SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

2 June – 14 August 2020

TOPICAL REPORT

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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DATA ANALYTICS

Why plot-driven data storytelling is important and how to create it

"Data storytelling can yield significant benefits in informational analysis, but it requires skill and expertise. Learn some tips from data experts to get the most out of the experience."
Source: TechRepublic

66 data science teams compete in challenge to help reopen Los Angeles

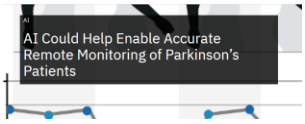
"Winners identified location-based risks, developed apps to calculate infection risk, and delivered data-driven recommendations for Los Angeles County's reopening stages.."
Source: International Federation of Robotics

EMPLOYMENT

Job interviews: Recruiters are using artificial intelligence to analyse what you say to find the right hire

"Harqen's AI platform analyses language to determine a candidate's suitability for a role, potentially making

HEALTHCARE



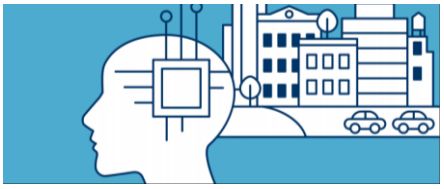
AI Could Help Enable Accurate Remote Monitoring of Parkinson's Patients

"In a paper recently published in Nature Scientific Reports, IBM Research and scientists from several other medical institutions developed a new way to estimate the severity of a person's Parkinson's disease (PD) symptoms by remotely measuring and analyzing physical activity as motor impairment increased. Using data captured by wrist-worn accelerometers, we created statistical representations of PD patients' motor movement that could be objectively evaluated using AI either in-clinic or from a more natural setting, such as a patient's home."
Source: IBM

Improving the accuracy of medical diagnosis with causal machine learning

"In medical diagnosis a doctor aims to explain a patient's symptoms by determining the diseases causing them. However, existing machine learning approaches to diagnosis are purely associative, identifying diseases that are strongly correlated with a patients symptoms. We show that this inability to disentangle correlation from causation can result in sub-optimal or dangerous diagnoses. To overcome this, we reformulate diagnosis as a counterfactual inference task and

AI



The art of customer-centric artificial intelligence

"As the COVID-19 crisis grips the world, the impact of AI on the customer experience is accelerating. As customers seek contactless or non-touch interfaces, numerous sectors have stepped up their digital and AI game."
Source: Capgemini

The 2020 State of AI and Machine Learning Report

"The 2020 State of AI and Machine Learning report illustrates the current state of artificial intelligence and machine learning, showcasing where the industry is as a whole in 2020 compared to 2019. The 2020 report is the output of a cross-industry, large-organization study of senior business leaders and technologists."
Source: Appen

Why building consumer trust is the key to unlocking AI's true potential

"Without consumer confidence that AI is being used ethically and transparently, however, its full potential will not be realised."
Source: World Economic Forum

it less prone to bias than video-based recruitment technology."
Source: TechRepublic

Inclusive AI: Are AI hiring tools hurting corporate diversity?

"More companies are using AI hiring tools in the hiring process to pinpoint premium candidates. But potential biases in these technologies have raised ethical concerns."
Source: TechRepublic

COVID 19

A new predictive algorithm aims to forecast COVID-19 case spikes

"The model for the early-warning system uses real-time data from Twitter, Google searches, and mobility data from smartphones, among other data streams."
Source: TechRepublic

ARTIFICIAL INTELLIGENCE

IBM & MIT Roundtable: Solving AI's Big Challenges Requires a Hybrid Approach

"At IBM Research's recent "The Path to More Flexible AI" virtual roundtable, a panel of MIT and IBM experts discussed some of the biggest obstacles they face in developing artificial intelligence that can perform optimally in real-world situations.."
Source: IBM

AI-powered tool aims to help reduce bias and racially charged language on websites

"22% of more than 500,000 business websites contain some form of racial and gender bias, according to UserWay."
Source: TechRepublic

