Machine Learning and AI to Improve Health
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Our current output of data is 2.5 quintillion \((10^{18})\) Bytes a day. 90% of the data in the world has been created in the last two years!

Enormous amount of data is generated via medical health records, test results, genomics, diagnostics and wearables, coupled with demographic data from multiple sources.

Machine learning is a branch of artificial intelligence in which algorithms learn from data, with or without explicit guidance, to improve predictions or classifications of data.

As of November 2018, the fastest supercomputer with a LINPACK benchmark scores 143.5 PFLOPS. Moreover, cloud computing has emerged as an on-demand platform for delivery of computing power.

According to Deloitte the global annual health spending will reach to $8.734 trillion dollars by 2020, increasing at an annual rate of 5.4 percent.

AI is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, and decision-making.
Applications of AI and Machine Learning in Healthcare

Artificial intelligence, machine learning, and advances in data science are described as transformative technologies for the healthcare sector. They could potentially affect many aspects of health care.

- **Identifying Diseases and Diagnosis**
  One of the main AI & ML applications in healthcare is the identification and diagnosis of diseases and ailments which are otherwise considered hard-to-diagnose (e.g. PReDicT by BERG).

- **Medical Imaging Diagnosis**
  AI, Machine learning and deep learning are both responsible for the breakthrough technologies for imaging Diagnosis (e.g. InnerEye by Microsoft).

- **Drug Discovery and Manufacturing**
  One of the primary clinical applications of AI & machine learning lies in early-stage drug discovery process (e.g. Project Hanover for cancer treatment by Microsoft).

- **Behavioral Modification**
  It is an important part of preventive medicine, and after the proliferation of AI & machine learning in healthcare, many startups have grown in this field (e.g. Somatics B2B2C ML-Based startup).
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**Outbreak Prediction**
AI-based technologies are being put to use in monitoring and predicting epidemics around the world (e.g. ProMED-mail a real-time Reporting Platform).

**Crowdsourced Data Collection**
Crowdsourcing allowing researchers and practitioners to access a vast amount of information uploaded by people based on their own consent (e.g. ResearchKit by Apple to treat Asperger and Parkinson).

**Smart Health Records**
Maintaining up-to-date health records is an exhaustive process. MIT is at the cutting edge of developing the next generation of intelligent, smart health records, by using ML and AI technologies.

**Personalized Medicine**
Personalized treatments pairs individual health with predictive analytics for better disease assessment, is extensively relying on AI and ML technologies (e.g. IBM Watson Oncology).
AI-Based Health Care Startups are Growing Globally
AI, Machine Learning, and Big Data Analytics enhances the quality of health services in the HealthCloud eco-system.

IoT plays a critical role in mass data acquisition, and creating a comprehensive smart monitoring and management of health services.

HealthCloud has all the required modules to become the 1st Health Backend as a Service in the Iranian market.
- **HealthCloud** is an spin-off from the Value Added Service Laboratory at Sharif University of Technology.
- During the first six months of operation, **HealthCloud** attracted more than 8 million users on 2.5G text-based services, who receive daily health tips on their favorite topics.
- Following this successful experience we decided to develop a comprehensive AI-Based PHR system, called **HealthCloud**, as an OTT over the 3G and 4G Networks.
BCB HealthCloud PHR System Features

**Health Measurement Exams**
Users can participate in different measurement exams created by practitioners to check their overall health status.

**Continuous Health monitoring System**
Systematic analysis of multiple health factors and providing tailored information help users to keep track of their major health measures.

**Health-related Document Management**
Users can manage their health documents such as prescriptions and test reports in their account, securely.

**Online Consultation with a Network of Certified Practitioners**
Users can ask questions and seek consultation on more than 75 branches of medical science, while protecting their privacy. HealthCloud guarantees providing a reliable answer within 24 hours.

**Family Health Management System**
The entire family can have a single account for efficient management of their health services while receiving services according to their own profile.

**Location-Based Services**
Using crowdsourcing technics, HealthCloud has built the most comprehensive geo-location database of health-related centers in Iran which users can access through a Mobile app.

**Health Newsletter**
The users will receive high quality newsletters with contents from the credited experts in various health fields.

**Smart Content Delivery**
The users will receive content based on their profiles and health record histories or based on their favorites.
Some Key Ideas to Promote Use of AI & ML in Healthcare

Dedicated On-Line WHS Social Media
To train, share knowledge and best practices, globally.

Develop Open Platforms
To promote global cooperation on deployment of AI-Based e-health services

Develop Standards
To make the data shareable across different platforms

Promote Startups
Foster Innovative Ideas to Improve Healthcare with AI
Thank you for your Time and consideration.

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