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Bioinformatics up to Date

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Inside…..

About us

The Bioinformatics Infrastructure Facility (BIF) at Biotechnology division, CSIR NEIST, Jorhat runs under the Biotechnology Information System Network (BTISnet) programme of DBT, Ministry of Science & Technology, and Government of India. The Centre was established on 2nd February, 2008 to promote innovation in Biological research and education through Bioinformatics accomplishment. The main goal is to facilitate and expose students and researchers from different academic institutions of North East India in Bioinformatics. The center conduct training and workshops for enlightening the use of bioinformatics applications in biological research and development. The Centre has access to global information through 24 hour high speed internet facility, and also e-journal facilities with DeLCON, Science Direct etc. To date the Centre has profoundly extended support in R & D work with a great intensity to different biological discipline including medicinal chemistry, computer aided drug design, genomics and proteomic data analysis etc.

Prediction of Recurrence in Cervical Cancer Using a Nine-lncRNA Signature.

Cervical cancer ranks the fourth most frequently diagnosed cancer and the second most common cause of female cancer-associated mortalities in the world. In spite great advancement in treatment such as surgery, radiotherapy, and chemotherapy, the prognosis for patients with cervical cancer still remain a challenge. This study aimed to identify new biomarkers that are related with the recurrence through comprehensive bioinformatics analysis. lncRNA expression data of cervical cancer patients were collected online and were divided into training, validation, and test set.

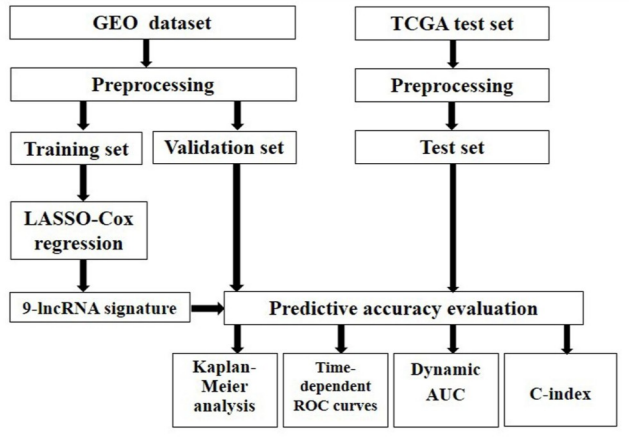

Figure1. Overall workflow for predicting recurrence in cervical cancer

A nine lncRNA signature was developed by conducting LASSO Cox regression model along with 10-fold cross validation. Kaplan–Meier analysis, C-index, time-dependent ROC curves and dynamic AUC were used to validated the prognostic value of this risk score .In addition, Gene ontology biological process enrichment and Kyoto Encyclopedia Genes and Genomes signaling pathways analysis were performed to evaluate Biological function of the lncRNAs in cervical cancer cells . The overall workflow of the method is described in figure 1.The result of the study indicated that a higher predict accuracy was observed in the nine lncRNA signature than that of FIGO stage in all the three sets. Also Stratified analysis demonstrated that the nine-lncRNA signature can predict the recurrence of cervical cancer within FIGO stage. According to the gene enrichment analysis the potential mechanisms underlying the nine-lncRNAs from the signature were also identified.

The present study concluded that comprehensive comparative analysis of lncRNA expression pattern conducted and nine-lncRNA signature constructed can be applied to predict disease free survival in cervical cancer. Further Gene annotation and functional enrichment analysis revealed the underlying mechanisms where lncRNAs in the signature exerts their biological roles in tumor progression.

Source: Yu Mao *et al.* 2019.J Frontiers in Genet-

Artificial Intelligence: Revolutionizing Healthcare Sector in 2019.

Artificial intelligence (AI) and machine learning tools continue to revolutionize healthcare and have been making great impact in the medical field. AI is one of the modern technologies redefining various healthcare disciplines as described in figure 1 and is considered as the top technology that every healthcare filed should learn about in today's world .This article aims at describing the importance of AI applications in healthcare. AI provides space for huge amounts of data to be fed into rules-based algorithms which provide insights to help physicians, researchers and medical technicians in making crucial decisions about patients' health, developing new drugs and improving operational efficiency across health organizations.

