Cognitive Computing for Medicine - CoCoMed

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Various terms have been used in the past for describing the adoption of sophisticated tools that make the life of a medical professional better that subsequently leads to a better life for the citizen. Terms such as Medical Informatics, Computer Aided Diagnosis, Artificial Intelligence in Medicine, Computational Intelligent Medical System, and Machine Learning in Medicine, have been used and are being used in an effort to facilitate the main players with better tools and methods. Cognitive computing is the simulation of human thought processes in a computerized model. Cognitive computing involves self-learning systems that use data mining, pattern recognition and natural language processing to mimic the way the human brain works. Different types of cognitive computing solutions offer various capabilities, such as, Learning and building knowledge from various structured and unstructured sources of information, Understanding natural language and interact with humans, Capturing the expertise of top experts, Improving the cognitive processes for better decision making, and making it more uniform across different professions. The closets attempt to combine efforts is offered by Computational Intelligence (CI) where at least three of the well tested approaches are combined, being Artificial Neural Networks (ANN), Fuzzy Systems (FS), and Evolutionary Computing (EC). Therefore one can claim that CI=ANN+FS+EC. Our experience in applying the above in many real life environments generated some doubts whether the proposed equation is true because if it was true one could claim that CI is the same as Cognitive Computing (CC) which is not [1]. In fact CI¡CC, and therefore, if we want to serve better the medical community we must go few steps ahead and claim that CC=ANN+FS+EC+X, where X is an additional factor to be discovered from the intelligent processing of the data within the Electronic Health Record (EHR) of a citizen [2]. No mention was made about Artificial Intelligence (AI), but if one likes to put this in perspective can claim that AI¿¿CC¿ANN+FS+EC. Imagine putting all the above in the medical environment and call it Cognitive Computing for supporting eHealth. Todays consumers want more control over their health, as well as more personalized and convenient care. In spite of the fact that healthcare executives understand such demands, the majority are unable to deliver. Also, they all agree that effective decision making is important in any industry, but in healthcare it can make the difference between life and death. The question is how specifically healthcare organizations, professionals and citizens can utilize cognitive computing to address issues currently troubling the industry, simply because the user becomes more aware of technology and its potential in all disciplines. This new computing paradigm if adopted goes in line with the long standing EU directive, and main theme of the eHealth 2016

Week meeting. Facilitating active participation and empowering people brought in by the three capability areas that align with the three industry focus areas, Engage, Discover and Decide. The healthcare academia and industry can bridge the gap between opportunities and current capabilities in the health sector. Hidden knowledge and insights that reside in data (structured and unstructured), EHR, can be fully exploited for discovery, insight, decision support and dialogue. The Electronic Health Record (EHR) is a collection of continuously updated health-related facts and medical data associated with a patient. The EHR is a dynamic and a dynamically updated electronic record that chronologically stores a citizens medical data from approximately nine months before birth to their death. EHR management systems enable storage and retrieval of patient data, facilitate physicians to provide safer and effective care through embedded clinical decision support and intelligent diagnostic systems, and can provide useful information through the collection of data for medical research purposes. The essence of healthcare systems nowadays is to address the needs and preferences of patients for an appropriate and cost-effective healthcare. EHR is a prerequisite and precondition for practicing eHealth. Moreover, cognitive computing systems build knowledge and learn, understand natural language, and reason and interact more naturally with people than traditional programmable systems. It is a common believe that cognitive computing has the potential to radically change healthcare. The medical professionals and the citizens can be benefited tremendously, not only for curing and monitoring but also for preventing medical incidences merging EHR with cognitive computing systems. The theme is Focus on Health rather that the Illness.

References

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