SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

5 June – 6 August 2021

TOPICAL REPORT

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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news

DATA SCIENCE

Data science needs drudges

"Quality data science outputs depend on quality inputs. Data cleansing and preparing may not be exciting work, but it's critical."
Source: Info World

A look at industry demand for data scientists

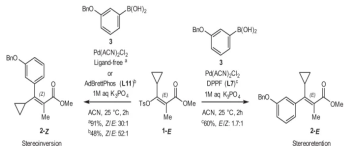
"With Glassdoor ranking data science as the #2 job in America for 2021, exploring demand trends within the field can only lead to beneficial insights. After all, finding patterns and observing correlations are exactly the skills that make these data professionals so valuable in business. Understanding why the field of data science is growing will help to see where data scientists can make the most of their opportunities."
Source: Tech Talks

5 tips for improving your data science workflow

"The biggest wastes in data science and machine learning don't stem from inefficient code, random bugs, or incorrect analysis. They stem from flaws in planning and communication. Execution mistakes can cost a day or two to fix, but planning mistakes can take weeks to months to set right. Here are five ways you can avoid making those mistakes in the first place."
Source: Venture Beat

academic

DATA SCIENCE



Data-science driven autonomous process optimization

"Autonomous process optimization involves the human intervention-free exploration of a range process parameters to improve responses such as product yield and selectivity. Utilizing off-the-shelf components, we develop a closed-loop system for carrying out parallel autonomous process optimization experiments in batch. Upon implementation of our system in the optimization of a stereoselective Suzuki-Miyaura coupling, we find that the definition of a set of meaningful, broad, and unbiased process parameters is the most critical aspect of successful optimization. Importantly, we discern that phosphine ligand, a categorical parameter, is vital to determination of the reaction outcome."
Source: Nature

Towards Culturally Relevant Personalization at Scale: Experiments with Data Science Learners

"In this article we describe our experiences building a large-scale data science program aimed at supporting diversity in online data science learning. This program was built to support a set of introductory skills-based, higher education

reports

DATA SCIENCE

Over 80% Of Data Scientists Struggle With Real-World Datasets Despite Training: Scaler

"Scaler Academy, a leading ed-tech start-up for upskilling students and working professionals, announced their new program for engineers looking to get specialised in Data Science and Machine Learning. The course is called Scaler Data Science & ML. It has been developed based on insights from a survey conducted by Scaler with over 100 data scientists working with the top 50 tech and product companies globally."
Source: Aithority

Four Deep Learning Papers to Read in August 2021

"Welcome to the August edition of the ‚Machine-Learning-Collage' series, where I provide an overview of the different Deep Learning research streams. So what is a ML collage? Simply put, I draft one-slide visual summaries of one of my favourite recent papers. Every single week. At the end of the month all of the resulting visual collages are collected in a summary blog post. Thereby, I hope to give you a visual and intuitive deep dive into some of the coolest trends. So without further ado: Here are my four favourite papers that I read in July 2021 and why I believe

Top reliable datasets for all your data science projects

"Completing data science projects is an easy way to finesse your portfolios. If you want to scale up in your career as a data scientist, your employers would want to know the kind of data problems you can solve, and that depends on the datasets you use. Kaggle has myriad datasets and it can get overwhelming to choose the right one to test a new machine learning concept. While this is not an exhaustive list, Analytics Insight has prepared a list of good and reliable data sets that can be used for several types of data science projects."
Source: Analytics Insight

ARTIFICIAL INTELLIGENCE

Artificial Intelligence may diagnose dementia in a day

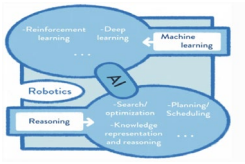
"Scientists are testing an artificial-intelligence system thought to be capable of diagnosing dementia after a single brain scan. It may also be able to predict whether the condition will remain stable for many years, slowly deteriorate or need immediate treatment. Currently, it can take several scans and tests to diagnose dementia. The researchers involved say earlier diagnoses with their system could greatly improve patient outcomes."
Source: BBC

Can we please do more about gender bias in AI?

"It is not a coincidence that virtual personal assistants such as Siri, Alexa, and Cortana have female names and come with a default female voice. Artificial Intelligence (AI) relies on algorithms that learn from real-world data made by humans, so it can, inadvertently, reinforce gender bias.
Gartner predicts that by 2022, 85% of AI projects will deliver erroneous outcomes due to bias in data, algorithms, or the teams responsible for managing them. In order to produce technology that is fairer, there must be a concerted effort from researchers and machine learning teams across the industry to correct this imbalance."
Source: Tech Wire Asia

courses. We are motivated by work done in project-based learning contexts and culturally responsive pedagogies and are particularly keen to understand how we can scale such kinds of approaches to large and diverse global classrooms. Specifically, we consider the country from which a learner is accessing the course as the key context for our work and discuss two interrelated investigations we have undertaken to understand how this feature interacts with learners' motivation and learning. Our findings provide insights on how learners respond to location-specific problem-based personalizations in data science education and provides an initial exploration as to how this form of personalization differs depending on the geo-political context of the learners."
Source: Springer Link

ARTIFICIAL INTELLIGENCE



A panoramic view and swot analysis of artificial intelligence for achieving the sustainable development goals by 2030: progress and prospects

"The17 Sustainable Development Goals (SDGs) established by the United Nations Agenda 2030 constitute a global blueprint agenda and instrument for peace and prosperity worldwide. Artificial intelligence and other digital technologies that have emerged in the last years, are being currently applied in virtually every area of society, economy and the environment. Hence, it is unsurprising that their current role in the pursuance or hampering of the SDGs has become critical. This study aims at providing a snapshot and comprehensive view of the progress made and prospects in the relationship between artificial intelligence technologies and the SDGs. A comprehensive review of existing literature has been firstly conducted, after which a series SWOT (Strengths, Weaknesses, Opportunities and Threats) analyses have been undertaken to identify the strengths, weaknesses, opportunities and threats inherent to artificial intelligence-driven technologies as facilitators or barriers to each of the SDGs."
Source: Springer Link

them to be important for the future of Deep Learning."
Source: Towards Data Science

Anaconda 2021 State of Data Science

"The 2021 State of Data Science report looks at how data science as a field is growing, the overall trends in adoption from commercial environments and academic institutions, and what students can do to prepare for the future.
For this year's online survey, we received more than 4,200 responses from individuals using data science and machine learning tools in more than 140 countries."
Source: Anaconda

ARTIFICIAL INTELLIGENCE

AI in Transportation Market to Hit USD 44,885.8 Million by 2026 at 17.5% CAGR - Report by Market Research Future (MRFR)

"New York, US, Aug. 11, 2021 (GLOBE NEWSWIRE) -- Market Overview:
According to a comprehensive research report by Market Research Future (MRFR), "Global AI in Transportation Market information by Offering, by Software, by Application and Region – forecast to 2026" the market size is expected to grow from USD 18,520.0 million in 2020 to USD 44,885.8 million by 2026 at a CAGR of 17.5%."
Source: Yahoo! Finance

Artificial Intelligence and Automated Systems Legal Update (2Q21)

"After a busy start to the year, regulatory and policy developments related to Artificial Intelligence and Automated Systems ("AI") have continued apace in the second quarter of 2021. Unlike the comprehensive regulatory framework proposed by the European Union ("EU") in April 2021,[1] more specific regulatory guidelines in the U.S. are still being proposed on an agency-by-agency basis. President Biden has so far sought to amplify the emerging U.S. AI strategy by continuing to grow the national research and monitoring infrastructure kick-started by the 2019 Trump Executive Order[2] and remain focused on innovation and competition with China in transformative innovations like AI, superconductors, and robotics. Most recently, the U.S. Innovation and Competition Act of 2021—sweeping,

How to evangelize Artificial Intelligence (AI) in your organization

"Having trouble making the case for artificial intelligence projects and getting people excited about AI's business potential? Consider these strategies to address fears and build support."
Source: The Enterprises Project

Unlocking The Power Of Predictive Analytics With AI

"Predictive analytics uses statistical algorithms combined with internal and external data to forecast future trends, which enables businesses to optimize inventory, improve delivery times, increase sales and ultimately, reduce operational costs. When paired with artificial intelligence (AI), the insights gleaned from these advanced systems are the key to more accurate and timely forecasting going forward."
Source: Forbes

The collective benefits of artificial intelligence and machine learning.

"The COVID-19 pandemic has pulled together a variety of factors that have brought the opportunities of artificial intelligence (AI) and machine learning (ML) into sharp focus across the board. Authored by James Fanshawe CBE AFNI, Chairman of the UK's Maritime Autonomous Systems Regulatory Working Group."
Source: Lloyd's Register

When Selecting Memory for AI, You Must Choose…Wisely

"In part 3 of this series, we explored how the Roofline model can help determine whether certain AI architectures are limited by their compute performance or memory bandwidth. Utilizing this data, designers can make informed decisions on which type of memory system would be best suited to a particular application."
Source: Electronic Design

Latent AI, which says it can compress common AI models by 10x, lands some key backing

"Roughly a year ago, Latent AI, a now three-year-old, Menlo Park, California-based startup, pitched a handful of investors during TechCrunch's Battlefield competition. It didn't win that contest, but that hasn't kept it from winning the interest of investors elsewhere. It just closed on $19 million in Series A funding in a round co-led by Future Ventures and Blackhorn Ventures, with participation

Consumer trust and perceived risk for voice-controlled artificial intelligence: The case of Siri

"Artificial intelligence (AI) has the potential to change consumer behavior. However, despite billions of consumers using mobile smart phones, adoption of (artificial) intelligent voice assistants, like Siri, is relatively low. A conceptual model was constructed to determine the influence of consumer trust, interaction, perceived risk, and novelty value on brand loyalty for AI supported devices. Using the MTurk platform, data was collected from a sample of 675 Apple iPhone-using respondents. The findings showed perceived risk seems to have a significantly negative influence on brand loyalty; however, other factors were found to have a significantly positive influence on brand loyalty. The influence of novelty value of using Siri was found to be moderated by brand involvement and consumer innovativeness in such a way the influence is greater for consumers who are less involved with the brand and who are more innovative."
Source: Elsevier

The Chinese approach to artificial intelligence: an analysis of policy, ethics, and regulation

"In July 2017, China's State Council released the country's strategy for developing artificial intelligence (AI), entitled 'New Generation Artificial Intelligence Development Plan' (新一代人工智能发展规划). This strategy outlined China's aims to become the world leader in AI by 2030, to monetise AI into a trillion-yuan (ca. 150 billion dollars) industry, and to emerge as the driving force in defining ethical norms and standards for AI. Several reports have analysed specific aspects of China's AI policies or have assessed the country's technical capabilities. Instead, in this article, we focus on the socio-political background and policy debates that are shaping China's AI strategy. In particular, we analyse the main strategic areas in which China is investing in AI and the concurrent ethical debates that are delimiting its use. By focusing on the policy backdrop, we seek to provide a more comprehensive and critical understanding of China's AI policy by bringing together debates and analyses of a wide array of policy documents."
Source: Springer Link

MACHINE LEARNING

bipartisan R&D and science-policy legislation—moved rapidly through the Senate.

While there has been no major shift away from the previous "hands off" regulatory approach at the federal level, we are closely monitoring efforts by the federal government and enforcers such as the FTC to make fairness and transparency central tenets of U.S. AI policy. Overarching restrictions or bans on specific AI use cases have not yet been passed at the federal level, but we anticipate (at the very least) further guidance that insists upon greater transparency and explainability to address concerns about algorithmic discrimination and bias, and, in the near term, increased regulation and enforcement of narrow AI applications such as facial recognition technology.

Our 2Q21 Artificial Intelligence and Automated Systems Legal Update focuses on these key regulatory efforts, and also examines other policy developments within the U.S. and EU that may be of interest to domestic and international companies alike."
Source: Gibson Dunn

IDC Forecasts Companies to Spend Almost $342 Billion on AI Solutions in 2021

"Worldwide revenues for the artificial intelligence (AI) market, including software, hardware, and services, is estimated to grow 15.2% year over year in 2021 to $341.8 billion, according to the latest release of the International Data Corporation (IDC) Worldwide Semiannual Artificial Intelligence Tracker. The market is forecast to accelerate further in 2022 with 18.8% growth and remain on track to break the $500 billion mark by 2024. Among the three technology categories, AI Software occupied 88% of the overall AI market. However, in terms of growth, AI Hardware is estimated to grow the fastest in the next several years. From 2023 onwards, AI Services is forecast to become the fastest growing category.

Within the AI Software category, AI Applications has the lion's share at nearly 50% of revenues. In terms of growth, AI Platforms is the strongest with a five-year compound annual growth rate (CAGR) of 33.2%. The slowest will be AI System Infrastructure Software with a five-year CAGR of 14.4% while accounting for roughly 35% of all AI Software revenues. Within the AI Applications market, AI ERM is expected to grow slightly stronger than AI CRM over the next five years. Meanwhile, AI Lifecycle Software is forecast to grow the fastest among the markets within AI Platforms."
Source: IDC

from Booz Allen, Lockheed Martin, 40 North Ventures, and Autotech Ventures. The company has now raised $22.5 million altogether.
What are these backers funding exactly? The company says it makes software designed to train, adapt and deploy edge AI neural networks, irrespective of hardware constraints or the inexpensive chips that are typically found in edge devices."
Source: Tech Crunch

Voice AI Technology Is More Advanced Than You Might Think

"Systems that can handle repetitive tasks have supported global economies for generations. But systems that can handle conversations and interactions? Those have felt impossible, due to the complexity of human speech. Any of us who regularly use Alexa or Siri can attest to the deficiencies of machine learning in handling human messages. The average person has yet to interact with the next generation of voice AI tools, but what this technology is capable of has the potential to change the world as we know it."
Source: Forbes

With AI, Your Car Can Detect Potholes

"The Korea Institute of Civil Engineering and Building Technology (KICT) has announced the development of an 'AI-based automatic pothole detection system'. The system is designed to be installed on the windshield of a vehicle to detect potholes on the road surface in real-time. Potholes can damage cars and may even lead to life-threatening accidents.
In particular, potholes can cause problems in the rainy seasons. In Seoul, when the record was set for heavy rain in August 2020, more than 7,000 pothole reports were received in August 2020 when a record downpour hit the city. In Korea, the number of potholes reported across country from 2016 to 2018 was 657,993. Total damage compensation amounted to 4.6 billion won nationwide, and road repair costed 1.7 trillion won. If a vehicle passes over a pothole at high speed without noticing it, the vehicle may break away from the driving lane, hence a threat to the driver's life."
Source: National Research Council of Science & Technology

ARTIFICIAL INTELLIGENCE INDUSTRY

Machine Learning Support for Radar-Based Surveillance Systems

"Nowadays, radar-based surveillance systems already consist of highly complex tracking, sensor data fusion, and identification algorithms, which track the trajectories of moving objects. They are embedded in a real-time middleware with a straight forward processing chain according to the Joint Directors of Laboratories (JDL) fusion model. With the spread of new technologies, e.g., big data, distributed data processing and machine learning open up new possibilities for surveillance systems. Commercial data providers provide trajectories of all kinds of vessels and aircraft worldwide. Best known are automatic dependent surveillance–broadcast and (satellite-) automatic identification system used in air and maritime surveillance. Both are cooperative systems and, meanwhile, also integrated as the sensor source in surveillance systems. An advantage of these trajectories is that in addition to the unique identification of the object by an identifier, e.g., International Civil Aviation Organization code or Maritime Mobile Service Identity (MMSI), with which they can be easily assigned to the generating objects contain additional context data that can be used as labels for supervised machine learning."
Source: IEEE Aerospace and Electronic Systems Magazine

Advanced Data Analytics and Supervised Machine Learning in Optics Engineering Analysis

"Advance data analytics and machine learning have affected almost every industry and area of scientific research, including engineering. Although limited literature of Machine Learning in optics engineering are found, Machine learning adoption has been valuable and garners a lot of interest in this field [1][2], and the rate of research in this area is growing rapidly [3]. In fiber optic transmission system, an optical transceiver is a core element, responsible for converting electrical signal to light pulses and vice versa. It comprises of housing, optoelectronic devices and PCBA, it has to undergo various characterization and tests at different stages of the manufacturing processes. Optical transceiver characterization is a very complex process with many sub-processes and parameters within those sub-processes which can lead to

Growth Opportunities In Ai Processors, Microled, Wearables, 5g Modules, And Memory

"The Microelectronics Technology Opportunity Engine for July 2021 covers innovations in AI processors, Micro-LEDs, wearables, 5G modules, voice recognition, and memory.

The Microelectronics Technology Opportunity Engine captures global electronics-related innovations and developments on a weekly basis. Developments are centered on electronics attributed by low power and cost, smaller size, better viewing, display and interface facilities, wireless connectivity, higher memory capacity, flexibility and wearables. Research focus themes include small footprint lightweight devices (CNTs, graphene), smart monitoring and control (touch and haptics), energy efficiency (LEDs, OLEDs, power and thermal management, energy harvesting), and high speed and improved conductivity devices (SiC, GaN, GaAs)."
Source: Frost & Sullivan

Mubadala Backs Software Startup People.ai in New Funding Round

"People.ai's software can record and analyze employees' calendars and phone calls, helping companies determine, for example, the best number of clients for one salesperson to cover. The software also helps companies boost their bottom line, he added... The company has patents on AI technology that help its software filter out personal calls or emails, to help avoid violations of employee privacy."
Source: Bloomberg

This hot startup is now valued at $1 billion for its A.I. skills

"Snorkel AI, a startup with roots in Stanford University's artificial intelligence lab, is now valued at $1 billion as part of its latest $85 million funding... Snorkel AI specializes in data labeling, the annotating of information for training a machine-learning system to recognize and act on patterns its technology discovers in other data sets. For instance, financial services firms could use Snorkel AI to label documents with keywords so that machine-learning systems could analyze other data sets for similar information, explained Snorkel CEO Alexander Ratner."
Source: Fortune

How Small-Business Owners Can Get Started With AI

"The post-pandemic revolution that's turning the business world on its head is that "business as usual" doesn't have to mean a bunch of people sitting around computers from 9 to 5, working for someone else, tied to a desk or office. And for many, the technology adopted during the pandemic just to stay afloat may have become a permanent means for successfully launching and running a business from the comfort of your home.

Never in our pre-pandemic lives would most companies have imagined being able to support, let alone grow, their operations while working completely remote. Other companies are being built from the ground up, entirely supported by artificial intelligence automation and "e-everything" from the get-go."
Source: Forbes

The AI-powered organization: Shifting the paradigm to drive better decision making

difficulties using traditional analytics approach."
Source: IEEE Xplore

Machine Learning for the Control of Prosthetic Arms: Using Electromyographic Signals for Improved Performance

"The human hand can perform many precise functions and is relied upon for countless aspects of daily life. When upperlimb amputation is necessitated, an affected individual's sense of independence is understandably impacted."
Source: IEEE Xplore

Machine learning of solvent effects on molecular spectra and reactions

"Fast and accurate simulation of complex chemical systems in environments such as solutions is a long standing challenge in theoretical chemistry. In recent years, machine learning has extended the boundaries of quantum chemistry by providing highly accurate and efficient surrogate models of electronic structure theory, which previously have been out of reach for conventional approaches. Those models have long been restricted to closed molecular systems without accounting for environmental influences, such as external electric and magnetic fields or solvent effects. Here, we introduce the deep neural network FieldSchNet for modeling the interaction of molecules with arbitrary external fields. FieldSchNet offers access to a wealth of molecular response properties, enabling it to simulate a wide range of molecular spectra, such as infrared, Raman and nuclear magnetic resonance. Beyond that, it is able to describe implicit and explicit molecular environments, operating as a polarizable continuum model for solvation or in a quantum mechanics/molecular mechanics setup."
Source: Royal Society of Chemistry

Perspectives of using machine learning in laser powder bed fusion for metal additive manufacturingv

"The adoption of laser powder bed fusion (L-PBF) for metals by the industry has been limited despite the significant progress made in the development of the process chain. One of the key obstacles is the inconsistency of the parts obtained from L-PBF. Due to its complexity, there are many potential fluctuations that can occur within the process chain which can lead to quality

"What are the key factors needed to build a successful AI-powered organization? It turns out, it's not just about the tools and technology. We take a closer look at how best to implement AI for better decision making, and why everyone should be involved."
Source: Ericsson

Is Baidu's AI push working?

"Baidu practically owns search in China, controlling nearly 80% of the sector. Its closest competitor, Sogou, holds just 11%. There's just one problem: web search isn't the cash cow it used to be, and Chinese internet users now spend more time in apps.
Advertising revenue is the primary source of income for search companies, and Baidu's ad business has seen growth slow to a crawl over the past few years, with a few quarterly exceptions. The AI giant has been hamstrung by the decline of web search, rising competition from rivals like ByteDance and Alibaba, and accusations of bad behavior like prioritizing its own search results and allowing ads for questionable medical treatments.
The company is trying a full-blown pivot, even telling people it's no longer a search company. The story it's telling now is about AI."
Source: Technode

How To Build A Perfect AI Team

"Artificial intelligence (AI) is now on a mission to permeate every industry. From e-commerce and healthcare to travel and finance, AI has made its way to just about every type of industry. In fact, the adoption rate of AI has increased by more than 270%, according to Gartner, Inc. Moreover, 37% of all types of businesses are now using AI-driven technologies such as natural language processing, predictive analysis, machine learning and robotic process automation.
Therefore, if you're still not using AI in your business, then it's highly likely your competitors are already doing so, and very soon, you'll be left behind. That's why we have come up with this article that will allow you to build your own AI team to eliminate your existing bottlenecks and achieve your business goals."
Source: Forbes

REGULATIONS

inconsistency in L-PBF parts. Machine learning (ML) has the possibility to overcome this obstacle by utilising datasets obtained at various stages of the L-PBF process chain. In this perspective article, the integration of ML into the different stages of L-PBF process chain, which potentially lead to better quality control, is explored. Prior to L-PBF, ML can be used for part designs and file preparation. Then, ML algorithms can be applied in the process parameter optimisation and in situ monitoring. Finally, ML can also be integrated into the post-processing."
Source: Taylor & Francis

DEEP LEARNING

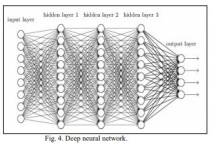


Fig. 4. Deep neural network.

Application of Deep Learning for Credit Card Approval: A Comparison with Two Machine Learning Techniques

"The increased credit card defaulters have forced the companies to think carefully before the approval of credit applications. Credit card companies usually use their judgment to determine whether a credit card should be issued to the customer satisfying certain criteria. Some machine learning algorithms have also been used to support the decision. The main objective of this paper is to build a deep learning model based on the UCI (University of California, Irvine) data sets, which can support the credit card approval decision. Secondly, the performance of the built model is compared with the other two traditional machine learning algorithms: logistic regression (LR) and support vector machine (SVM). Our results show that the overall performance of our deep learning model is slightly better than that of the other two models."
Source: International Journal of Machine Learning and Computing

Deep learning based user grouping for FD-MIMO systems exploiting statistical channel state information

"The joint spatial division and multiplexing (JSDM) is a two-phase precoding scheme for massive multiple-input-multiple-output (MIMO) system under frequency division duplex (FDD) mode to reduce the amount of channel state information (CSI) feedback. To apply this scheme, users need to be partitioned into groups so that users in the same group have similar channel covariance eigenvectors while users in different

Big Tech's Stranglehold on Artificial Intelligence Must Be Regulated

"In other words, the mix of positives and negatives puts this potent new suite of technologies on a knife-edge. Do we have confidence that a handful of companies that have already lost public trust can take AI in the right direction? We should have ample reason for worry considering the business models driving their motivations. To advertising-driven companies like Google and Facebook, it's clearly beneficial to elevate content that travels faster and draws more attention—and misinformation usually does—while micro-targeting that content by harvesting user data."
Source: Foreign Policy

AI in Biotech and Synthetic Biology: What Can Be Protected? What Should Be Kept Secret?

"Machine learning (ML), bioinformatics, artificial intelligence (AI), and other computational tools have become ubiquitous in the biotech and synthetic biology industries because such technology allows for rapid processing of a large amount of complex data to produce advancements in therapeutics and diagnostics. As we previously discussed in Patenting Considerations for Artificial Intelligence in Biotech and Synthetic Biology Part 1 and Part 2, applications such as sequencing and functional genomics; drug design, discovery, and testing; pharmacology; big data analytics; cancer diagnosis; and target identification and designing constructs, have realized tremendous benefits due to the use of machine learning and AI. Thus, as the landscape becomes increasingly more competitive, it is important for companies, particularly in the aforementioned industries, to obtain patent protection for their AI-related technology."
Source: The National Law Review

SMART LIVING

How The Pandemic Has Shifted Attitudes To The 'Artificial Intelligence Of Things' And The Smart Home

"How — and where — we work is just one of the ways most people have had to change. Working from home has been the norm for so many over

groups have almost orthogonal eigenvectors. In this paper, taking the clustered user model into account, we consider the user grouping of JSDM for the downlink massive MIMO system with uniform planar antenna array (UPA) at base station (BS). A deep learning based user grouping algorithm is proposed to improve the efficiency of the user grouping process. The proposed grouping algorithm transfers the statistical CSI of all users into a picture, and utilizes the deep learning enabled objective detection model you look only once (YOLO) to divide the users into different groups rapidly. Simulation results show that the proposed user grouping scheme can achieve higher sum rate with less time delay."
Source: IEEE Xplore

Special issue on deep learning for emerging embedded real-time image and video processing systems

"One of the main aims of the multimedia as related to image and video processing is to enable real-time image super resolution or a visually pleasing high-resolution image based on low-resolution image sequences. High resolution images are composed of higher pixel density with fine and more precise details as compared with low-resolution images or video. Many related applications, such as video surveillance, ultra-high definition TV, low-resolution face recognition, and remote image sensing are based on super-resolution techniques. These techniques have attracted high interest from both academia and industry, and currently is an active area of research in image and video processing."
Source: Springer Link

Can AI distinguish a bone radiograph from photos of flowers or cars? Evaluation of bone age deep learning model on inappropriate data inputs

"Objective
To evaluate the behavior of a publicly available deep convolutional neural network (DCNN) bone age algorithm when presented with inappropriate data inputs in both radiological and non-radiological domains.
Methods
We evaluated a publicly available DCNN-based bone age application. The DCNN was trained on 12,612 pediatric hand radiographs and won the 2017 RSNA Pediatric Bone Age Challenge (concordance of 0.991 with radiologist ground-truth). We used the application to analyze 50 left-hand radiographs (appropriate data inputs) and seven classes of

the past year, and even as we progress out of this pandemic, we may see businesses continue to allow employees to work from home. As a result, this way of working has placed a renewed focus on the importance of our homes, and discussions around the tech-enabled "smart" home have never been timelier."
Source: Forbes

How to Choose an Edge AI Device

"With all the buzz surrounding edge computing these days, perhaps you're thinking it's time to invest in intelligent edge technologies for your IoT network. What are the key factors in pinpointing the right platform for your system?"
Source: Electronic Design

AUTOMATION

A new generation of AI-powered robots is taking over warehouses

"In the months before the first reports of covid-19 would emerge, a new kind of robot headed to work. Built on years of breakthroughs in deep learning, it could pick up all kinds of objects with remarkable accuracy, making it a shoo-in for jobs like sorting products into packages at warehouses.
Previous commercial robots had been limited to performing tasks with little variation: they could move pallets along set paths and perhaps deviate slightly to avoid obstacles along the way. The new robots, with their ability to manipulate objects of variable shapes and sizes in unpredictable orientations, could open up a whole different set of tasks for automation."
Source: MIT Technology Review

BIOMEDICAL

Deep Learning, AI Used to Advance X-ray Data Technologyv

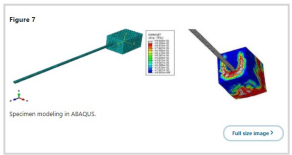
"Researchers have developed a new computational framework called 3D-CDI-NN. The framework has demonstrated it can create 3D visualizations from data collected at the APS significantly faster than traditional methods.

inappropriate data inputs in radiological (i.e., chest radiographs) and non-radiological (i.e., image of street numbers) domains. For each image, we noted if (1) the application distinguished between appropriate and inappropriate data inputs and (2) inference time per image. Mean inference times were compared using ANOVA."
Source: Springer Link

Deep Learning-based Anomaly Detection to Classify Inaccurate Data and Damaged Condition of a Cable-stayed Bridge

"Cables of cable-stayed bridges are gradually damaged by weather conditions, vehicle loads, and corrosion of materials. Stayed cables are an essential factor closely related to the stability of a cable-stayed bridge. Damaged cables might lead to the bridge collapse due to tension capacity lost. Therefore, it is necessary to develop structural health monitoring (SHM) techniques that check the cable conditions. Besides, the sensor network system development has contributed to the state analysis, such as damage detection and structural deformation, by allowing us to collect large-scale SHM data. However, the collected SHM data might include abnormal data due to device malfunctioning or unexpected environmental inconstancies. Furthermore, since data anomalies interfere with accurate structural evaluation, we need to identify anomalies and treat them appropriately in the data preprocessing stage."
Source: IEEE Xplore

NEURAL NETWORKS



Application of artificial neural networks and multiple linear regression on local bond stress equation of UHPC and reinforcing steel bars

"We investigated the use of an Artificial Neural Network (ANN) to predict the Local Bond Stress (LBS) between Ultra-High-Performance Concrete (UHPC) and steel bars, in order to evaluate the accuracy of our LBS equation, proposed by Multiple Linear Regression (MLR). The experimental and numerical LBS results of specimens, based on RILEM standards and using pullout tests, were assessed by the ANN algorithm using the TensorFlow platform. For

Coherent diffraction imaging (CDI) is an X-ray technique that bounces ultra-bright X-ray beams off samples. The beams of light then are collected by detectors as data and are turned into images. According to Mathew Cherukara, leader of the Computational X-ray Science group in Argonne's X-ray Science Division (XSD), the current detectors only capture some of the beam's information."
Source: Health IT Analytics

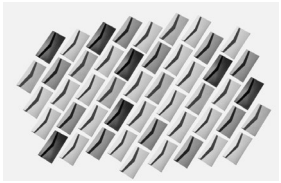
AI-Driven Biology Can Get Critical Medicines To Patients Faster

"One of the challenges of modern healthcare is getting very specific, targeted medicine to patients quickly. Artificial intelligence (AI) has already demonstrated how it can transform data analysis in healthcare, and now it is helping bring drugs to patients faster.
Absci, a synthetic biology company that recently went public, is using an AI-powered platform for protein discovery and production to help pharmaceutical companies create drugs that were previously impossible to make. The platform accelerates preclinical development of new treatments for complex diseases like cancers and autoimmune disorders."
Source: Forbes

Skin Cancer Predictions and Fake Customer Service Agents are the Latest in AI Advancements

"The World Robotics report shows that Europe is the region with the highest robot density globally, with an average value of 114 units per 10,000 employees in the manufacturing industry. For more facts about robots watch IFR´s video news about Europe in one minute."
Source: Nasdaq

SECURITY



AI Wrote Better Phishing Emails Than Humans in a Recent Test

"Researchers have long debated whether it would be worth the effort for scammers to train machine learning algorithms that could then generate compelling phishing messages. Mass phishing messages are simple and formulaic, after all, and are already highly effective. Highly targeted and tailored "spearphishing" messages are more labor intensive to compose, though.

each specimen, steel bar diameters (db) of 12, 14, 16, 18, and 20, concrete compressive strength (f'c), bond lengths (L), and concrete covers (C) of db, 2db, 3db and 4db were used as input parameters for our ANN. To obtain an accurate LBS equation, we first modified the existing formula, then used MLR to establish a new LBS equation. Finally, we applied ANN to verify our new proposed equation. The numerical pullout test values from ABAQUS and experimental results from our laboratory were compared with the proposed LBS equation and ANN algorithm results."
Source: Nature Scientific Reports

Analysis and estimation of fading time from thermoluminescence glow curve by using artificial neural network

"The artificial neural network (ANN) is an information processing technology inspired by the information processing technique of the human brain. The way the simple biological nervous system works is imitated with ANN. In this study, an ANN model is proposed to analyze and simulate TL intensity of experimental data of quartz crystals with respect to the fading. In this model, network type and transfer function are chosen as the feed-forward backpropagation algorithm and Tansig respectively for the training of the proposed ANN model. The optimization process is also chosen as Levenberg–Marquardt in this study. The performance criteria of the proposed method were evaluated according to the coefficient of determination (R2) and mean-squared error (MSE) techniques. After simulation results are obtained, the TL glow curve of the prediction results of quartz crystal is obtained as a function of fading time irradiated with β-source at 70 Gy for stored in 64 h at room temperature."
Source: Taylor & Francis

Neural network-based multi-view enhanced multi-learner active learning: theory and experiments

"As applications of neural networks increase in our daily lives, their practicality and accuracy become more of a challenge as they are applied to approximate more complicated functions typically composed of different dependent or independent views. While the complexity of the functions and the number of views to be approximated or simulated increases, the task becomes more complicated and more difficult in that it may eventually jeopardise the classifier's accuracy

That's where NLP may come in surprisingly handy."
Source: Wired

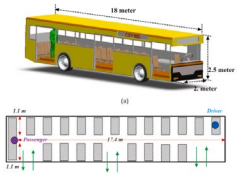
and make the results unreliable. This paper surveys an improved active learning method called Enhanced Multi-Learner (EML) to facilitate the approximation or simulation of complex functions via neural networks by distributing the complexities of the task under simulation among an array of learners where each network is responsible for learning a specific view."
Source: Taylor & Francis

REINFORCEMENT LEARNING

A joint power and bandwidth allocation method based on deep reinforcement learning for V2V communications in 5G

"Vehicular communications have recently attracted great interest due to their potential to improve the intelligence of the transportation system. When maintaining the high reliability and low latency in the vehicle-to-vehicle (V2V) links as well as large capacity in the vehicle-to-infrastructure (V2I) links, it is essential to flexibility allocate the radio resource to satisfy the different requirements in the V2V communication. This paper proposes a new radio resources allocation system for V2V communications based on the proximal strategy optimization method. In this radio resources allocation framework, a vehicle or V2V link that is designed as an agent. And through interacting with the environment, it can learn the optimal policy based on the strategy gradient and make the decision to select the optimal sub-band and the transmitted power level. Because the proposed method can output continuous actions and multi-dimensional actions, it greatly reduces the implementation complexity of large-scale communication scenarios. The simulation results indicate that the allocation method proposed in this paper can meet the latency constraints and the requested capacity of V2V links under the premise of minimizing the interference to vehicle-to-infrastructure communications."
Source: IEEE Xplore

BIOMEDICAL



Prediction of the spread of Corona-virus carrying droplets in a bus - A computational based artificial intelligence approach

"Public transport has been identified as high risk as the corona-virus carrying droplets generated by the infected passengers could be distributed to other passengers. Therefore, predicting the patterns of droplet spreading in public transport environment is of primary importance. This paper puts forward a novel computational and artificial intelligence (AI) framework for fast prediction of the spread of droplets produced by a sneezing passenger in a bus. The formation of droplets of salvia is numerically modelled using a volume of fluid methodology applied to the mouth and lips of an infected person during the sneezing process. This is followed by a large eddy simulation of the resultant two phase flow in the vicinity of the person while the effects of droplet evaporation and ventilation in the bus are considered. The results are subsequently fed to an AI tool that employs deep learning to predict the distribution of droplets in the entire volume of the bus. This combined framework is two orders of magnitude faster than the pure computational approach. It is shown that the droplets with diameters less than 250 micrometers are most responsible for the transmission of the virus, as they can travel the entire length of the bus."

Source: Journal of Hazardous Materials

Disrupting 3D printing of medicines with machine learning

"3D printing (3DP) is a progressive technology capable of transforming pharmaceutical development. However, despite its promising advantages, its transition into clinical settings remains slow. To make the vital leap to mainstream clinical practice and improve patient care, 3DP must harness modern technologies. Machine learning (ML), an influential branch of artificial intelligence, may be a key partner for 3DP. Together, 3DP and ML can utilise intelligence based on human learning to accelerate drug product development, ensure stringent quality control (QC), and inspire innovative dosage-form design. With ML's capabilities, streamlined 3DP drug

delivery could mark the next era of personalised medicine. This review details how ML can be applied to elevate the 3DP of pharmaceuticals and importantly, how it can expedite 3DP's integration into mainstream healthcare."
Source: Trends in Pharmacological Sciences

Artificial Intelligence (AI) and Big Data for Coronavirus (COVID-19) Pandemic: A Survey on the State-of-the-Arts

"The very first infected novel coronavirus case (COVID-19) was found in Hubei, China in Dec. 2019. The COVID-19 pandemic has spread over 214 countries and areas in the world, and has significantly affected every aspect of our daily lives. At the time of writing this article, the numbers of infected cases and deaths still increase significantly and have no sign of a well-controlled situation, e.g., as of 13 July 2020, from a total number of around 13.1 million positive cases, 571, 527 deaths were reported in the world. Motivated by recent advances and applications of artificial intelligence (AI) and big data in various areas, this paper aims at emphasizing their importance in responding to the COVID-19 outbreak and preventing the severe effects of the COVID-19 pandemic."
Source: Cornell University

PEDAGOGY

Implementation of Competency Enhancement Program for Science Teachers Assisted by Artificial Intelligence in Designing HOTS-based Integrated Science Learning

"Education currently supported by technological developments such as artificial intelligence (AI) and robotics. Science learning based on higher-order thinking skills (HOTS) is needed as the main goal in learning. AI in teacher professional developments are the new way to be implemented. The purpose of this research was to describe the competency enhancement program for science teacher that assisted by AI in designing HOTS-based integrated science learning. 29 science teachers in West Java participated in this program. Descriptive analysis was used to analyze the data from all participants. The results revealed that the program held in blended learning

with face-to-face sessions about higher order thinking skills in science learning, use of multiple representations in science learning, construct of science learnings' theme, integrated science learning, and continued by online learning by web based-AI. Science teachers perceived helpfulness to integrate various science content, followed courses, held discussion, answer the tests, and validating lesson plan products. Teachers has new experiences for the implementation program."
Source: JJPI

ETHICS

Ethics and Regulation of Artificial Intelligence

"Over the last few years, the world has deliberated and developed numerous ethical principles and frameworks. It is the general opinion that the time has arrived to move from principles and to operationalize on the ethical practice of AI. It is now recognized that principles and standards can play a universal harmonizing role for the development of AI-related legal norms across the globe. However, how do we translate and embrace these articulated values, principles and actions to guide Nation States around the world to formulate their regulatory systems, policies or other legal instruments regarding AI? Our regulatory systems have attempted to keep abreast of new technologies by recalibrating and adapting our regulatory frameworks to provide for new opportunities and risks, to confer rights and duties, safety and liability frameworks, and to ensure legal certainty for businesses. These past adaptations have been reactive and sometimes piecemeal, often with artificial delineation on rights and responsibilities and with unintended flow-on consequences."
Source: Springer Link