SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

10 October – 4 December 2020

TOPICAL REPORT

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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news

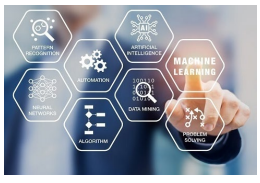
DATA SCIENCE

Today's data science roles won't exist in 10 years
"AutoML is poised to turn developers into data scientists — and vice versa. Here's how AutoML will radically change data science for the better."
Source: InfoWorld

How to Approach Your Mission-Critical Big Data Strategy
"Across industries, big data has joined traditional, structured data as a mission-critical element. Here's some advice for CIOs and big data leaders on how to get started."
Source: Information Week

How to Manage the Data Deluge
"Data is more like water, not oil -- too much of it can waterlog a business. How can an organization gain control of the volume? Here's a five-step process that can help."
Source: Information Week

MACHINE LEARNING



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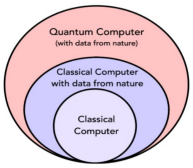
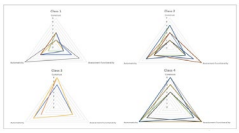
DATA SCIENCE



Power of data in quantum machine learning
"In this work, we show that some problems that are classically hard to compute can be predicted easily with classical machines that learn from data."
Source: arXiv

MACHINE LEARNING



From substitution to redefinition: A framework of machine learning-based science assessment
"This study develops a framework to conceptualize the use and evolution of machine learning (ML) in science assessment. We systematically reviewed 47 studies that applied ML in science assessment and classified them into five categories: (a) constructed response, (b) essay, (c) simulation, (d) educational game, and (e) inter-discipline. We compared the ML-based and conventional science assessments and extracted 12 critical characteristics to map three variables in a three-dimensional framework:

reports

DATA SCIENCE

How to build a successful data science training program
"Data scientists are in short supply. Some companies are filling the gap by setting up training programs to reskill employees for data science roles."
Source: CIO

What is DataOps?
"DataOps (data operations) is an agile, process-oriented methodology for developing and delivering analytics. It brings together DevOps teams with data engineers and data scientists to provide the tools, processes and organizational structures to support the data-focused enterprise."
Source: CIO

MACHINE LEARNING

Machine Learning 101: Part 1
"The purpose of this series of articles is to provide a complete guide (from data to predictions) to machine learning, for .NET developers in a .NET ecosystem, and that is possible now using Microsoft ML.NET and Jupyter Notebooks. Even more, you don't

What You Need to Know About Machine Learning Pipelines

"As CI/CD flourishes to aid ML development, IT professionals have several options to learn about pipelines and maintaining data model reliability. Here's an overview."
Source: Information Week

Translating lost languages using machine learning

"Recent research suggests that most languages that have ever existed are no longer spoken. Dozens of these dead languages are also considered to be lost, or "undeciphered" — that is, we don't know enough about their grammar, vocabulary, or syntax to be able to actually understand their texts."
Source: MIT Computer Science & Artificial Intelligence Lab

Machine learning uncovers missing information about ethnicity and Aboriginal status in population health data: study

"Machine learning can be used to fill a significant gap in Canadian public health data related to ethnicity and Aboriginal status, according to research published today in PLOS ONE by a University of Alberta research epidemiologist."
Source: University of Alberta

AI Machine Learning Innovation to Develop Chemical Library for Drug Discovery

"Purdue University innovators have introduced chemical reactivity flowcharts to help chemists interpret reaction outcomes using statistically robust machine learning models trained on a small number of reactions. The work is published in Organic Letters."
Source: SciTechDaily

The future growth of AI and ML

"We've all come to terms with the fact that artificial intelligence (AI) is transforming how businesses operate and how much it can help a business in the long term. Over the past few years, this understanding has driven a spike in companies experimenting and evaluating AI technologies and who are now using it specifically in production deployments."
Source: Fintech News

Preserving privacy of machine learning models

"When you see headlines about artificial intelligence (AI) being used to detect health issues, that's usually thanks to a hospital providing data to researchers. But such systems aren't construct, functionality, and automaticity."
Source: Wiley Online Library

