Medicine 2.0: A Generation Next Practice of Healthcare and Medicine
Social networking, an area that has been considered unprofessional, is now attracting big industries all over the world. Most of the established as well as start-up IT companies have realized the professional benefits of social networking and are applying web technologies (Web 2.0) in their work culture as collaboration tools (enterprise 2.0). Such innovative collaborations enhance the stakeholder, employee, and customer interactions and support the organizations to grow globally and consistently, withstanding the competition even at times of economic volatility. Healthcare and medicine, a knowledge-based industry holds a high potential to exploit the innovative technologies like Web 2.0.

With the success of ‘Facebook’, ‘Twitter’, ‘Delicious’, and ‘Digg’, many healthcare and medical companies have also started adopting web technology tools in various areas of science, medicine and biomedical research. This new approach in healthcare and medicine provides a significant platform for the physicians, biomedical researchers, patients, and other healthcare professionals to interact, participate, and collaborate in groups. Improved exchange of knowledge between the expert groups and within the peer communities accomplishes increased productivity, less duplication of effort, and fostered research resulting in faster scientific breakthroughs.

Besides sharing and communicating scientific information, Web 2.0 tools are also used in effective deployment of upcoming applications like electronic personal health records (ePHRs), e-consultation (doctor consultations through e-mails), and e-epidemiology (collection and utilization of epidemiological data via web tools). Currently, ‘Google Health’, ‘Dossia’, and Microsoft ‘HealthVault’ are providing ePHRs that help the patients and healthcare consumers to directly assess their health reports online. Thus, adopting the trend of web technologies in healthcare and medicine may further transform the complex traditional practice into an easier, comprehensible, and accessible system called “Medicine 2.0”.

Medicine 2.0 is a new transparent approach in healthcare that relies upon the principles of social networking, end user participation, openness, and collaboration. According to the Web 2.0 concept, all the users of Medicine 2.0 are considered experts, be it the caregiver or the patient; their knowledge is collectively utilized and made functional considering the physician as a specialist in identifying the disease and the patient as an expert in experiencing it. Medicine 2.0 entails a wide variety of applications such as Health 2.0, PHR 2.0, Science 2.0, Biosurveillance 2.0, and Bio TIFF, predominantly targeting patients/consumers, health professionals, and biomedical researchers. Although, some of them are conceptual, a rising trend is observed in their practical application.

Health 2.0

It refers to the deployment of Web 2.0 applications into healthcare and other related functional areas to facilitate the rapid dissemination of information, trust management, and accountability. Web technology tools like social networking sites, blogs, wikis, etc. in the form of healthcare portals, medical blogs and information sites helps the user to search, communicate, and generate the health information online.
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- Social networking: It is the nucleus of Web 2.0 and Medicine 2.0 applications. Social networking sites like LinkedIn, Tiromed and Sermo assist the medical professionals and healthcare organizations to share new ideas, legislation issues and best practices in the area of interest. Patient targeted networking sites like ‘Patientslikeme.com’ are providing good platform for the patients to share self-experiences related to illnesses, therapeutic approaches and other issues regarding health. Such effective interactions assist the patients in decision-making and getting support from online support groups.

Importantly, the huge potential for ‘viral marketing’ (online promotion of products or services via social networks) is attracting many health practitioners to invest in social media. Besides, the growing number of hospitals and increased cost of healthcare is lending the hospitals and healthcare organizations to apply new strategies to attract the patients and to compete to top their preference list. Viral marketing through social networking sites is an excellent medium for hospitals or public practitioners to reach healthcare consumer or patients in person. In US, about 367 hospitals use social media to provide immediate customer services for the patients.

- Video or audio podcasting: Besides social networking, the Health 2.0 offers video or audio podcasting (similar to YouTube). Currently several health portals and medical blogs are using audio and video podcasts to update members with conference details, continuing medical education (CME), latest industry news, and expert interviews. Examples include American College of Cardiology (ACC) conference podcasts, iCritical Care Podcasts, Cleveland Clinic Videocast etc. Through subscription to Really Simple Syndication (RSS) feed or iTune, the member can periodically get updates for new podcasts and information. Since 2005, the Mayo Clinic in US is using social media channels to podcast clinical posts.

- Blogs: Another Web 2.0 based application is healthcare or medical blog. Medical blog is a web publishing tool owned by a single person, either a doctor or a patient or the CEO of a hospital. Everyone can post content on blogs by expressing their opinions and observations. Blogs detail a physician approach towards disease, a patient experience to therapy, consumer aimed health tips and treatment approaches. Usually, medical blogs contain information that does not appear in a medical paper. A few examples include ‘Kelvin MD’, a physician blog; ‘Clinical Cases and Images’, a case blog; ‘RunningAHospital.blogspot.com’ for CEOs of the hospital; ‘healthcareguy.com’ for healthcare IT professionals.

