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ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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ARTIFICIAL INTELLIGENCE



Fulfilling Brain-inspired Hyperdimensional Computing with In-memory Computing

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

Iso-accuracy Deep Learning Inference with In-memory Computing

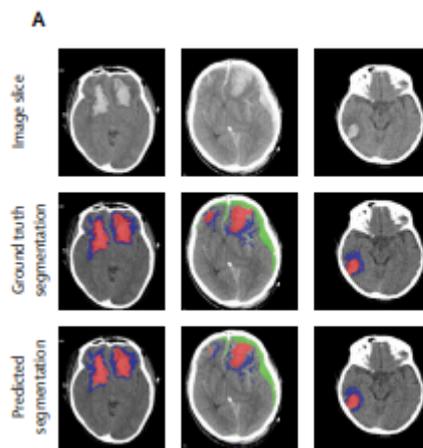
"Can analog AI hardware support deep learning inference without compromising accuracy? Our research team at IBM Research Europe in Zurich thought so when we started developing a groundbreaking technique that achieves both energy efficiency and high accuracy on deep neural network computations using phase-change memory devices. We believe this could be a way forward in advancing AI hardware-accelerator architectures."

Source: IBM

How NVIDIA hopes to industrialize AI with MLOps

"We still spend far too much time training machine learning models

HEALTHCARE



Multiclass semantic segmentation and quantification of traumatic brain injury lesions on head CT using deep learning: an algorithm development and multicentre validation study

"CT is the most common imaging modality in traumatic brain injury (TBI). However, its conventional use requires expert clinical interpretation and does not provide detailed quantitative outputs, which may have prognostic importance. We aimed to use deep learning to reliably and efficiently quantify and detect different lesion types."

Source: Lancet Digital Health 2020

On instabilities of deep learning in image reconstruction and the potential costs of AI

AI OUTLOOK



100 Data and Analytics Predictions Through 2021

"This collection of more than 100 data-and-analytics-related Strategic Planning Assumptions (SPAs) or predictions through 2021, heralds several transformations and challenges ahead that CIOs and data and analytics leaders should embrace and include in their planning for successful strategies.."

Source: Gartner

Living in an AI World 2020

"The Living in an AI World 2020 study: Achievements and Challenges of Artificial Intelligence across Five Industries survey was designed and conducted to assess the perception of AI as it relates to five specific industries: healthcare, financial services, transportation, technology, and retail. This research serves to uncover the pain points, perceived risks and challenges of U.S. companies related to AI. It shows that while there is some variation in AI adoption across industries, there is also a depth of engagement that is highly encouraging."

Source: KPMG

Artificial Intelligence (AI) Chips - Statistics & Facts

rather than deploying them. Could MLOps--which brings data scientists and DevOps together--be a solution?"

Source: Source: Tech Republic

Here's how to check in on your AI system, as COVID-19 plays havoc

"MIT Technology Review reported last week that a number of AI systems are breaking down in the context of the COVID-19 pandemic. Systems designed for tasks ranging from inventory management to recommending online content are no longer working as they should."

Source: World Economic Forum

AI stock trading experiment beats market in simulation

"Researchers in Italy have melded the emerging science of convolutional neural networks (CNNs) with deep learning - a discipline within artificial intelligence - to achieve a system of market forecasting with the potential for greater gains and fewer losses than previous attempts to use AI methods to manage stock portfolios. The team, led by Prof. Silvio Barra at the University of Cagliari, published their findings on IEEE/CAA Journal of Automatica Sinica."

Source: EurekAlert

HUMAN INTERACTION



IBM Research Progresses Field of Human-Computer Interaction (HCI)

"IBM Research's contributions to CHI 2020 focus on creating and designing AI technologies that center on user needs and societal values, spanning the topics of novel human-AI partnerships, AI UX and design, trusted AI, and AI for accessibility. In this post, we highlight a selection of our work on these topics, and provide a full list of accepted IBM work at the end."