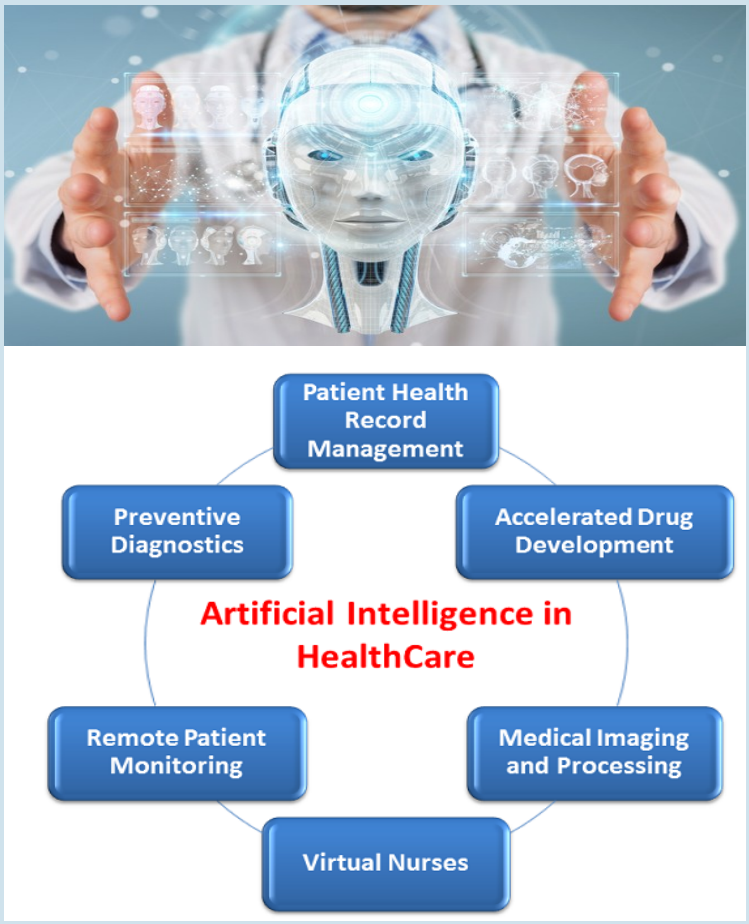

Figure 1.The various field in which Artificial intelligence play a role in Healthcare.

There are 3 major techniques in artificial intelligence technology that play a role in creating solutions for healthcare and pharma problems. First is Machine learning which focuses on developing automated clinical decision systems allowing doctors to make predictions that are accurate, instead of using simple estimated score systems. The second technique is Deep learning which is used to produce automated predictions from data input and lastly the Cognitive computing that entails the imitation of human thought processes via pattern recognition, natural language processing and machine learning by self-learning systems which aim in building automated computerized models to solve problems without humans assistance.

AI can help make the complex process of decision making in healthcare easier, enhance the efficiency and speed of disease imaging and in addition make the process of disease diagnoses and prediction faster & more accurate. It may not replace humans any time soon but for now, AI is helping both pharma and healthcare organizations make better decisions, faster. Anyone working in healthcare should pay close attention to AI – and even adopt this technology.

Source: Codrin Arsene , 2019, Article, Smart Data Collective.