- Wiki: The server software that helps the user to create the content, and also edit the information online through any web browser. Wikis such as ‘Ask Dr. Wiki’, ‘Diabetes Wiki’, ‘Autism Wiki’, etc. act as the online repositories of information. For instance, ‘Ask Dr. Wiki’ is an open source online encyclopedia of medical information created by physicians for physicians, healthcare professionals and medical students. Any one from the medical background can contribute clinical notes, medical images, and medical review articles to ‘Ask Dr. Wiki’. Although, the user generated content can raise concerns regarding the reliability of the information, the consumer ratings (like the ones on amazon.com or epinions.com), book marking (PeerClip), and tagging bring the credibility cues for the users about the websites and other meta information. ‘Tagging’, another approach of Web 2.0, allows the user to create their own taxonomy for web pages (delicious.com), news (digg.com), blogs (technorati.com) etc. According to the number and popularity, the tags rise to the top similar to Google ranking.

PHR 2.0

Social networking concept like patientslikeme.com applied to the emerging PHR application has led to the development of a new conceptual model called PHR 2.0. According to this concept, the patient takes the responsibility responsibility of one’s own health and health information utilization. It empowers the patient to share part of his/her health reports with other patients, healthcare professionals, and researchers facilitating their active participation in healthcare and research. PHR 2.0 helps the researchers to use the patient data in the clinical research by directly
addressing the patient about the consent and other ethical issues. However, PHR 2.0 creates complex privacy issues regarding the young patient participation and long time availability of data on internet.

Science 2.0
Science 2.0, another hypothetical model Medicine 2.0 has practical application of Web 2.0 in biomedical research and science. Internet services like ‘Google Scholar’, ‘Pubmed’, Embase, etc., are converting the ambiguous research literature and research publishing into an easily accessible and manageable system. Science 2.0 offers technology tools like ‘EndNote’ and ‘Reference Manager’ to organize, index, and manage the scientific information online. Web technology tools in science also ease the process of searching and retrieving the scientific literature by providing the subject specific search engines to researchers. For example, Entrez, Omni Medical Search, Mamma Health etc. provide peer-reviewed medical information resources and reliable sites for best quality medical information.

With reference to the scientific publishing, Web 2.0 based technologies like ‘f1000’ highlights the current high-interest research papers to the scientific community and presents them for post publishing peer-review. This introduces the researchers to global community and improves the chances of their research work getting published. Networking sites like ‘Twitter’ further assists the scientists to reach the peer communities much faster than the traditional approaches. Furthermore, the bookmarking tools like ‘CiteULike’, ‘WebCite’, or ‘Connotea’, provide pointers to alert scientists about the recently published literature depending on what other members of similar network have cited and bookmarked.

Bio-surveillance 2.0
Globalization has led to the progressive diminution of geographic isolation of plants, animals, and other organisms and resulted in climatic changes, pathogen, and its vector transfer across the boundaries. Recent disease epidemics, irrespective of the boundaries and their worldwide spread with in a short period of time pointed out the need of a bio-surveillance system and obviousness of the global collaboration of experts. This has led to the development of the new concept called Bio-surveillance 2.0; an effective collaborative platform where experts from multiple domains work together for detection of various bio-surveillance algorithms and other specific data sources to find collective solutions for the outbreaks worldwide.

Bio-TIFF
It is a self-documenting digital file that records diagnostic and laboratory results of patients from ePHR and simultaneously depicts the images pertaining to their health condition or treatment progression. Based on the documentation properties of Geo TIFF, virtual reality tools (Web 3.0), and the ePHR applications; Bio-TIFF exploits biomedical-mapping systems to analyze the biological inner space domains, where biological system deflections exhibit themselves as health and disease. Bio-TIFF uses cellular, anatomical, and biomedical coordinate systems to analyze and map the health status and disease condition of the patient.

Conclusion
The constructive participation and collective harnessing of wisdom through web technologies will bring a major shift in the health information economy. In spite of a wide range of applications and many positive trends, Medicine 2.0 appeared to be overlooked with privacy, security, and reliability issues. The mediocrity factor and the less direct instant profits may also limit the large-scale investments of Web 2.0 in healthcare and medicine. However, the openness, transparency, fast deployment, and end-user applications are making Medicine 2.0 an attractive concept to revolutionize the medical practice, healthcare, and biomedical research.

References: