SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

3 March - 7 April 2020

TOPICAL REPORT

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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news

ARTIFICIAL INTELLIGENCE

Why hasn't AI changed the world yet?

""Back in the 1970s, there were predictions that by 2020, we should have generalised AI by now, we should have been having some Moon and Mars bases and we're nowhere near that," says Aditya Kaul, Research Director at Omdia."
Source: BBC

Study shows widely used machine learning methods don't work as claimed

"Researchers demonstrated the mathematical impossibility of representing social networks and other complex networks using popular methods of 'low-dimensional embeddings."
Source: EUREKALERT

Understanding research on how people develop trust in AI can inform its use

"The use of artificial intelligence (AI), technologies that can interact with the environment and simulate human intelligence, has the potential to significantly change the way we work. Successfully integrating AI into organizations depends on workers'

academic

COLLABORATION

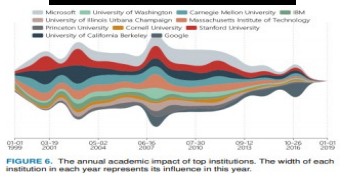
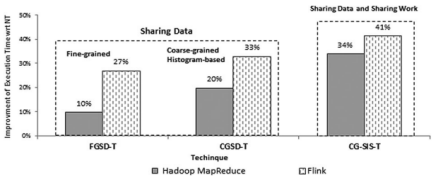


FIGURE 6. The annual academic impact of top institutions. The width of each institution in each year represents its influence in this year.

Institutional Collaboration and Competition in Artificial Intelligence

"he institutional collaboration and competition in academia have benefited the development of science, with inter-institutional scientific work promoting the exchange of ideas and competing fields developing rapidly. However, understanding of how the institutions collaborate and compete in science is sorely lacking, especially in emerging fields."
Source: IEEE Access

DATA SCIENCE

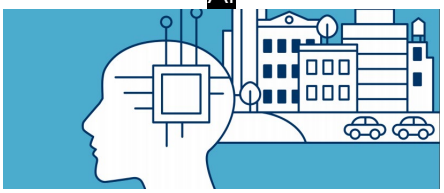


Fake news propagates differently from real news even at early stages of spreading

"While existing studies of fake news focus on theoretical modeling of propagation or identification methods based on machine learning, it is important to understand the realistic propagation mechanisms between theoretical models and black-box methods. Here we track

reports

AI



AMERICAN ARTIFICIAL INTELLIGENCE INITIATIVE: YEAR ONE ANNUAL REPORT

"This document — American Artificial Intelligence Initiative: Year One Annual Report— reviews the strategic objectives of the Initiative, as well as the United States' substantial progress on implementing the strategy over the first year. The chapters that follow describe the six main elements of the strategy, as well as Federal progress to date in these elements.."
Source: WHITEHOUSE

WHITE PAPER On Artificial Intelligence - A European approach to excellence and trust

"Against a background of fierce global competition, a solid European approach is needed, building on the European strategy for AI presented in April 20181. To address the opportunities and challenges of AI, the EU must act as one and define its own way, based on European values, to promote the development and deployment of AI. The Commission is committed to enabling scientific breakthrough, to preserving the EU's technological leadership and to ensuring that new technologies are at the service of all Europeans –

level of trust in the technology. A new review examined two decades of research on how people develop trust in AI."
Source: EUREKALERT

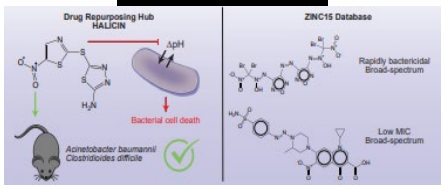
'Blind over-reliance' on AI technology to manage international migration could lead to serious breaches of human rights

"Over-reliance by countries on artificial intelligence to tackle international migration and manage future migration crisis could lead to serious breaches of human rights, a new study warns."
Source: EUREKALERT

Putting artificial intelligence to work in the lab

"An Australian-German collaboration has demonstrated fully-autonomous SPM operation, applying artificial intelligence and deep learning to remove the need for constant human supervision."
Source: EUREKALERT

HEALTHCARE



Artificial intelligence improves X-ray identification of patients with broken bones