PAC-Bayes control: learning policies that provably generalize to novel environments

"Our goal is to learn control policies for robots that provably generalize well to novel environments given a dataset of example environments. The key technical idea behind our approach is to leverage tools from generalization theory in machine learning by exploiting a precise analogy (which we present in the form of a reduction) between generalization of control policies to novel environments and generalization of hypotheses in the supervised learning setting."
Source: Sage Journals

Development of a machine learning algorithm for early detection of opioid use disorder

"Opioid use disorder (OUD) affects an estimated 16 million people worldwide. The diagnosis of OUD is commonly delayed or missed altogether. We aimed to test the utility of machine learning in creating a prediction model and algorithm for early diagnosis of OUD."
Source: British Pharmacological Society

First-principles study of Pd-alloyed Cu(111) surface in hydrogen atmosphere at realistic temperatures

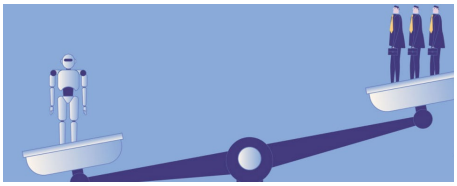
"Alloying is a well-established and versatile method to modify and tune properties of functional materials. Alloy properties depend crucially on the spatial distribution of the alloying elements. In particular, in heterogeneous catalysis, the distribution of guest metal atoms at the catalytic surface has a dramatic effect on its chemical properties."
Source: Journal of Applied Physics

Leveraging multi-way interactions for systematic prediction of pre-clinical drug combination effects

"We present comboFM, a machine learning framework for predicting the responses of drug combinations in pre-clinical studies, such as those based on cell lines or patient-derived cells. comboFM models the cell context-specific drug interactions through higher-order tensors, and efficiently learns latent factors of the tensor using powerful factorization machines."
Source: Nature Communications

have to be a data scientist to do machine learning."
Source: Jax

INSIGHTS & ANALYSIS



How Artificial Intelligence Could Widen the Gap Between Rich and Poor Nations

"Our recent staff research finds that new technology risks widening the gap between rich and poor countries by shifting more investment to advanced economies where automation is already established. This could in turn have negative consequences for jobs in developing countries by threatening to replace rather than complement their growing labor force, which has traditionally provided an advantage to less developed economies."
Source: International Monetary Fund

The state of AI in 2020

"The results of this year's McKinsey Global Survey on artificial intelligence (AI) suggest that organizations are using AI as a tool for generating value. Increasingly, that value is coming in the form of revenues…And while companies overall are making some progress in mitigating the risks of AI, most still have a long way to go."
Source: McKinsey & Company

Executive's guide to developing AI at scale

"Developing artificial intelligence and analytics applications typically involves different processes, technology, and talent than those for traditional software solutions. Executives who possess a solid understanding of the basics can ensure they're making the right investments in their tech stacks and teams to build reliable solutions at scale. We've created an interactive guide to help."
Source: McKinsey & Company

Growth Opportunities In Artificial Intelligence And Advanced Analytics

"This edition of IT, Computing and Communications (ITCC) Technology Opportunity Engine (TOE) provides a snapshot of the emerging ICT led innovations in artificial intelligence and advanced analytics. This issue focuses on the application of information and communication technologies in alleviating the challenges faced across industry

as robust as they could be, because such data is usually only taken from one organization."
Source: MIT Computer Science & Artificial Intelligence Lab

Machine learning uncovers potential new TB drugs

"Machine learning is a computational tool used by many biologists to analyze huge amounts of data, helping them to identify potential new drugs. MIT researchers have now incorporated a new feature into these types of machine-learning algorithms, improving their prediction-making ability."
Source: MIT Computer Science & Artificial Intelligence Lab

DEEP LEARNING

New deep learning models require fewer neurons

"Artificial intelligence (AI) can become more efficient and reliable if it is made to mimic biological models. New approaches in AI research are hugely successful in experiments."
Source: MIT Computer Science & Artificial Intelligence Lab

'It will change everything': DeepMind's AI makes gigantic leap in solving protein structures

