and has outliers. To overcome these problems is a challenge for researchers and concerned health experts. (Foers et al., 2020)

3. Problem Statement

Diseases never come with prior intimation. In real-world scenarios reporting such diseases is a real challenge. We are proposing the new idea to automate this process of diseases predictive and providing tests and medicine service. The purpose of this app is to help doctors to maintain patient history. Through this app, people will be able to get one more way to properly medical checkup without visiting hospitals. A long queue of patients in almost every hospital and clinic can be observed. This is an important issue that needs to be resolved. We can increase the number of doctors against the number of patients; however, it's not possible in developing countries due to lack of resources.

4. Problem Solution for Proposed System

We are living in an era of the internet and information technology. Everything is being done with computers. Health is vital, does not matter what country we are from or what race we are, or what age or gender we are; we all strive for a healthy life. It is crucial for everyone, and it costs more than anything. That's why we are going to develop an expert system named Al-Shaafi which can provide medical facilities to the patients in the minimum possible time.

Patients would be able to diagnose themselves just like a real checkup by a doctor. This diagnosis will inform the patients about their disease they are suffering with. This expert system will also facilitate the patients in the treatment for the respective illness they are suffering with. A team of dedicated doctors would be available if a patient needs medical consultancy. Moreover, emergency services like ambulance and rescue would be available 24/7. This expert system will also facilitate the woman in terms of obstetrics and gynaecology.

It has been observed that the medical history of the patients is overlooked by the doctor when the patient visits the doctor for the next time. Al-Shaafi will provide the facility to record patient history. Moreover, It can virtually connect a healthcare provider to a patient at any time of the day or night.

5. Related System Analysis

We studied three systems like this and found weaknesses in different eras.

1. **CURRENT Medical Diagnosis and Treatment CMDT 2020** ^[1]
2. **Medical Laboratory Diagnosis** ^[2]
3. **Symptomate – Symptom checker** ^[3]

Table 1 Related System Analysis with proposed project solution

Application Name	Weakness	Proposed Project Solution
CURRENT Medical Diagnosis and Treatment CMDT	- No Medical Consultancy - No Emergency Helpline - No Obstetrics and Gynaecology - PKR 10,100	- Medical Consultancy - Emergency Helpline - Obstetrics and Gynaecology - Cheap Solution
Medical Laboratory Diagnosis	- No Medical Consultancy - No Emergency Helpline - No Obstetrics and Gynaecology - PKR 390	- Medical Consultancy - Emergency Helpline - Obstetrics and Gynaecology - Cheap Solution
Symptomate – Symptom checker	- No Emergency Helpline - No Obstetrics and Gynaecology - No Laboratory Tests	- Emergency Helpline - Obstetrics and Gynaecology - Laboratory Tests

6. Advantages/Benefits of Proposed System

- Patients would be able to diagnose themselves just like a real checkup by a doctor.
- The diagnosis will inform the patients about their disease they are suffering with.
- This expert system will also facilitate the patients in the treatment for the respective illness they are suffering with.
- A team of dedicated doctors would be available if a patient needs medical consultancy.
- Emergency services like ambulance and rescue would be available 24/7.
- This expert system will also facilitate the woman in terms of obstetrics and gynaecology.
- It has been observed that the medical history of the patients is overlooked by the doctor when the patient visits the doctor for the next time. Al-Shaafi will provide the facility to record patient history.
- It virtually connects a healthcare provider to a patient at any time of the day or night.

7. Scope

Diseases never come with prior intimation. In real-world scenarios reporting such diseases is a real challenge. So, we are proposing the new idea to automate this process of diseases predictive and

providing tests and medicine service. The purpose of this app is to help doctors to maintain patient history. Through this app, people will be able to get one more way to properly medical checkup without visiting hospitals. A long queue of patients in almost every hospital and clinic can be observed. This is an important issue that needs to be resolved. We can increase the number of doctors against the number of patients; however, it's not possible in developing countries due to lack of resources.

Patients would be able to diagnose themselves just like a real checkup by a doctor. This diagnosis will inform the patients about their disease they are suffering with. This expert system will also facilitate the patients in the treatment for the respective illness they are suffering with. A team of dedicated doctors would be available if a patient needs medical consultancy. Moreover, emergency services like ambulance and rescue would be available 24/7. This expert system will also facilitate the woman in terms of obstetrics and gynaecology.

It has been observed that the medical history of the patients is overlooked by the doctor when the patient visits the doctor for the next time. Al-Shaafi will provide the facility to record patient history. Moreover, It can virtually connect a healthcare provider to a patient at any time of the day or night.

8. Data Gathering Approach

We have collected data about diagnostics, laboratory, treatment and Obs & Gynae from the doctors that are engaged in this project. The doctors shared their experience with what they concluded throughout their practice. We preserved their experience in this expert system.

9. Concepts

This system follows the real life scenario of diagnostics and treatment Flow. Patient visits the doctor and informs them of their symptoms. On the basis of symptoms, the doctor advises some tests based on the expertise of the doctor. The results of those tests declare the disease. After identification of disease; the patient is now advised for the treatment. During his treatment, he can contact the doctor to discuss complications he may have. In case of emergency, he may have emergency services available 24/7. This system is also designed for pregnant women. They can get proper guidelines as well as emergency services. Indeed, here is no substitution for a human life.

10. Conclusion

Patients may diagnose themselves just like a real checkup by a doctor. This diagnosis will inform the patients about their disease they are suffering with. This expert system also facilitates the patients in the treatment for the respective illness they are suffering with. A team of dedicated doctors would be available if a patient needs medical consultancy. Moreover, emergency services like ambulance and rescue would be available 24/7. This expert system also facilitates women in obstetrical and gynaecological treatment. It has been observed that when the patient visits the doctor for the next time, the medical history of the patients is usually overlooked. Al-Shaafi provides the facility to record the patient's history. This expert system virtually connects a patient to the doctor for medical consultancy.

11. References

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