"Artificial intelligence that can "read" electronic radiology reports and flag patients with broken bones who are at risk of osteoporosis outperformed the traditional manual method of health care professionals reading X-ray reports, a new study finds. The results were accepted for presentation at ENDO 2020, the Endocrine Society's annual meeting, and will be published in a special supplemental section of the Journal of the Endocrine Society."
Source: EUREKALERT

New artificial intelligence system can empower medical professionals in diagnosing skin diseases

"Researchers have developed an AI algorithm capable of diagnosing 134 skin disorders and supporting specialists by augmenting the accuracy of diagnoses and large databases of fake news and real news in both, Weibo in China and Twitter in Japan from different cultures, which include their traces of re-postings."
Source: EPJ Data Science

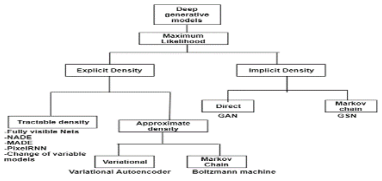
Measuring and mitigating behavioural segregation using Call Detail Records

"The overwhelming amounts of data we generate in our daily routine and in social networks has been crucial for the understanding of various social and economic factors. The use of this data represents a low-cost alternative source of information in parallel to census data and surveys. Here, we advocate for such an approach to assess and alleviate the segregation of Syrian refugees in Turkey."
Source: EPJ Data Science

Measuring the effect of node aggregation on community detection

"We identify the class of community detection algorithms most suitable to cope with node aggregation, and develop an index for aggregability, capturing to which extent the aggregation preserves the community structure. We illustrate its relevance on real-world examples (mobile phone and Twitter reply-to networks). Our main message is that any node-partitioning analysis performed on aggregated networks should be interpreted with caution, as the outcome may be strongly influenced by the level of the aggregation.."
Source: EPJ Data Science

CYBERSECURITY



A review of generative adversarial networks and its application in cybersecurity

"This paper reviews Generative Adversarial Networks (GANs) in detail by discussing the strength of the GAN when compared to other generative models, how GANs works and some of the notable problems with training, tuning and evaluating GANs. The paper also briefly reviews notable improving their lives while respecting their rights.."
Source: European Commission

Managing AI and ML in the enterprise 2020 (free PDF)

"As artificial intelligence (AI) and machine learning (ML) reshape critical sectors, such as healthcare, finance, human resources, and public safety, CXOs must understand the ethical issues of using AI and ML and ensure that their algorithms aren't sources of unconscious bias.
This free PDF ebook from TechRepublic and ZDNet examines how companies manage, benefit from, and make ethical decisions regarding their AI and ML usage."
Source: Techrepublic

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This free PDF ebook from TechRepublic and ZDNet examines how companies manage, benefit from, and make ethical decisions regarding their AI and ML usage."
Source: Techrepublic

AWARDS

Europe; Growth Excellence Leadership Award - Artificial Intelligence for Insurance

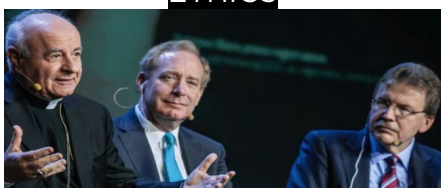
"Founded in 2014 in London, Tractable has quickly built an excellent reputation in providing cutting-edge AI solutions for customers in the insurance industry. By leveraging its top-notch technology insight and AI technology, which enables companies to assess damage and repair costs in real-time to settle claims faster, the company nicely outpaces its other competitors — maintaining an excellent reputation among its clients in the insurance industry."
Source: Frost & Sullivan

predicting treatment options, reports the Journal of Investigative Dermatology."
Source: EUREKALERT

AI-powered shoes unlock the secrets of your sole

"Researchers at Stevens Institute of Technology have developed an AI-powered, smart insole that instantly turns any shoe into a portable gait-analysis laboratory."
Source: EUREKALERT