Higher ed institutions are using Otter's AI technology to transfer lectures into notes

"The company says its speech technology can help students and educators avoid video conferencing fatigue."
Source: TechRepublic

derive counterfactual diagnostic algorithms."
Source: Nature Communications

Towards an AI diagnosis like the doctor's

"Artificial intelligence (AI) is an important innovation in diagnostics, because it can quickly learn to recognize abnormalities that a doctor would also label as a disease."
Source: Eurekalert

Machine learning reveals recipe for building artificial proteins

"In a breakthrough that could have implications across the healthcare, agriculture, and energy sectors, a team lead by researchers in the Pritzker School of Molecular Engineering (PME) at the University of Chicago has developed an artificial intelligence-led process that uses big data to design new proteins."
Source: Eurekalert

Pan-cancer computational histopathology reveals mutations, tumor composition and prognosis

"We use deep transfer learning to quantify histopathological patterns across 17,355 hematoxylin and eosin-stained histopathology slide images from 28 cancer types and correlate these with matched genomic, transcriptomic and survival data. This approach accurately classifies cancer types and provides spatially resolved tumor and normal tissue distinction."
Source: Nature Cancer

COLLABORATION

This robot scientist conducts experiments by itself

"An intelligent robot that works independently 21.5 hours a day is helping scientists at the University of Liverpool with their research.
Source: World Economic Forum

DEEP LEARNING

Biologically-Inspired Deep Learning Predicts Chords of Bach

"Today, as reported in Nature Machine Intelligence, my colleagues and I have demonstrated a novel

DATA SCIENCE

The State of Data Science 2020 Moving from hype toward maturity

"The good news is, the hype around data science and machine learning is giving way to reality. But the bad news is that we've got a long way to go before we achieve maturity. Enterprises, academics, and data professionals have work to do before the discipline can really deliver on its potential for business and society."
Source: Anaconda

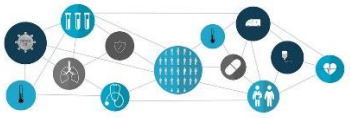
Innovations in Artificial Intelligence and Virtual Reality

"This issue focuses on the application of information and communication technologies in alleviating the challenges faced across industry sectors in areas such as healthcare, retail, legal, ICT, real estate, and travel. In addition, this issue highlights emerging innovations and disruptive business models in a post-COVID scenario."
Source: Frost & Sullivan

Global Big Data Analytics Market Fueling Artificial Intelligence, 2020

"his research measures the future impact of COVID-19 on the global Big Data Analytics (BDA) market. The embedded ecosystem has led to a hyper-connected world and growth of the Internet of Things (IoT). Thanks to ubiquitous networks, IoT has connected all manner of endpoints and unveiled a treasure trove of data."
Source: Frost & Sullivan

HEALTHCARE



Frost Radar™: Artificial Intelligence for Healthcare IT, Global, 2020

"Frost & Sullivan research has identified the core areas in which artificial intelligence (AI)-enabled healtchcare IT solutions are most relevant for hospitals, physicians, and payers."
Source: Frost & Sullivan

AI, analytics, and NLP are valuable, despite lack of obvious financial return

"Instead of focusing on return to business, consider how technologies can give your business a competitive advantage."
Source: TechRepublic

AI-enabled future crimes ranked: Deepfakes, spearphishing, and more

"A study explores the possible range and risk of attacks from military robots and autonomous attack drones to AI-assisted stalking. Here are the top 5."
Source: TechRepublic

AI tool lets startups determine the value of their e-commerce business in 24 hours for free

"Valuation was developed by the co-founder of alternative capital firm Clearbanc, who spent six years on the Canadian version of "Shark Tank."
Source: TechRepublic

A bored 13-year-old from New Jersey used COVID-19 isolation to take an online IBM class, and within two weeks created and launched Rita, a fully functional chatbot.