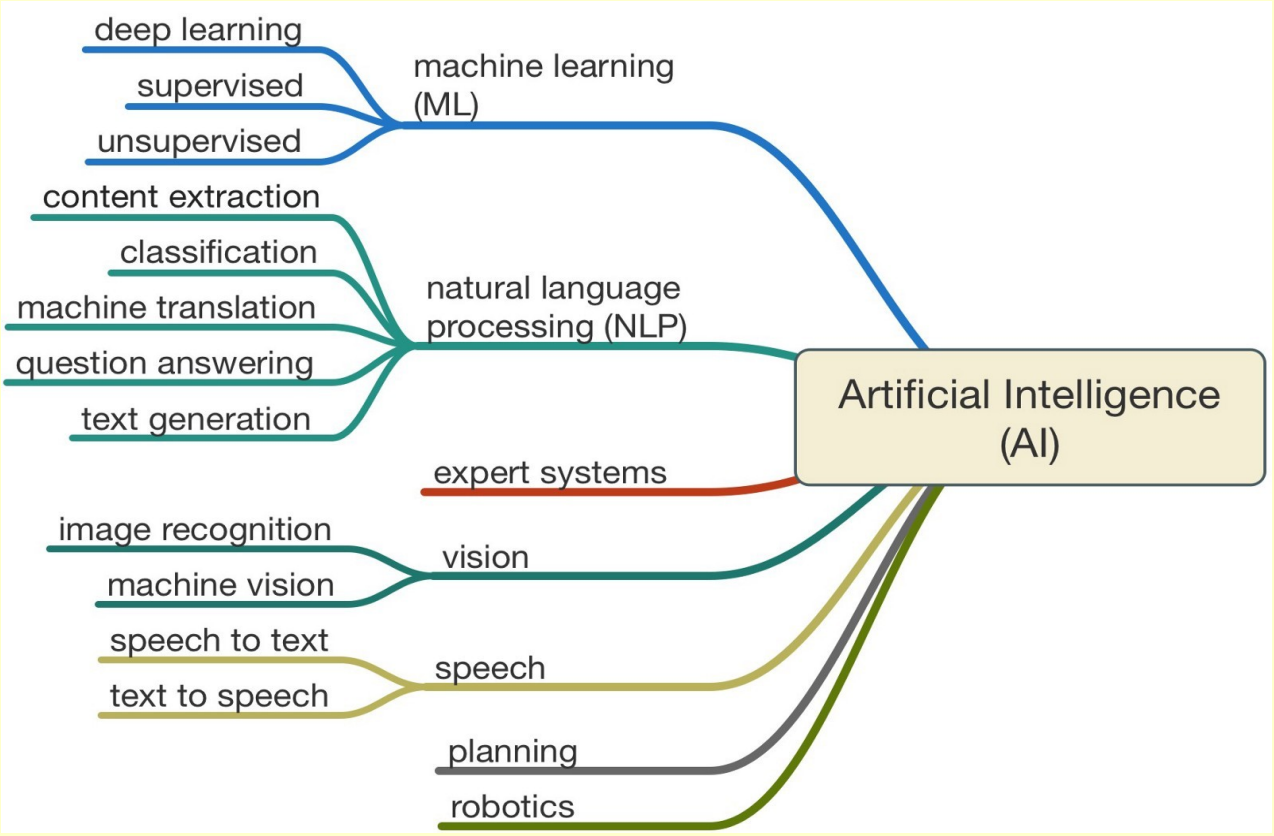

Figure3. An overview of Artificial Intelligence

Upcoming event

1.http://www.unicomlearning.com/2019/Artificial_Intelligence_Machine_Learning_Bangalore_2019/

2.https://www.allconferencealert.com/event_detail.php?ev_id=208590

Osteocalcin

Small biomineral crystals are used to build bone, eggshells and even tiny compasses. Osteocalcin, shown here in figure1, is the second most abundant protein in our bones (after collagen) and also acts as a hormone promoting bone growth. It binds to the surface of hydroxyapatite crystals, in bone and it is composed of calcium and phosphate. Many calcium ions are shown in the crystal structure, showing this perfectly-matched spacing of amino acids to ions. Eggshell protein struthiocalcin also binds to the surface of the mineral crystals by using an array of acidic amino acids that bind calcium, helping to direct crystal growth during the formation of the eggshell. Studies of ostrich egg fossils show that this interaction is so strong that fragments of the protein-mineral complex can last for millions of years.

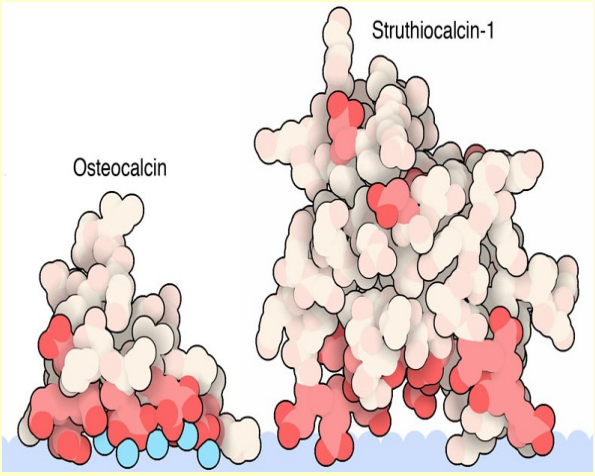

Figure 1:The close view of Osteocalcin. Two biomineralization proteins, with acidic amino acids in red and calcium ions in blue.

The folding pattern of struthiocalcin (termed C-type lectin) is similar to antifreeze proteins which bind to the surface of ice crystals . These peptides consist of a simple alpha helix or a beta strand with a repeated sequence of acidic amino acids, which resembles the struthiocalcin mineral-binding surface. Researchers have successfully engineered peptides that can form vaterite, a calcium carbonate mineral form that is different than the calcite which is found in eggshell.

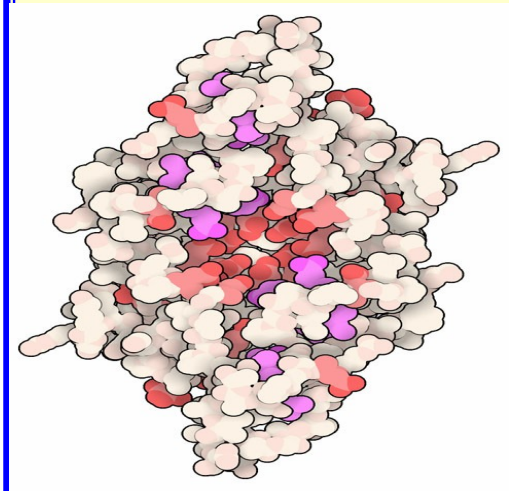

Figure 2.The close view of Magnetochrome (MamP) with acidic amino acids in red and hemes in magenta.

Magnetochrome or MamP, shown here in figure 2, builds perfect crystals of iron oxide. MamP is a modular protein which is composed of central domain linked to two consecutive magnetochrome domains. The central domain brings together acidic glutamate amino acids and form a pocket for initiating iron nucleation . The hemes in magnetochrome domains are similar to cytochrome c and shuttle electrons switch the oxidation state of the iron atoms as they combined with oxygen in the growing magnetite crystal.

Source: http://pdb101.rcsb.org/motm/232

Kindly send us your feedback to

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