"An artificial intelligence (AI) network developed by Google AI offshoot DeepMind has made a gargantuan leap in solving one of biology's grandest challenges — determining a protein's 3D shape from its amino-acid sequence."
Source: Nature

NEURAL NETWORKS

Shrinking massive neural networks used to model language

"A new approach could lower computing costs and increase accessibility to state-of-the-art natural language processing."
Source: MIT News

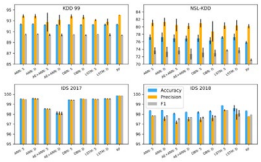
A neural network learns when it should not be trusted

"Increasingly, artificial intelligence systems known as deep learning neural networks are used to inform

Bayesian learning of chemisorption for bridging the complexity of electronic descriptors

"Building upon the d-band reactivity theory in surface chemistry and catalysis, we develop a Bayesian learning approach to probing chemisorption processes at atomically tailored metal sites. With representative species, e.g., *O and *OH, Bayesian models trained with ab initio adsorption properties of transition metals predict site reactivity at a diverse range of intermetallics and near-surface alloys while naturally providing uncertainty quantification from posterior sampling."
Source: Nature Communications

DEEP LEARNING



Deep learning methods in network intrusion detection: A survey and an objective comparison

"In this paper, we first introduce a taxonomy of deep learning models in intrusion detection and summarize the research papers on this topic. Then we train and evaluate four key deep learning models - feed-forward neural network, autoencoder, deep belief network and long short-term memory network - for the intrusion classification task on two legacy datasets (KDD 99, NSL-KDD) and two modern datasets (CIC-IDS2017, CIC-IDS2018)."
Source: Elsevier

Power-law scaling to assist with key challenges in artificial intelligence

"Power-law scaling, a central concept in critical phenomena, is found to be useful in deep learning, where optimized test errors on handwritten digit examples converge as a power-law to zero with database size. For rapid decision making with one training epoch, each example is presented only once to the trained network, the power-law exponent increased with the number of hidden layers."
Source: Nature

Deep learning can accelerate grasp-optimized motion planning

sectors in areas such as healthcare, retail, real estate, telecom, and advertising."
Source: Frost & Sullivan

Growth Opportunities In Artificial Intelligence, Deep Neural Networks, Cognitive Radio, And Marketing Automation

"This edition of IT, Computing and Communications (ITCC) Technology Opportunity Engine (TOE) provides a snapshot of the emerging ICT led innovations in Artificial Intelligence, Deep Neural Networks, Cognitive Radio and Marketing Automation. This issue focuses on the application of information and communication technologies in alleviating the challenges faced across industry sectors in real estate, fashion, retail/ e-commerce, telecom and automotive."
Source: Frost & Sullivan

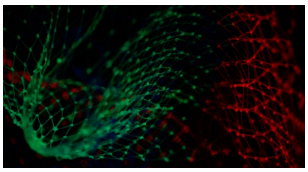
Top 10 Big Data trends of 2020

"During the last few decades, Big Data has become an insightful idea in all the significant technical terms. Additionally, the accessibility of wireless connections and different advances have facilitated the analysis of large data sets."
Source: Fintech News

In-depth: Artificial Intelligence 2020

"Artificial Intelligence is no longer science fiction, it has already been adopted in various industries. This report shows that automation through AI not only leads to cost savings, it is also expected to result in robust productivity growth."
Source: Statista

FORECAST



Machine learning in banking and marketing applications for 2021 and beyond

"Artificial intelligence (AI) and machine learning in banking make the strongest combination possible. Since these technologies are versatile, there are a lot of ways to use them across industries, and in the fintech sector as well."
Source: Robotics and Automation News

Top 6 machine learning trends of 2021

"Machine Learning (ML) is a well-known innovation that nearly

decisions vital to human health and safety, such as in autonomous driving or medical diagnosis. These networks are good at recognizing patterns in large, complex datasets to aid in decision-making. But how do we know they're correct?"
Source: MIT News

Neural networks that imagine others' states of mind

"Many artificial intelligence (AI) systems tout their ability to "learn from scratch," but this usually isn't strictly true. Self-driving cars have intricate 3D maps of their surroundings, while systems like AlphaGo have information about the tile positions of the various game pieces. But what if an AI could be trained by imagining others' states of mind?"
Source: MIT Computer Science & Artificial Intelligence Lab

NATURAL LANGUAGE PROCESSING

New test reveals AI still lacks common sense

"Despite advances in natural language processing, AI still doesn't have the common sense to understand human language, finds a new USC study."
Source: University of Southern California

IoT

System brings deep learning to "internet of things" devices

"Advance could enable artificial intelligence on household appliances while enhancing data security and energy efficiency."
Source: MIT News

COMPUTING SYSTEMS

AI System Beats Supercomputer in Combustion Simulation

"Cerebras Systems, which makes a specialized AI computer based on the largest chip ever made, is breaking out of its original role as a neural-network training powerhouse and

"In experiments, the proposed deep learning–based warm-started optimizing motion planner reduces compute and motion time when compared to a sampling-based asymptotically optimal motion planner and an optimizing motion planner. When applied to grasp-optimized motion planning, the results suggest that deep learning can reduce the computation time by two orders of magnitude (300×), from 29 s to 80 ms, making it practical for e-commerce warehouse picking."
Source: Science Robotics

Understanding adversarial examples requires a theory of artefacts for deep learning

"Here, I review recent empirical research on adversarial examples that suggests that deep neural networks may be detecting in them features that are predictively useful, though inscrutable to humans. To understand the implications of this research, we should contend with some older philosophical puzzles about scientific reasoning, helping us to determine whether these features are reliable targets of scientific investigation or just the distinctive processing artefacts of deep neural networks."
Source: Nature

The unreasonable effectiveness of deep learning in artificial intelligence

"Deep learning has provided natural ways for humans to communicate with digital devices and is foundational for building artificial general intelligence. Deep learning was inspired by the architecture of the cerebral cortex and insights into autonomy and general intelligence may be found in other brain regions that are essential for planning and survival, but major breakthroughs will be needed to achieve these goals."
Source: National Academy of Sciences of the United States of America

Deep learning on image denoising: An overview

"In this paper, we offer a comparative study of deep techniques in image denoising. We first classify the deep convolutional neural networks (CNNs) for additive white noisy images; the deep CNNs for real noisy images; the deep CNNs for blind denoising and the deep CNNs for hybrid noisy images, which represents the combination of noisy, blurred and low-resolution images. Then, we analyze the motivations and principles of the different types of deep learning methods."
Source: Elsevier

everyone knows about. A study uncovers that 77% of devices that we presently use are utilizing ML."
Source: Analytics Insight

2021 Trends in Data Science: The Entire AI Spectrum

"As an enterprise discipline, data science is the antithesis of Artificial Intelligence. The one is an unrestrained field in which creativity, innovation, and efficacy are the only limitations; the other is bound by innumerable restrictions regarding engineering, governance, regulations, and the proverbial bottom line."
Source: Inside Big Data

Top 10 Data and Analytics Trends for 2021

"How has the COVID-19 pandemic impacted the world of data and analytics in the enterprise? Here are the trends for 2021."
Source: Information Week

AI, 5G, and IoT top the list of the most important technologies for 2021

"The most important technologies in 2021 will be AI, 5G, and IoT, according to a newly released global survey of CIOs and CTOs by the technical professional organization IEEE."
Source: Tech Republic

POLICY

Promoting the Use of Trustworthy Artificial Intelligence in Government

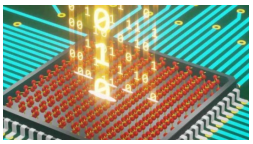
"On December 3, 2020, President Donald J. Trump signed the Executive Order on Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government, which establishes guidance for Federal agency adoption of Artificial Intelligence (AI) to more effectively deliver services to the American people and foster public trust in this critical technology."
Source: US Office of Science and Technology Policy

turning its talents toward more traditional scientific computing."
Source: IEEE Spectrum

Observability and Artificial Intelligence Have Become Essential to Managing Modern IT Environments

"AI and automation: the case for AIOps - To manage these complex, cloud-native environments and to save time and resources for developing new innovations that deliver business impact, teams need solutions that rely on artificial intelligence (AI) and continuous automation to provide precise and intelligent answers."
Source: Harvard Business Review

TECHNOLOGY



New electronic chip delivers smarter, light-powered AI

"Researchers have developed artificial intelligence technology that brings together imaging, processing, machine learning and memory in one electronic chip, powered by light."
Source: RMIT University

ARCHITECTURE

Exploring the use of artificial intelligence in architecture

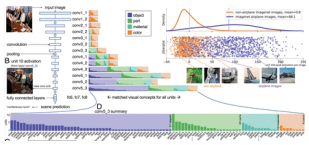
"Researchers at University of Michigan have recently been investigating the use of artificial intelligence (AI) in architecture. Their most recent paper, published in the International Journal of Architectural Computing, specifically explores the potential of AI as a tool to create new architectural designs."
Source: TechXplore

FLEET INDUSTRY

Driving the future: How AI will shape the fleet industry

"Unlike a human's natural intelligence, AI is where a machine has been programmed to possess intelligence which can help make jobs and tasks easier for us. It's used in

NEURAL NETWORKS



Understanding the role of individual units in a deep neural network

"First, we analyze a convolutional neural network (CNN) trained on scene classification and discover units that match a diverse set of object concepts. We find evidence that the network has learned many object classes that play crucial roles in classifying scene classes. Second, we use a similar analytic method to analyze a generative adversarial network (GAN) model trained to generate scenes. By analyzing changes made when small sets of units are activated or deactivated, we find that objects can be added and removed from the output scenes while adapting to the context."
Source: National Academy of Sciences of the United States of America

Application of the residue number system to reduce hardware costs of the convolutional neural network implementation

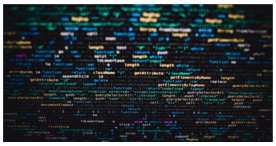
"Convolutional neural networks are a promising tool for solving the problem of pattern recognition. Most well-known convolutional neural networks implementations require a significant amount of memory to store weights in the process of learning and working. We propose a convolutional neural network architecture in which the neural network is divided into hardware and software parts to increase performance and reduce the cost of implementation resources."
Source: Elsevier

Patch-Wise Attack for Fooling Deep Neural Network

"By adding human-imperceptible noise to clean images, the resultant adversarial examples can fool other unknown models. Features of a pixel extracted by deep neural networks (DNNs) are influenced by its surrounding regions, and different DNNs generally focus on different discriminative regions in recognition. Motivated by this, we propose a patch-wise iterative algorithm – a black-box attack towards mainstream normally trained and defense models, which differs from the existing attack methods manipulating pixel-wise noise."
Source: Springer Link

many industries, but one where it is already present and going to thrive further is in the fleet industry."
Source: Robotics and Automation News

SECURITY



Potential of AI and machine learning to stop bot attacks

"The vast majority know about automated bots like AI powered chatbots are really software applications that can utilize artificial intelligence to interact with human users to achieve a task. Read how does AI and Machine Learning can stop bot attacks to ensure a secure business environment."
Source: Fintech News

5 ways to unlock the power of tech for the post-pandemic recovery

"As we have already seen, efforts to recover from COVID-19 have triggered a tsunami of innovations in work, collaboration, distribution and service delivery. They have, indeed, fundamentally shifted customer behavior on multiple levels. And so, the question is: how can we harness and shape the disruption 4IR tech engenders in such a way that simultaneously promotes global economic recovery, expands human opportunity, and increases cooperation and security?"
Source: World Economic Forum

AI can protect all energy firms from cyberattack. Here's how

"Most energy companies today struggle to detect and prevent cyberattacks on critical infrastructure. Digitalization in the sector has opened up new opportunities for cyber attackers. Could affordable, AI-driven cybersecurity monitoring services be the answer?"
Source: World Economic Forum

ETHICS

This is why we need to talk about responsible AI

"Responsible AI is designed to help recognize, prepare for, and mitigate potential harmful effects of AI. So why isn't anyone talking about it? Here are 5 tips on how your organization can join the conversation on Responsible AI."