Source: IBM

A Case for Cooperation Between Machines and Humans

"A computer scientist argues that the quest for fully automated robots is misguided, perhaps even dangerous. His decades of warnings are gaining more attention."

Source: New York Times

DATA ANALYTICS

"In this paper, we demonstrate a crucial phenomenon: Deep learning typically yields unstable methods for image reconstruction. The instabilities usually occur in several forms: 1) Certain tiny, almost undetectable perturbations, both in the image and sampling domain, may result in severe artefacts in the reconstruction; 2) a small structural change, for example, a tumor, may not be captured in the reconstructed image; and 3) (a counterintuitive type of instability) more samples may yield poorer performance."

Source: PNAS

Automatic diagnosis of the 12-lead ECG using a deep neural network

"The role of automatic electrocardiogram (ECG) analysis in clinical practice is limited by the accuracy of existing models. Deep Neural Networks (DNNs) are models composed of stacked transformations that learn tasks by examples. This technology has recently achieved striking success in a variety of task and there are great expectations on how it might improve clinical practice."

Source: Nature

Evaluation of a Deep Neural Network for Automated Classification of Colorectal Polyps on Histopathologic Slides

"In this prognostic study of a deep neural network to classify the 4 most common polyp types on digitized histopathologic slides from a single institution (internal test set) and 24 US institutions (external test set), the mean accuracy was 93.5% on the internal test set and 87.0% on the external test set."

Source: Jama Network

Direct steering of de novo molecular generation with descriptor conditional recurrent neural networks

"Deep learning has acquired considerable momentum over the past couple of years in the domain of de novo drug design. Here, we propose a simple approach to the task of focused molecular generation for drug design purposes by constructing a conditional recurrent neural network (cRNN)..."

Source: Machine Learning

Improving healthcare operations management with machine learning

"The main goal of this work was to study this relationship using two major types of operational problems:

"Semiconductor chips are crucial in our digital lives. Fitted with billions of electronic transistors that constitute elaborate integrated circuits, these chips power everything from smartphones and laptops, to more industrial and automotive applications. The next development in the semiconductor industry are chips that support artificial intelligence (AI) technologies. These "AI chips" are forecast to generate global revenues of 10.14 billion U.S. dollars in 2020. However, the overall semiconductor industry may experience a decline in 2020 due to the coronavirus (COVID-19) outbreak, with disruption to technology supply chains a possibility."

Source: Statista

Growth Opportunities in Artificial Intelligence and Analytics in Surgery, 2020

"This study covers the needs of the OR market, the current landscape of solutions across the two segments of clinical and operational offerings, the market forecast, regional analysis of the solutions, funding analysis for start-ups, the role of medtech and medical imaging equipment participants in terms of how they envision the 'future of the OR' and how start-ups could play a role in that vision, as well growth opportunities for the short and long terms."

Source: Frost & Sullivan

Fuelling Digital Pathology Advances Using Artificial Intelligence

"The real potential of artificial intelligence (AI) to revolutionize digital pathology is just beginning to be noticed. AI-driven technology capabilities range from the acceleration of the computational analysis of atomic and molecular properties in the tissue, the bases of de novo diagnostics strategies, and drug response comparison, to the optimization of companion diagnostics methodologies and post-treatment surveillance policies."

Source: Frost & Sullivan

GLOBAL; PRODUCT LEADERSHIP AWARD - ARTIFICIAL INTELLIGENCE-DRIVEN BUILDING TECHNOLOGIES INDUSTRY

"Frost and Sullivan forecasts that the market for AI in homes and buildings will grow from \$719 million in 2020 to reach \$8.9 billion in 2030 at a global compound annual growth rate of 27.7%. Despite AI's inherent benefits, existing challenges restrain market growth and drive down adoptions. Some of the challenges are high expenditure, uncertain return in

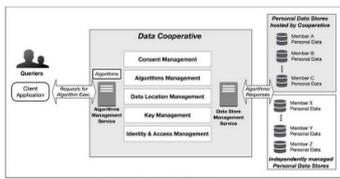


Figure 1: Overview of the Data Cooperative Ecosystem

MIT professor wants to shift power to the people by building local data collectives

"Building the New Economy" envisions data co-ops to make it easier for people to control and analyze their own financial and health data."

Source: Tech Republic

Prescriptive analytics: Manage manufacturing costs and improve ROI

"Today's manufacturing organizations operate in a dynamic environment characterized by increased complexity and uncertainty. The financial performance of manufacturers hinges on their ability to manage production costs efficiently, while rapidly adapting to constantly changing conditions, from demand fluctuations to delivery challenges."

Source: IBM Blog

Why prescriptive analytics and decision optimization are crucial

"Prescriptive analytics help businesses identify the best course of action, so they achieve organizational goals like cost reduction, customer satisfaction, profitability etc. While figuring out what you should do is a crucial aspect of any business, the value of prescriptive analytics is often missed. There is still an inclination to "go with the gut" when looking at an array of possible scenarios.."

Source: IBM Blog

Optimize healthcare delivery and reduce costs with Prescriptive analytics

"The global healthcare industry is undergoing a fundamental transformation as it moves from a volume-based business to a value-based business. With increasing demand from consumers for enhanced healthcare quality, healthcare providers and insurers are under pressure to deliver better outcomes."

Source: IBM Blog

The rise of decision intelligence: AI that optimizes decision-making

"Today, doing more with less is a key principle that drives business strategy across many resource-intensive industries. Businesses are looking to

predicting operational events, and identifying key workflow drivers. Using practical examples, we demonstrate how machine learning can improve human ability to understand and manage healthcare operations, leading to more efficient healthcare."

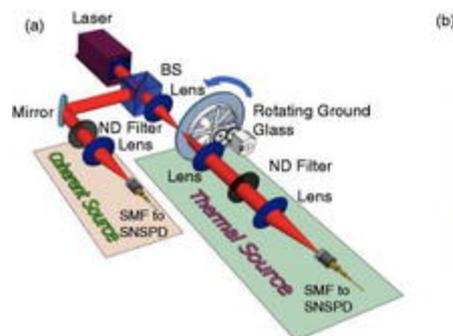
Source: Machine Intelligence

An interpretable mortality prediction model for COVID-19 patients

"The sudden increase in COVID-19 cases is putting high pressure on healthcare services worldwide. At this stage, fast, accurate and early clinical assessment of the disease severity is vital. To support decision making and logistical planning in healthcare systems, this study leverages a database of blood samples from 485 infected patients in the region of Wuhan, China, to identify crucial predictive biomarkers of disease mortality."

Source: Machine Intelligence

MACHINE LEARNING



Identification of light sources using machine learning

"In this article, we exploit the self-learning features of artificial neural networks and the naive Bayes classifier to dramatically reduce the number of measurements required to discriminate thermal light from coherent light at the single-photon level. We demonstrate robust light identification with tens of measurements at mean photon numbers below one."

Source: AIP

Bayesian Optimization of a Free-Electron Laser

"A Gaussian process model provides probabilistic predictions for the machine response with respect to control parameters, enabling a balance of exploration and exploitation in the search for the global optimum. We show that the model parameters can be learned from archived scans, and correlations between devices can be extracted from the beam transport."

Source: Physical Review Letters

investment, cybersecurity risks, and the lack of infrastructure compatibility and resources."

Source: Frost & Sullivan

Artificial Intelligence in the Global Homes & Buildings Industry, Forecast to 2030

"The study focusses on the impact of AI on the homes & buildings industry, defines the role of AI in home and building applications, and highlights the opportunities for stakeholders in the industry. The main purpose of the study is to analyse the current and future AI-based applications in the homes & buildings industry."

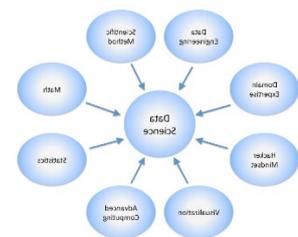
Source: Frost & Sullivan

Artificial Intelligence for Drug Discovery in the Pharmaceutical Industry, 2020

"Frost & Sullivan analysis shows that the AI impact over the pharma value chain can more than double what is achievable using traditional analytics and capture between 2% and 3% of the industry revenue, amounting to more than \$50 billion in potential annual impact. This Frost Radar™ recognizes the participants that are at the forefront of developing and employing the tools. This is an industry-first benchmarking study that provides an introduction to the ecosystem and recognizes the pioneering companies."

Source: Frost & Sullivan

DATA SCIENCE



Global Big Data Analytics Market, 2020

"This Frost Radar focuses on the global Big Data analytics market. It divides the market into 2 major segments: data discovery and visualization (DDV) and advanced analytics. Both are experiencing a growing interest from investors and have attracted millions of dollars in funding committed to product enrichments, expansion into new industry verticals, and development of distribution partnerships to meet the growing demand for analytics."

Source: Frost & Sullivan

EUROPE; PRODUCT LEADERSHIP AWARD - AUTOMATED AI DATA SCIENCE PLATFORMS

"Founded in 2014 and headquartered in Israel, Iguazio's

get a higher return out of artificial intelligence (AI) and machine learning (ML) than just great insights. They need access to recommendations that help simplify complex decisions around how scarce resources should be allocated, how to schedule tasks, and how to deal with constraints."

Source: IBM Blog

3 ways prescriptive analytics helps deliver better financial services

"As any financial services executive knows, improving business results with precise, timely decisions is much harder than it looks. A multitude of factors can get in the way of achieving the optimal mix of cost savings, risk mitigation, profitability and customer satisfaction, including the speed of technology advancements, new market entrants and constantly changing regulatory requirements."

Source: IBM Blog

Sayyy whattt?: Researchers analyze strange human tweets to build better AI

"Twitter is a weird place with a language all its own. A new study focuses on using the tweets, chock-full of misspellings and slang, to improve artificial intelligence."

Source: Tech Republic

AI and machine learning are making insurance more predictable

"Data helps the insurance company, the agency, and the customer make better predictions and choices."

Source: Tech Republic

How AI and machine learning are helping to fight COVID-19

"In the fight against COVID-19, organizations have been quick to apply their machine learning expertise in several areas: scaling customer communications, understanding how COVID-19 spreads, and speeding up research and treatment."

Source: World Economic Forum

Lessons from COVID-19 modeling: the interplay of data, models and behaviour

"In the history of humanity, perhaps no data models have been more recognizable than COVID-19's infection and death curves. Virtually everyone, from the farmer in India to the director of the Center for Disease Control and Prevention (CDC) in the US, is now familiar with them."

Source: World Economic Forum

A new set of cluster driven composite development indicators

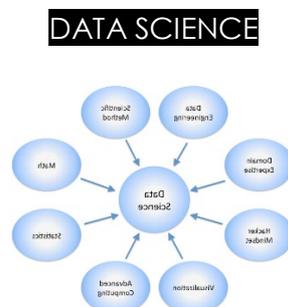
"Composite development indicators used in policy making often subjectively aggregate a restricted set of indicators. We show, using dimensionality reduction techniques, including Principal Component Analysis (PCA) and for the first time information filtering and hierarchical clustering, that these composite indicators miss key information on the relationship between different indicators."

Source: EPJ Data Science

Development of Industrial Equipment Diagnostics System Based on Modified Algorithms of Artificial Immune Systems and AMDEC Approach Using Schneider Electric Equipment

"The researches are devoted to the development of a diagnostic system for industrial equipment based on the AMDEC (l'Analyse des Modes de Défaillances, de leurs Effets et de leur Criticité) mode, failure and criticality analysis approach and modified AIS algorithms, using the industrial equipment from Schneider Electric as an example."

Source: ICIEAM



Optimal Feature Selection for Big Data Classification: Firefly with Lion-Assisted Model

"In this article, the proposed method develops a big data classification model with the aid of intelligent techniques. Here, the Parallel Pool Map reduce Framework is used for handling big data. The model involves three main phases, namely (1) feature extraction, (2) optimal feature selection, and (3) classification. For feature extraction, the well-known feature extraction techniques such as principle component analysis, linear discriminate analysis, and linear square regression are used."

Source: Big Data

SecDedoop: Secure Deduplication with Access Control of Big Data in the HDFS/Hadoop Environment

data science platform invigorates machine and deep learning for enterprises by automating the entire data science lifecycle, including ML pipeline automation, to deliver fast and accurate business outcomes."

Source: Frost & Sullivan

Post-pandemic Growth Opportunity Analysis of the Big Data Analytics Market

"This 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

Will 'Big Data' Restore Active Managers' Mojo?

"Sophisticated tech used to gather and analyze information may be able to improve returns, but the data isn't showing it."

Source: New York Times

FACIAL RECOGNITION

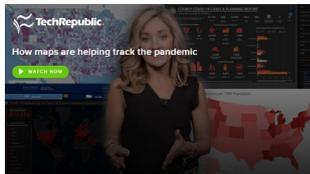


Amazon face recognition falsely matches 105 US and UK politicians with police mugshots, but can you trust accuracy claims?

"Tests show Amazon's face recognition software incorrectly matched more than 100 photos of US and UK lawmakers with police arrest photos, but measuring accuracy isn't as simple as it sounds.."

Source: Comparitech

COVID 19



Maps and dashboards show new coronavirus hotspots and reopening dates by state and county

"Definitive Healthcare offers a dashboard and interactive tool that can filter by state, and by county, and report what's opening and when."

Source: Tech Republic

How COVID-19 data highlights the search for a single version of the truth

"Poor coronavirus data outcomes in states like Georgia and Florida can teach us lessons about how we use data analytics."

Source: Tech Republic

Artificial intelligence is predicting coronavirus outbreaks before they start

"Artificial intelligence has played a central role in the fight against the coronavirus. Cotiviti has leveraged AI to predict COVID-19 hot spots around the country before an outbreak happens."

Source: Tech Republic

"in this article, we propose a secure data deduplication with access control of big data over HDFS (Hadoop Distributed File System)/Hadoop environment, called SecDedoop. First, the system achieves security for data confidentiality by third party vendor using elliptic curve cryptography. There are two types of keys (public key and private key) generated for data retrieval. Second, we consider data deduplication."

Source: Big Data

CDNB: CAVIAR-Dragonfly Optimization with Naive Bayes for the Sentiment and Affect Analysis in Social Media

"this article concentrates on presenting a novel method, named CAVIAR-Dragonfly optimization with Extended Naive Bayes (CDNB), for performing sentiment classification and affective state classification. At first, the BITS review from Twitter is subjected to preprocessing, which includes stop word removal and stemming. Then, the next step is the feature extraction, in which all the reviews are converted to a feature vector."

Source: Big Data

How A.I. Steered Doctors Toward a Possible Coronavirus Treatment

"Specialists at the London start-up BenevolentAI helped identify the arthritis drug baricitinib, which is now part of a clinical trial."

Source: New York Times

HEALTHCARE



Researchers incorporate computer vision, uncertainty into AI for robotic prosthetics

"Researchers have developed new software that can be integrated with existing hardware to enable people using robotic prosthetics or exoskeletons to walk in a safer, more natural manner on different types of terrain. The new framework incorporates computer vision into prosthetic leg control, and includes robust artificial intelligence (AI) algorithms that allow the software to better account for uncertainty."

Source: NC State University

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