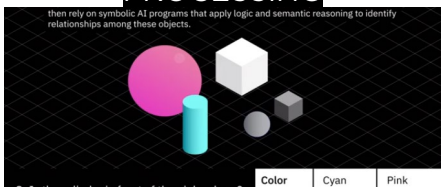
ETHICS



Female IBM Researchers are helping AI overcome bias and find its voice

"This month, we are highlighting the work of four AI researchers at IBM who are pushing the frontiers of the technology. Their efforts extend from work process automation to the design of ever more intelligent chatbots to the discovery of new, more effective antibiotics. All four of these researchers are women—a constituency that has helped lead IBM Research in the crucial task of removing or mitigating bias from AI algorithms—a key for fairness and gender equitys."
Source: IBM

NATURAL LANGUAGE PROCESSING



Chatbots provide millions with COVID-19 information every day, but they can be improved - here's how

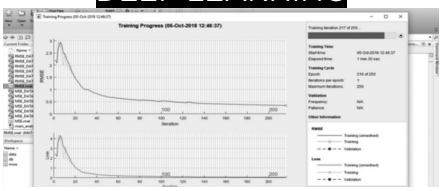
"Chatbots have been a natural choice for disseminating health information during the coronavirus crisis. Advances in Natural Language Processing (NLP) have enabled conversational AI technologies and widened their reach, leading to tools such as Siri, Alexa, and Google Home that are part of many consumers' every day lives. The intuitive interface of chatbots presents a low-friction approach to disseminate critical

GAN architectures like the Deep Convolutional Generative Adversarial Network (DCGAN), and Wasserstein GAN, with the aim of showing how design specifications in these architectures help solve some of the problems with the basic GAN model."
Source: Artificial Intelligence Review

pAElla: Edge-AI based Real-Time Malware Detection in Data Centers

"In this paper, we focus on Data Centers (DCs) and Supercomputers (SCs), where a new generation of high-resolution monitoring systems is being deployed, opening new opportunities for analysis like anomaly detection and security, but introducing new challenges for handling the vast amount of data it produces."
Source: IEEE Internet of Things Journal

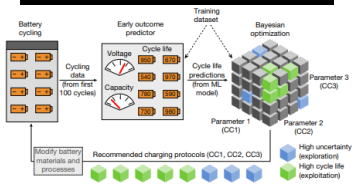
DEEP LEARNING



Deep learning-based breast cancer classification through medical imaging modalities: state of the art and research challenges

"This review focuses on breast cancer classification by using medical imaging multimodalities through state-of-the-art artificial deep neural network approaches. It is anticipated to maximize the procedural decision analysis in five aspects, such as types of imaging modalities, datasets and their categories, pre-processing techniques, types of deep neural network, and performance metrics used for breast cancer classification."
Source: Artificial Intelligence Review

MACHINE LEARNING



Ten Challenges in Advancing Machine Learning Technologies toward 6G

"As the 5G standard is being completed, academia and industry

North America; Entrepreneurial Company of the Year Award - Artificial Intelligence in Energy

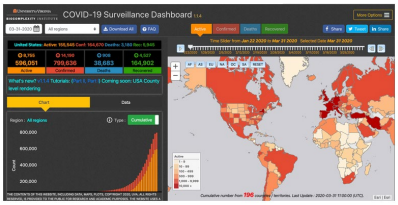
"Founded in 2017, BluWave-ai leverages artificial intelligence (AI) to bolster renewable energy source (RES) adoption and use. The Ottawa, Canada-based company's grid energy optimization platform employs machine learning (ML) to optimize the cost, availability, reliability, and sustainability of energy sources, both renewable and nonrenewable. BluWave-ai enables its customers to improve energy decisions, saving up to 20% on energy costs and realizing a greener, more sustainable grid while simultaneously resolving intermittency and increasing reliance on sources such as wind and solar."
Source: Frost & Sullivan

information to vast populations. And Chatbots, like websites, are available 24/7."
Source: Weforum

There Is a Racial Divide in Speech-Recognition Systems, Researchers Say

"Technology from Amazon, Apple, Google, IBM and Microsoft misidentified 35 percent of words from people who were black. White people fared much better.."
Source: NYT

DATA ANALYTICS



Digital coronavirus maps helping public understand the pandemic better

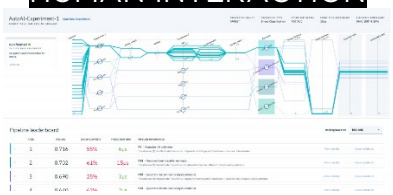
"Dawen Xie, the lead developer behind the University of Virginia's COVID-19 dashboard, said its goal was to help people deal with the coronavirus pandemic through historical data and up-to-date figures."
Source: TechRepublic

New coronavirus maps show effectiveness of stay-at-home orders and testing data

"Domo has updated its free interactive coronavirus global tracker with information that includes county-level statistics for every state in the US, as well as stay-at-home orders and testing information.

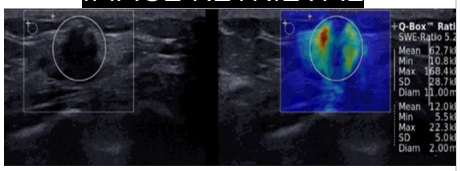
The maps uses Domo's platform to show the trajectory of the coronavirus. It breaks it down globally by country and locally by US state and county to show the number of confirmed cases, how many people have recovered, how many have died, and who is currently infected."
Source: TechRepublic

HUMAN INTERACTION



have begun to consider a more developed cellular communication technique, 6G, which is expected to achieve high data rates up to 1 Tb/s and broad frequency bands of 100 GHz to 3 THz. Besides the significant upgrade of the key communication metrics, Artificial Intelligence (AI) has been envisioned by many researchers as the most important feature of 6G, since the state-of-the-art machine learning technique has been adopted as the top solution in many extremely complex scenarios."
Source: IEEE Wireless Communications

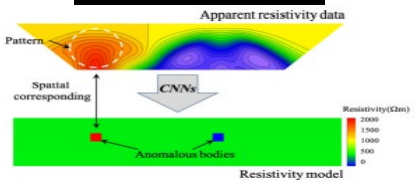
IMAGE RETRIEVAL



Enhanced bag of visual words representations for content based image retrieval: a comparative study

"…this paper aims to categorize and evaluate the existing BoVW model based formulations for the task of content based image retrieval. The commonly used datasets and the evaluation metrics to assess the retrieval effectiveness of these existing models are discussed."
Source: Artificial Intelligence Review

DEEP LEARNING



A survey of swarm and evolutionary computing approaches for deep learning

"The paper reviews the significant roles of SI and EC in optimizing the hyper-parameters and architectures of a DL system in context to large scale data analytics. Finally, we identify some open problems for further research, as well as potential issues related to DL that require improvements, and an extensive bibliography of the pertinent research is presented."
Source: Artificial Intelligence Review

Recent trends in deep learning based personality detection

IBM at the Intersection of Human-Computer Interaction and AI

"New data from Gartner Inc. suggests that the recruiting, management, and retention of artificial intelligence talent (AI) will be a strategic challenge globally for the foreseeable future. For the past four years, Gartner found, the strongest demand for talent with AI skills has come from non-IT departments."
Source: IBM

Automation May Take Jobs—but AI Will Create Them

"CHANCES ARE YOU'VE already encountered, more than a few times, truly frightening predictions about artificial intelligence and its implications for the future of humankind. The machines are coming and they want your job, at a minimum."
Source: WIRED

CIOs face uphill climb in finding skilled artificial intelligence talent

"The ACM International Conference on Intelligent User Interfaces (IUI) is the premier venue where the human-computer interaction (HCI) community meets the artificial intelligence (AI) community. Work presented at IUI focuses on improving the interaction between humans and AI systems by combining HCI approaches with state-of-the art AI techniques from machine learning (ML), natural language processing (NLP), data mining, knowledge representation, and reasoning. IBM Research has actively engaged with the IUI community for decades."
Source: IBM

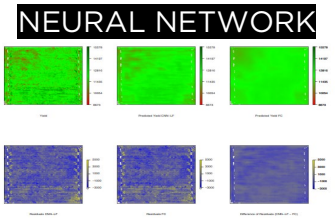
Characterizing the Evolution of Tasks Within Occupations

"AI has started to transform occupations, with the potential to make both labor and machines more efficient and productive. To better understand this transformation, our team at the MIT-IBM Watson AI Lab presented a new study at the AAAI Conference on AI, Ethics, and Society

"In this paper, we review significant machine learning models which have been employed for personality detection, with an emphasis on deep learning-based methods. This review paper provides an overview of the most popular approaches to automated personality detection, various computational datasets, its industrial applications, and state-of-the-art machine learning models for personality detection with specific focus on multimodal approaches."
Source: Artificial Intelligence Review

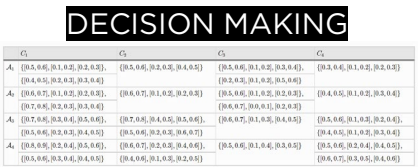
Recommendation system based on deep learning methods: a systematic review and new directions

"This paper is the first SLR specifically on the deep learning based RS to summarize and analyze the existing studies based on the best quality research publications. The paper particularly adopts an SLR approach based on the standard guidelines of the SLR designed by Kitchemen-ham which uses selection method and provides detail analysis of the research publications."
Source: Artificial Intelligence Review



Exploring the limit of using a deep neural network on pileup data for germline variant calling

"Single-molecule sequencing technologies have emerged in recent years and revolutionized structural variant calling, complex genome assembly and epigenetic mark detection. However, the lack of a highly accurate small variant caller has limited these technologies from being more widely used."
Source: Nature Machine Intelligence



Linguistic neutrosophic partitioned Maclaurin

on "Learning Occupational Task-Shares Dynamics for the Future of Work" that shows how to predict changes in the economy's demand for different tasks. As AI continues to evolve and tasks transform, the next decade is expected to see significant changes in task requirements across occupations."
Source: IBM

COVID 19

COVID-19: How to fight disease outbreaks with data

"The good news is that in today's age of information, our global connectivity gives us a strong advantage in fighting infectious disease. We can analyze masses of data across different parts of the world to identify outbreaks and use advanced machine learning models to predict future movement across geographies. The challenge is that collating relevant data and standardizing it at a global level is a complicated task.."
Source: Weforum

How Hospitals Are Using AI to Battle Covid-19

"The COVID-19 crisis is causing business leaders to face difficult questions. Find out how even basic analytics tools such as Microsoft Excel can help you model future scenarios."
Source: TechRepublic

Coronavirus-related first responder data skyrockets in the past week

"A data dashboard of 11,275 records of EMS, fire departments, and hospitals on April 2nd found that the number of documented responses that appear related to COVID-19, not surprisingly, has grown nearly tenfold in the past week as both the public and EMS responders have become more aware of the pandemic.
The dashboard, developed by data software provider ESO, is capturing, tracking, and analyzing response data to improve the patient journey and the health and safety of communities across the US."
Source: TechRepublic

symmetric mean operators based on clustering algorithm and their application to multi-criteria group decision-making

"The paper reviews the significant roles of SI and EC in optimizing the hyper-parameters and architectures of a DL system in context to large scale data analytics. Finally, we identify some open problems for further research, as well as potential issues related to DL that require improvements, and an extensive bibliography of the pertinent research is presented."
Source: Artificial Intelligence Review

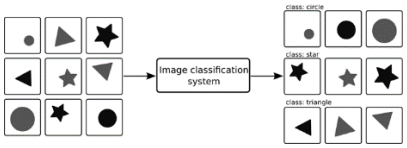
Interval neutrosophic hesitant fuzzy Einstein Choquet integral operator for multicriteria decision making

"In this paper, we define some new Einstein operational rules on interval neutrosophic hesitant fuzzy elements, then we propose the interval neutrosophic hesitant fuzzy Einstein Choquet integral (INHFECI) operator and discuss its properties."
Source: Artificial Intelligence Review

An extended TOPSIS method based on ordered fuzzy numbers for group decision making

"The aim of this paper and its main contribution is to present a new approach for ranking of alternatives for group decision making using the Technique for Order Preference by Similarity to Ideal Solution method based on ordered fuzzy numbers. This is an alternative to methods that use different forms of averages for the aggregation of the individual matrices into a collective matrix."
Source: Artificial Intelligence Review

IMAGE ANALYSIS



Feature selection in image analysis: a survey

"The goal of this paper is to survey the most recent feature selection methods developed and/or applied to image analysis, covering the most popular fields such as image

MIT introduces "COVID-19 Rapid Innovation Dashboard," an all-hands-on-deck team effort between the five schools, to research, report, and find solutions to the coronavirus.

"A community of students, faculty, staff and alumni from academia and science labs across the five schools of the Massachusetts Institute of Technology in Cambridge, MA, have pooled resources to create the COVID-19 Rapid Innovation Dashboard, as MIT's entry point to urgent problem-solving to address the pandemic. The latest version launched April 2 and grew out of the MIT Innovation Initiative."
Source: TechRepublic

Microsoft teams up with leading universities to tackle coronavirus pandemic using AI

"The newly-formed C3.ai Digital Transformation Institute has an open call for proposals to mitigate the COVID-19 epidemic using artificial intelligence and machine learning.."
Source: TechRepublic

How data analytic tools can provide clarity during the coronavirus pandemic

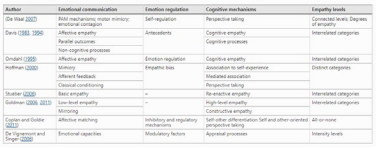
"The COVID-19 crisis is causing business leaders to face difficult questions. Find out how even basic analytics tools such as Microsoft Excel can help you model future scenarios."
Source: TechRepublic

IBM Releases Novel AI-Powered Technologies to Help Health and Research Community Accelerate the Discovery of Medical Insights and Treatments for COVID-19

"IBM Research has been actively developing new cloud and AI-powered technologies that can help researchers across a variety of scientific disciplines accelerate the process of discovery. As the COVID-19 pandemic unfolds, we continue to ask how these technologies and our scientific knowledge can help in the global battle against coronavirus."
Source: IBM

classification, image segmentation, etc."
Source: Artificial Intelligence Review

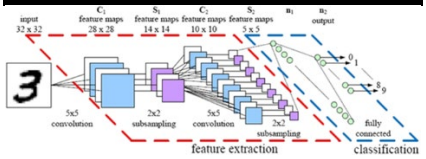
HUMAN INTERACTION



Modeling empathy: building a link between affective and cognitive processes

"The aim of this article is…to call for a holistic and multilayered view of a model of empathy, taken from the rich background research from various disciplines. To achieve this, we present a comprehensive background on the theoretical foundations, followed by the working definitions, components, and models of empathy that are proposed by various fields."
Source: Artificial Intelligence Review

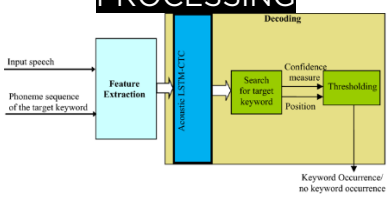
CHARACTER RECOGNITION



Performance evaluation of classifiers for the recognition of offline handwritten Gurmukhi characters and numerals: a study

"This paper presents a comparative study of various classifiers and the results achieved for offline handwritten Gurmukhi characters and numerals recognition. Various classifiers used and evaluated in this study include k-nearest neighbors, linear-support vector machine (SVM), RBF-SVM, Naive Bayes, decision tree, convolution neural network and random forest classifier."
Source: Artificial Intelligence Review

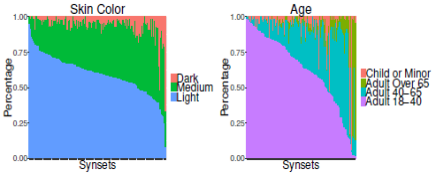
NATURAL LANGUAGE PROCESSING



A survey on structured discriminative spoken keyword spotting

"This paper includes a comprehensive review on various spoken keyword spotting (especially discriminative spoken keyword spotting) approaches. The most common datasets and evaluation measures for training and evaluating the spoken keyword spotting systems are reviewed in this paper."
Source: Artificial Intelligence Review

COMPUTER VISION



A survey on structured discriminative spoken keyword spotting

"For surveillance applications, pose-invariant face recognition (PIFR) will become a major break-through by presenting the solution of this unique challenge. In recent decade, several techniques are presented to address this challenge over well-known data-sets…By reviewing PIFR, it is historically divided into five eras based on 160 referred papers and their cumulative citations."
Source: Artificial Intelligence Review