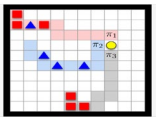
Quantum implementation of an artificial feed-forward neural network

"Quantum computing promises to solve certain tasks much more efficiently than any classical computing machine, and actual quantum processors are now becoming available through cloud access to perform experiments and testing also outside of research labs. Here we show in practice an experimental realization of an artificial feed-forward neural network implemented on a state-of-art superconducting quantum processor using up to 7 active qubits."
Source: IOP Science

Coupling RBF neural network with ensemble learning techniques for landslide susceptibility mapping

"Using multiple ensemble learning techniques for improving the predictive accuracy of landslide models is an active research area. In this study, we combined a radial basis function (RBF) neural network (RBFN) with the Random Subspace (RSS), Attribute Selected Classifier (ASC), Cascade Generalization (CG), Dagging for spatial prediction of landslide susceptibility in the Van Chan district, Yen Yen Bai Province, Vietnam."
Source: Elsevier

REINFORCEMENT LEARNING



Fast reinforcement learning with generalized policy updates

"In this article, we propose to address this issue through a divide-and-conquer approach. We argue that complex decision problems can be naturally decomposed into multiple tasks that unfold in sequence or in parallel. By associating each task with a reward function, this problem decomposition can be seamlessly accommodated within the standard reinforcement-learning formalism."
Source: National Academy of Sciences of the United States of America

Deep reinforcement learning based mobile edge computing for intelligent Internet of Things

"In this paper, we investigate mobile edge computing (MEC) networks for intelligent internet of things (IoT), where multiple users have some computational tasks assisted by multiple computational access points

Source: World Economic Forum

ROI from AI: The importance of strong foundations

"How to get a positive ROI from AI initiatives? Implement key practices across data management, tracking results, and security, privacy, and ethics."
Source: Deloitte Insights

MARKET

Artificial Intelligence Will Revolutionize Energy, Earning Billions For Investors

"As the world is anticipating the end of the COVID-19 pandemic, energy consumption in industry and services is likely to grow. In the longer term, the developing world will increase its energy utilization, leading to growth of global primary energy demand by of 0.4% - 0.6% per year, or a 25% increase by 2050."
Source: Forbes

Deloitte brings its Artificial Intelligence Institute to China

"China is now among five key markets across the world to house a Deloitte AI Institute centre, following an expansion drive by the Big Four accounting and advisory firm."
Source: Consultancy Asia

How Enterprises Prioritized AI in 2020

"Last year at this time, IT leaders were creating budgets and plans for AI initiatives. Here's how a pandemic impacted them."
Source: Information Week

INSIGHT

The secret to designing a positive future with AI? Imagination

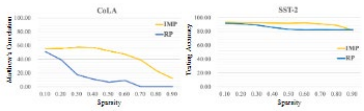
"Ongoing developments in automation and AI may, if left unchecked, leave most humans with no economically valuable role in society. The World Economic Forum Global AI Council experts and policy makers have met with science fiction authors and is organizing a movie competition to gain a range of perspectives and visions for the future."
Source: World Economic Forum

(CAPs). By offloading some tasks to the CAPs, the system performance can be improved through reducing the latency and energy consumption, which are the two important metrics of interest in the MEC networks."
Source: Elsevier

Real-time optimization using reinforcement learning

"This work introduces a novel methodology for real-time optimization (RTO) of process systems using reinforcement learning (RL), where optimal decisions in response to external stimuli become embedded into a neural network. This is in contrast to the conventional RTO methodology, where a process model is solved repeatedly for optimality. This reinforcement learning real-time optimization methodology (RL-RTO) utilizes an actor-critic architecture similar to that being used in dynamic control research."
Source: Elsevier

NATURAL LANGUAGE PROCESSING



The Lottery Ticket Hypothesis for Pre-trained BERT Networks

"In this work, we combine these observations to assess whether such trainable, transferrable subnetworks exist in pre-trained BERT models. For a range of downstream tasks, we indeed find matching subnetworks at 40% to 90% sparsity. We find these subnetworks at (pre-trained) initialization, a deviation from prior NLP research where they emerge only after some amount of training."
Source: Cornell University