"While her peers reveled in an unprecedented virtual school year, the self-described "technology enthusiast," Harita Suresh, 13, was bored. She decided on an online course and settled on IBM Skills Network's "AI chatbots without programming." She lacked experience with artificial intelligence, but was eager to learn through the self-paced course."
Source: TechRepublic

Why the gym of the future is your living room

"Sweat tech: Tonal CEO Aly Orady explains why big data and AI are the pedals that power the future of fitness."
Source: TechRepublic

DeepMind sets AI loose on Diplomacy board game, and collaboration is key

"Artificial intelligence systems have become increasingly well-adapted to a host of basic board games. Now, DeepMind is hoping to teach agents the art of collaboration using Diplomacy.."
Source: TechRepublic

Detroit police admit to first facial recognition mistake after false arrest

"On Wednesday morning, the ACLU announced that it was filing a complaint against the Detroit Police approach to deep learning that incorporates biologically-inspired neural dynamics and enables in-memory acceleration, bringing it closer to the way in which the human brain works. The results point towards the broad adoption of more biologically-realistic deep learning for applications in artificial intelligence (AI).."
Source: IBM

Ensemble deep learning in bioinformatics

"Here, we share recent key developments in ensemble deep learning and look at how their contribution has benefited a wide range of bioinformatics research from basic sequence analysis to systems biology."
Source: Nature Machine Intelligence

Development of an Urban Greenery Evaluation System Based on Deep Learning and Google Street View

"With the development of computer technology, the way to obtain data is more diverse. For the assessment of urban greenery quality, there are many methods, such as using remote sensing satellite images captured from above (antenna, space) sensors, to assess urban green coverage."
Source: Proceedings of the 25th CAADRIA Conference - Volume 1

NATURAL LANGUAGE PROCESSING

IBM Research AI Advances Speaker Diarization in Real Use Cases

"In a recent publication, "Speaker Embeddings Incorporating Acoustic Conditions for Diarization," presented virtually at ICASSP 2020, we describe a novel speaker diarization algorithm that can consider not only speaker information, but also identifying clues about individual recording environments that help differentiate between the speakers, resulting in improved diarization accuracy for our in-house, real test cases as well as public benchmark data.."
Source: IBM

Reducing Speech-to-Text Model Training Time on Switchboard-2000 from a Week to Under Two Hours

Growth Opportunities in Artificial Intelligence and Analytics in Surgery, 2020

"Artificial intelligence (AI) and analytics technologies are now being well accepted in healthcare, with bellwether clinical application areas (e.g., radiology), and operational application areas (e.g., revenue cycle management). One area of the hospital that perhaps needs the most attention, is the hospital operating room (OR)."
Source: Frost & Sullivan

INDUSTRY INSIGHTS

GROWTH OPPORTUNITIES IN COMPUTER VISION, ARTIFICIAL INTELLIGENCE, AND RETAIL AUTOMATION

"This issue focuses on the application of information and communication technologies in alleviating the challenges faced across industry sectors in areas such as healthcare, retail, e-commerce, AEC, and financial services."
Source: Frost & Sullivan

Global Artificial Intelligence (AI) Software Market, Forecast to 2025

"The global AI software market revenue will grow at a CAGR of 41.6% between 2019 and 2025, with IBM representing the highest revenue among all competitors during 2016–2018. The forecast share of Asia-Pacific (including China) in the total market revenue of the chemical industry in 2020 is about 60%, representing more digitization opportunities in the region."
Source: Frost & Sullivan

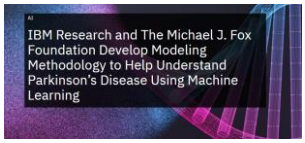
Global; Customer Value Leadership Award - Artificial Intelligence-driven Building Technologies

"Demand for value-driven solutions, cost savings due to increased operational efficiency, government support of artificial intelligence (AI) development, and the penetration of transformative technologies in buildings all combine to facilitate more active development of AI-driven building technologies."
Source: Frost & Sullivan

Artificial Intelligence in the US Military Training and Simulation Industry, 2020

Department on behalf of Robert Williams, a Black Michigan resident whom the group said is one of the first people falsely arrested due to facial recognition software."
Source: TechRepublic

