AI in Medical Application: An Exploration

Introduction:

In many developing countries there are few number of medical specialists so patients suffered from various diseases. To increase the number of doctors and nurses we need a long period of time. The universities do their best to graduate as many doctors as possible. But while this long time many patients may die. And while this long time the disease may have already spread out.

Computer technology could reduce the number of patients who die. Computer software developed by emulating human intelligence could be used to help doctor in making decisions. This software wasn't developed to replace doctors but to help them in diagnosing and predicting patient condition. AI technology in medical could reduce the cost, time, human experience and medical error.

Computer program known as (Medical Decision-Support System) was made to help doctor make clinical decision. It deals with medical data to diagnosing patient conditions and recommend the best treatment for the patient.

AI in Medicine:

Artificial Intelligence is a study to emulate human intelligence into computer technology. Hoong (1988) summarized the potential of AI technology in medicine as follows:

- Provides a lab for the examination, organization, representation and cataloguing of medical knowledge.
- Present new tools to help in medical decision making, training and research.
- Integrates activities in medical, computer and other sciences.
- Offers a content-rich discipline for future scientific medical specialty.

Many intelligent software have been developed to enhance health-care, reduce cost and etc. As express by many studies (such as Mahabela et al., 1992; Manickam and Abidi., 1999), intelligent system was developed to help doctors and patients and provide early diagnosis and prediction to prevent serious diseases. This software will never replace human expertise as human monitor and update the software's knowledge.

Early studies in intelligent medical system such as MYCIN, CASNET, PIP and Internist-1 have shown to out perform manual practice of diagnosis in several disease domain. MYCIN was made in the early 1970s to diagnose antimicrobial infection and recommend treatment to this infection. It has many facilities such as explanation, knowledge acquisition, teaching and system building. CASNET main application was the diagnosis and recommendation of treatment for glaucoma.

Data mining is an AI technique to discover the knowledge in large databases. Data mining could be used in collecting hidden information for medical purposes. Patient status whether life or dead was classified as training and testing pattern.

Fuzzy logic is a branch of AI techniques. It deals with an uncertainty in knowledge that simulates human reasoning in incomplete or fuzzy data. Meng (1996) used fuzzy relational inference in medical diagnosis.

Centralized Databases and WWW:

To now, most of the systems made worked with specified databases for certain disease. This means that patients data in one system can only be used by this system. So other systems need another databases for patients. For AI systems, when the number of patients is big, the system will produce more accurate results than in the system with less number of patients. The patient data and records are valuable for the knowledge-based system.

Many organizations develop electric medical information and upload it on the internet. The patients can use the information and monitor their risk level from their home without going to doctor. Patient records or data could be installed at the main server. This records could be accessed by health-care providers and the data could be updated. The interface for the interactions between the database and the providers would be through WWW.

Web-Based Medical Diagnosis and Prediction:

The model for Web-Based medical diagnosis and prediction consists of 4 components, they are databases, prediction module, diagnosis module and user interface. The database contains patient data and patient-disease data. Patient data such as name, address and etc. patient-disease data such as type of disease, the treatments and other details about therapy.

Prediction module and diagnosis module are 2 of the main features in Web-Based medical diagnosis and prediction. Prediction module use neural networks technologies to predict patient illness. Diagnosis module consists of expert system and fuzzy logic techniques to do diagnosis tasks. Expert system uses the rules to diagnosis patient's illness based on their conditions. Fuzzy logic is integrated to enhance the reasoning when dealing with fuzzy data. The mix of expert system and fuzzy logic forms a hybrid system could increase the performance.

Conclusion:

The main features in medical diagnosis and prediction using AI technology will make the consultation more interactive.

Centralized databases over the WWW have many advantages such as sharing information, cooperation between medical staff, online discussion, online treatment and diagnosis.