Transformers: State-of-the-Art Natural Language Processing

"Recent progress in natural language processing has been driven by advances in both model architecture and model pretraining. Transformer architectures have facilitated building higher-capacity models and pretraining has made it possible to effectively utilize this capacity for a wide variety of tasks. Transformers is an open-source library with the goal of opening up these advances to the wider machine learning community."
Source: ACL Anthology

COMPUTING SYSTEMS AND NETWORKS

Machine learning or leading? This how AI will influence leadership according to an expert

"Currently, AI lacks the emotional understanding and technical capabilities to be an effective leader. However, with its rapid development, the potential of AI is almost limitless. David De Cremer, founder and director of the Centre on AI Technology for Humankind talks about how AI could soon acquire the 'general intelligence' that humans have and be strategically placed in managerial roles."

Source: World Economic Forum

AI & JOBS

Stressed on the job? An AI teammate may know how to help

"Researchers are working toward intelligent machines that can sense cognitive fatigue and suggest interventions to help a human improve performance."

Source: MIT News

Don't fear AI. It will lead to long-term job growth.

"COVID-19 has accelerated the automation of many tasks, leading some to fear artificial intelligence (AI) will take their jobs. But AI will create more jobs than it destroys. To embrace this change, companies and governments must focus on upskilling and reskilling."

Source: World Economic Forum

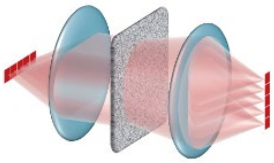
MEDIA

AI Tool May Predict Movies' Future Ratings

"USC Viterbi researchers are using AI as a tool identify violent, substance-abuse and sexual content in movie scripts before a single scene is shot"

Source: University of Southern California

UAS



Inference in artificial intelligence with deep optics and photonics

"Artificial intelligence tasks across numerous applications require accelerators for fast and low-power execution… Artificial intelligence inference, however, especially for visual computing applications, may offer opportunities for inference based on optical and photonic systems. In this Perspective, we review recent work on optical computing for artificial intelligence applications and discuss its promise and challenges."

Source: Nature

Artificial-Intelligence-Enabled Intelligent 6G Networks

"This article proposes an Ai-enabled intelligent architecture for 6G networks to realize knowledge discovery, smart resource management, automatic network adjustment and intelligent service provisioning, where the architecture is divided into four layers: intelligent sensing layer, data mining and analytics layer, intelligent control layer and smart application layer."

Source: IEEE Xplore

FOURTH INDUSTRIAL REVOLUTION

Artificial Intelligence and its impact on the Fourth Industrial Revolution: A Review

"Artificial Intelligence may revolutionize everything during the so-called fourth industrial revolution, which carries several emerging technologies and could progress without precedents in human history due to its speed and scope…This paper reviews the development and trends in AI, as well as the benefits, risks, and strategies in the field. During the course of the emerging industrial revolution, the common good may be achieved in a collaborative environment of shared interests and the hardest work will be the implementation and monitoring of projects at a global scale."

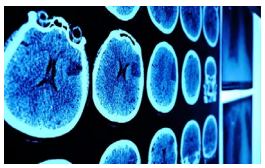
Source: Cornell University

AI & ECONOMICS

Autonomous balloons take flight with artificial intelligence

"An artificially intelligent controller can station a stratospheric balloon for weeks at a time without full knowledge of surrounding winds, opening up the prospect of unsupervised environmental monitoring."
Source: Nature

HEALTHCARE



How Artificial Intelligence Improves Medical Imaging in Hospitals

"Deep learning software, such as artificial intelligence, can improve the medical imaging process in hospitals by shortening scan times and improving patient care."
Source: HIT Infrastructure

COVID-19: Why we need to have tough conversations on the future of AI

"Our adoption of AI technology has accelerated during the pandemic. Applications and experimentation have ranged from patient scanning to global case tracking and prediction, write three experts for MIT Technology Review. We need a deeper conversation on what we need from AI in order to respond to future crises, while not generating a more fundamental, deeper vacuum of rights."
Source: World Economic Forum

Artificial intelligence model detects asymptomatic Covid-19 infections through cellphone-recorded coughs

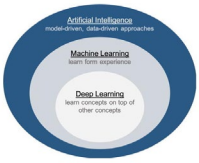
"MIT researchers have now found that people who are asymptomatic may differ from healthy individuals in the way that they cough. These differences are not decipherable to the human ear. But it turns out that they can be picked up by artificial intelligence."
Source: MIT News

AMERICAN ECONOMIC ASSOCIATION

Artificial Intelligence, Algorithmic Pricing, and Collusion

"Increasingly, algorithms are supplanting human decision-makers in pricing goods and services. To analyze the possible consequences, we study experimentally the behavior of algorithms powered by Artificial Intelligence (Q-learning) in a workhorse oligopoly model of repeated price competition. We find that the algorithms consistently learn to charge supracompetitive prices, without communicating with one another."
Source: American Economic Association

HEALTHCARE



Artificial intelligence for brain diseases: A systematic review

"In this work, we present an overview of different artificial intelligent techniques used in the brain care domain, along with a review of important clinical applications. A systematic and careful literature search in major databases such as Pubmed, Scopus, and Web of Science was carried out using "artificial intelligence" and "brain" as main keywords."
Source: AIP APL Bioengineering

A Survey on Explainable Artificial Intelligence (XAI): Toward Medical XAI

"Recently, artificial intelligence and machine learning in general have demonstrated remarkable performances in many tasks, from image processing to natural language processing, especially with the advent of deep learning (DL)… Unfortunately, the blackbox nature of the DL is still unresolved, and many machine decisions are still poorly understood. We provide a review on interpretabilities suggested by different research works and categorize them."
Source: IEEE Xplore

History of artificial intelligence in medicine

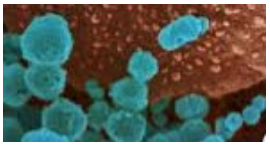
"This article presents a brief historical perspective on the evolution of AI over the last several decades and the introduction and development of AI in medicine in recent years. A brief

summary of the major applications of AI in gastroenterology and endoscopy are also presented, which are reviewed in further detail by several other articles in this issue of Gastrointestinal Endoscopy."
Source: Elsevier

Current status of artificial intelligence analysis for endoscopic ultrasonography

"Endoscopic ultrasonography (EUS) is an essential diagnostic tool for various types of pancreatic diseases such as pancreatic tumors and chronic pancreatitis; however, EUS imaging has low specificity for the diagnosis of pancreatic diseases. Artificial intelligence (AI) is a mathematical prediction technique that automates learning and recognizes patterns in data. This review describes the details and principles of AI and deep learning algorithms."
Source: Wiley Online Library

COVID-19



Applications of machine learning and artificial intelligence for Covid-19 (SARS-CoV-2) pandemic: A review

"The evidence of Machine Learning (ML) and Artificial Intelligence (AI) application on the previous epidemic encourage researchers by giving a new angle to fight against the novel Coronavirus outbreak. This paper aims to comprehensively review the role of AI and ML as one significant method in the arena of screening, predicting, forecasting, contact tracing, and drug development for SARS-CoV-2 and its related epidemic."
Source: Elsevier

COVID-Net: a tailored deep convolutional neural network design for detection of COVID-19 cases from chest X-ray images

"A critical step in the fight against COVID-19 is effective screening of infected patients, with one of the key screening approaches being radiology examination using chest radiography. It was found in early studies that patients present abnormalities in chest radiography images that are characteristic of those infected with COVID-19. Motivated by this and inspired by the open source efforts of the research community, in this study we introduce COVID-Net, a deep convolutional

neural network design tailored for the detection of COVID-19 cases from chest X-ray (CXR) images that is open source and available to the general public."
Source: Nature Scientific Reports

Deep learning methods for forecasting COVID-19 time-Series data: A Comparative study

"This paper presents a comparative study of five deep learning methods to forecast the number of new cases and recovered cases. Specifically, simple Recurrent Neural Network (RNN), Long short-term memory (LSTM), Bidirectional LSTM (BiLSTM), Gated recurrent units (GRUs) and Variational AutoEncoder (VAE) algorithms have been applied for global forecasting of COVID-19 cases based on a small volume of data. This study is based on daily confirmed and recovered cases collected from six countries namely Italy, Spain, France, China, USA, and Australia."
Source: Elsevier