HEALTHCARE



IBM Research and The Michael J. Fox Foundation Develop Modeling Methodology to Help Understand Parkinson's Disease Using Machine Learning

"IBM Research is using machine learning as a tool in the pursuit of revealing the complexities of these diseases. At this week's Machine Learning for Healthcare Conference, we present our progress in this area as motivated by Parkinson's disease (PD)."
Source: IBM

Using Generative AI to Accelerate Drug Discovery

"Novel drug design is difficult, costly and time-consuming. On average, it takes $3 billion and 12 to 14 years for a new drug to reach market. One third of this overall cost and time is attributed to the drug discovery phase requiring the synthetization of thousands of molecules to develop a single pre-clinical lead candidate. At IBM Research AI, we're researching ways to leverage artificial intelligence -based models to expedite this discovery phase at a significantly lower cost.."
Source: IBM

Why healthcare needs big data and analytics

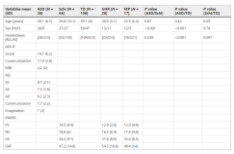
"Data scientists using a governed data lake can support real-time forecasts to arm government decision makers and healthcare professionals with data needed to help predict and contain the virus's spread.."
Source: IBM

MIT develops machine learning model to quicken release of COVID-19 vaccine

"Researchers from MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed a new combinatorial machine learning system that could both decrease research time needed for a COVID-19 vaccine and make it more effective, researchers said."
Source: TechRepublic

"we introduce the work published in our recent ICASSP 2020 paper [3] in which we successfully shorten the training time on the 2000-hour Switchboard dataset, which is one of the largest public ASR benchmarks, from over a week to less than two hours on a 128-GPU IBM high-performance computing (HPC) cluster. To the best of our knowledge, this is the fastest training time recorded on this dataset. The techniques developed in this work can also speed up large-scale training of models with deep architectures in a wide spectrum of DL applications."
Source: IBM

MACHINE LEARNING



Machine-learning classification using neuroimaging data in schizophrenia, autism, ultra-high risk and first-episode psychosis

"Neuropsychiatric disorders are diagnosed based on behavioral criteria, which makes the diagnosis challenging. Objective biomarkers such as neuroimaging are needed, and when coupled with machine learning, can assist the diagnostic decision and increase its reliability."
Source: Translational Psychiatry volume

Machine learning has a flaw; it's gullible

"Artificial intelligence and machine learning technologies are poised to supercharge productivity in the knowledge economy, transforming the future of work. But they're far from perfect."
Source: Eurekalert

Which way to the fridge? Common sense helps robots navigate

"A robot travelling from point A to point B is more efficient if it understands that point A is the living room couch and point B is a refrigerator, even if it's in an unfamiliar place. That's the common sense idea behind a "semantic" navigation system developed by Carnegie Mellon University and Facebook AI Research (FAIR)."
Source: Eurekalert

Federated learning in medicine: facilitating multi-

"This report explores the use of AI to deliver military training in the United States, summarizing the potential benefits and current limitations of the technology in the area."
Source: Frost & Sullivan

Towards Being Truly Intelligent: Next Wave of AI Technologies (Wave 2 - Reinforcement Learning)

"Reinforcement learning (RL) is a method of ML that focuses on finding the best possible behavior or method to achieve a predetermined set of objectives. These systems excel at discovering the best method to achieve predetermined goals.."
Source: Frost & Sullivan

Opportunities Analysis : Convergence of AI in 3D Printing

"This research service titled 'Opportunity Analysis: Convergence of AI in 3D Printing reviews the opportunities and future of artificial intelligence technology in the 3D printing industry."
Source: Frost & Sullivan

Automating Multicloud Management Using AI

"The AI-powered multicloud management solution provides complete end-to-end visibility across multicloud architecture, automates most of the manual operating processes, reduces latency, and enhances security."
Source: Frost & Sullivan

GROWTH OPPORTUNITIES IN AI- AND CLOUD-BASED SECURITY INNOVATIONS

"This Cyber Security Technology Opportunity Engine (TOE) provides a snapshot on emerging cyber security solutions powered by artificial intelligence and cloud-based innovations that help companies protect from threats, data breaches, phishing attacks and defend against modern attacks residing within cloud, endpoints, and various network layers."
Source: Frost & Sullivan

Frost Radar™: User and Entity Behaviour Analytics Based on Machine Learning, 2020

"The document presents competitive profiles on each of the companies in the Frost Radar™ based on their strengths, opportunities, and a small discussion on their positioning."
Source: Frost & Sullivan

NATURAL LANGUAGE PROCESSING

IBM Research addressing Enterprise NLP challenges in 2020

"The field of Natural Language Processing (NLP) has made large strides over the last decade. In fact, NLP is so common in today's AI applications that whether consumers are communicating with a virtual assistant, asking for travel directions or searching for weather predictions, chances are they're interacting with some form of NLP."
Source: IBM

Bringing IBM NLP capabilities to the CORD-19 Dataset

"To assist in the fight against the COVID-19 pandemic, prominent research institutes led by Allen Institute for AI (AI2) released earlier this year the COVID-19 Open Research Dataset (CORD-19). Comprised of scientific articles related to COVID-19, Sars-Cov-2, and related coronaviruses, the dataset (which at the time of writing this contains more than 75,000 full text scientific papers) is intended to mobilize researchers to apply recent advances in natural language processing to generate new insights in support of the fight against this infectious disease (1,2)."
Source: IBM

AI: New GPT-3 language model takes NLP to new heights

"Natural language processing is still being refined, but its popularity continues to rise. This new, better version is likely to help."
Source: TechRepublic

Natural language processing: A cheat sheet

"Learn the basics about natural language processing, a cross-discipline approach to making computers hear, process, understand, and duplicate human speech."
Source: TechRepublic

AI HARDWARE

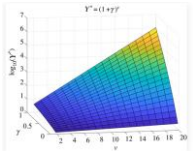
Fulfilling Brain-inspired Hyperdimensional Computing with In-memory Computing

"Scientists around the world are inspired by the brain and strive to

institutional collaborations without sharing patient data

"We show that federated learning among 10 institutions results in models reaching 99% of the model quality achieved with centralized data, and evaluate generalizability on data from institutions outside the federation."
Source: Scientific Reports

ETHICS



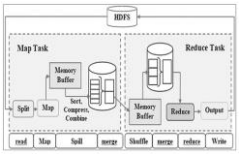
An ethical eye on AI

"Researchers from the University of Warwick, Imperial College London, EPFL (Lausanne) and Sciteb Ltd have found a mathematical means of helping regulators and business manage and police Artificial Intelligence systems' biases towards making unethical, and potentially very costly and damaging commercial choices - an ethical eye on AI."
Source: Eurekalert

Ethics and AI: An unethical optimization principle

"Artificial intelligence (AI) is increasingly deployed around us and may have large potential benefits. But there are growing concerns about the unethical use of AI. Professor Anthony Davison, who holds the Chair of Statistics at EPFL, and colleagues in the UK, have tackled these questions from a mathematical point of view, focusing on commercial AI that seek to maximize profits."
Source: Eurekalert

DATA SCIENCE



A Novel Oppositional Chaotic Flower Pollination Optimization Algorithm for Automatic Tuning of Hadoop Configuration Parameters

"At present, due to the introduction of the big data era, numerous numbers of data are generated consistently. Many applications utilize big data platforms, namely Spark, Hadoop, Amazon web services, and so on, since these platforms use several

AWARDS

Europe; Technology Innovation Award - AI-based Energy Intelligent Platform Industry

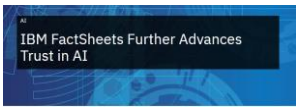
"Founded in 2013, Paris-based start-up METRON has developed a technologically advanced, artificial intelligence (AI)-based energy intelligent platform to optimize energy consumption efficiently and provide considerable cost saving benefits. METRON's platform applies machine learning algorithms through an event-driven architecture, where information is collected and processed quickly in real time.."
Source: Frost & Sullivan

mimic its abilities in the development of technology. Our research team at IBM Research Europe in Zurich shares this fascination and took inspiration from the cerebral attributes of neuronal circuits like hyperdimensionality to create a novel in-memory hyperdimensional computing system.."
Source: IBM

IBM Systems Research: AI and Hybrid Cloud Can Advance Only as Far as Hardware Can Take Them

"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: IBM

TRUST



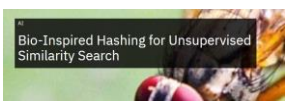
IBM FactSheets Further Advances Trust in AI

"We are excited to announce the release of a new, informative website that shares the latest in a concept introduced by IBM Research AI called AI FactSheets. A research project more than two years in the making, AI FactSheets is designed to foster increased levels of trust in AI by increasing transparency and enabling governance. The new website contains background on the project and IBM Research's methodology, as well as several new technical papers, multiple new examples of FactSheets, and other resources.."
Source: IBM

Ready for trusted insights and more confident decisions? Join us at Data and AI Virtual Forum

"It's true that AI can help users get faster and more accurate answers and insights. It supports better plans, budgets and forecasts. And unaided by machine-learning and AI solutions, enterprises can't hope to effectively understand and gain value from all the data they have. But there are many obstacles to adopting AI, and trust is not the least of them.."
Source: IBM

BIO-INSPIRED



parameters for tuning that further enhance the operating performances."
Source: Big Data

Moth-Flame Optimization-Bat Optimization: Map-Reduce Framework for Big Data Clustering Using the Moth-Flame Bat Optimization and Sparse Fuzzy C-Means

"…this study proposes a technique for big data clustering using the spark architecture. The proposed technique undergoes two steps for clustering the big data, involving feature selection and clustering, performed in the initial cluster nodes of spark architecture."
Source: Big Data

Configuring Parallelism for Hybrid Layouts Using Multi-Objective Optimization

"Modern organizations typically store their data in a raw format in data lakes. These data are then processed and usually stored under hybrid layouts, because they allow projection and selection operations. Thus, they allow (when required) to read less data from the disk. However, this is not very well exploited by distributed processing frameworks (e.g., Hadoop, Spark) when analytical queries are posed."
Source: Big Data

Efficient modeling of higher-order dependencies in networks: from algorithm to application for anomaly detection

"Recent research has shown the importance of using Higher-Order Networks (HONs) for modeling and analyzing such complex systems, as the typical Markovian assumption in developing the First Order Network (FON) can be limiting."
Source: EPJ Data Science

Hypernetwork science via high-order hypergraph walks

"We propose high-order hypergraph walks as a framework to generalize graph-based network science techniques to hypergraphs. Edge incidence in hypergraphs is quantitative, yielding hypergraph walks with both length and width. Graph methods which then generalize to hypergraphs include connected component analyses, graph distance-based metrics such as closeness centrality, and motif-based measures such as clustering coefficients. We apply high-order analogs of these methods to real world hypernetworks, and show they

Bio-Inspired Hashing for Unsupervised Similarity Search

"What can a fruit fly teach us about machine learning? Quite a bit, it turns out. The common fruit fly can recognize and categorize many different odors, and this drives much of the insect's behavior. In our paper, "Bio-Inspired Hashing for Unsupervised Similarity Search," published in ICML 2020, we use the inspiration from the fruit fly olfactory network and a biologically plausible method for representation learning to propose a data-driven hashing algorithm for approximate similarity search."
Source: IBM

reveal nuanced and interpretable structure that cannot be detected by graph-based methods."
Source: EPJ Data Science

Economic outcomes predicted by diversity in cities

"In this paper we show that diversity of amenities within a city neighborhood, computed from openly available points of interest on digital maps, accurately predicts human mobility ("flows") between city neighborhoods and that these flows accurately predict neighborhood economic productivity."
Source: EPJ Data Science