AI:10

GET INSIGHTS ON AI UNDER 10 MINUTES

WHAT'S HOT

WHAT IS INTELLIGENT DOCUMENT PROCESSING? WHY IDP MATTERS IN THE ENTERPRISE

An Interview on

SOCIAL INNOVATION

- David Leong

HEADLINE NEWS IN A FLASH

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WHAT IS INTELLIGENT DOCUMENT PROCESSING? WHY IDP MATTERS IN THE ENTERPRISE

Paperwork is the lifeblood of many organizations. According to one source, 15% of a company's revenue is spent creating, managing and distributing paper documents. But documents aren't just costly — they're time-wasting and error-prone. More than nine in 10 employees responding to a 2021 ABBY survey said that they waste up to eight hours each week looking through documents to find data, and using traditional method to create a new document takes on average three hours and incurs six errors in punctuation, spellings, omissions or printing.

Intelligent document processing (IDP) is touted as a solution to the problem of file management and orchestration. IDP combines technologies like computer vision, optical character recognition (OCR), machine learning and natural language processing to digitize paper and electronic documents and extract data from then — as well as analyze them. For example, IDP can validate information in files like invoices by cross-referencing them with databases, lexicons and other digital data sources. The technology can also sort documents into different storage buckets to keep them up to date and better organized.

Because of IDP's potential to reduce costs and free up employees for more meaningful work, interest in it is on the rise. According to KBV research, the market for IDP solutions could reach $4.1 billion by 2027, rising at a compound annual growth rate of 29.2% from 2021.

PROCESSING DOCUMENTS WITH AI

Adopting digitization alone can't solve every processing bottleneck. In a 2021 study published by PandaDoc, over 90% of companies using digital files still found business proposals and HR documents difficult to create. The answer — or at least part of the answer — lies in IDP. IDP automates processing data contained in documents, which entails understanding what the document is about and the information it contains, extracting that information and sending it to the right place.

IDP platforms begin with capturing data, often from several document types. The next step is recognition and classification of elements like fields in forms, the names of customers and businesses, phone numbers and signatures. Lastly, IDP platform validates and verifies the data — either through rules, humans in the loop or both — before integrating it into a target system, such as customer relationship management or enterprise resource planning software.

Two ways IDP recognize data in documents are OCR and handwritten-text recognition. Technologies that have been around for decades, OCR and handwritten text recognition attempt to capture major features in text, glyphs and images, like global features that describe the text as a whole and local features that describe individual parts of the text (like symmetry in the letters).

When it comes to recognizing images or the content within images, computer vision comes into play. Computer vision algorithms are "trained" to recognize patterns by "looking" at collections of data and learning, over time, the relationships between pieces of data. For example, a basic computer vision algorithm can learn to distinguish cats from dogs by ingesting large databases of cat and dog pictures captioned as "cat" and dog," respectively. OCR, handwritten text recognition, and computer vision aren't flawless. In particular, computer vision is susceptible to biases that can affect its accuracy. But the relative predictability of documents (e.g., invoices and barcodes follow a certain format) enables them to perform well in IDP.

Other algorithms handle post-processing steps like brightening and removing artifacts such as ink blots and stains from files. As for text understanding, it typically falls under the purview of natural language processing (NLP). Like computer vision systems, NLP systems grow in their understanding of text by looking at many examples. Examples come in the form of documents within training datasets, which contain terabytes to petabytes of data scraped from social media, Wikipedia, books, software hosting platforms like GitHub and other sources on the public web.

NLP-driven document processing can let employees search for key text within documents, or highlight trends and changes in documents over time. Depending on how the technology is implemented, an IDP platform might cluster onboarding forms together in a folder or automatically paste salary information into relevant tax PDFs. The final stages of IDP can involve robotic process automation (RPA), a technology that automates tasks traditionally done by a human using software robots that interact with enterprise systems. These AI-powered robots can handle a vast number of tasks, from moving files database-to-database to copying text from a document, pasting it into an email and sending the message.

With RPA, a company could, for example, automate report creation by having a software robot pull from different processed documents. Or they could eliminate duplicate entries in spreadsheets across various file formats and programs.

Source: venturebeat
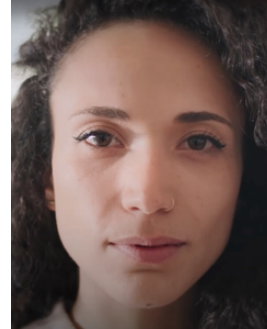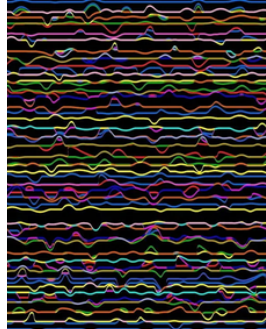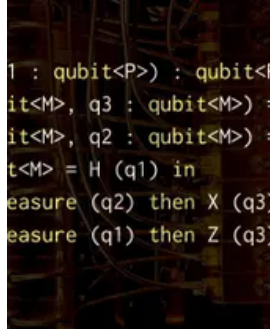
HEALDLINE NEWS IN A FLASH

DATA INTENSITY COULD BE THE NEW KPI

Microsoft CEO Satya Nadella coined the term tech intensity, a combination of technology adoption and technology creation. Companies can accelerate their growth by first adopting best-in-class technology and then building their own unique digital capabilities. Data intensity is about the attributes and properties of the data such as volume, velocity, types, structure, and how you transfer the energy in the data into value. Data intensity becomes a surrogate measure for digital transformation, in combination with complexity it is a measure for digital maturity and resilience. In the coming years, many organizations will have objectives, key results and KPIs tied to data intensity to capture that maturity level.

Source: venturebeat

AI-GENERATED FACES HAVE CROSSED THE UNCANNY VALLEY AND ARE NOW MORE TRUSTWORTHY THAN REAL ONES

A new study by a group of professors from University of Lancaster finds that humans can no longer spot the difference between real and fake faces. Their study included three experiments aimed at understanding whether people can discern a real face from a synthetic one created by Nvidia's StyleGAN2. After identifying 800 images of real and fake faces, Farid and Nightingale asked participants to look at a selection of them and sort them into real and fake. Participants were correct less than half the time, with an average accuracy of 48.2%. So how do we protect against people using synthetic images for nefarious means? Farid is a champion of an approach called 'controlled capture'. The technology captures metadata related to time and location for any photo taken within an app that has built-in camera function.

Source: fastcompany

MEET TWIST: MIT'S QUANTUM PROGRAMMING LANGUAGE

A team of researchers at MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) have created Twist, a new programming language for quantum computing. Twist is designed to make it easier for developers to identify which pieces of data are entangled, thereby allowing them to create quantum programs that have fewer errors and are easier to debug. Twist's foundations lie in identifying entanglement, a phenomenon wherein the states of two pieces of data inside a quantum computer are linked to each other. "Whenever you perform an action on one piece of an entangled piece of data, it may affect the other one. You can implement powerful quantum algorithms with it, but it also makes it unintuitive to reason about the programs you write and easy to introduce subtle bugs."

Source: spectrum.ieee.org

ARTIFICIAL INTELLIGENCE MAY ALREADY BE 'SLIGHTLY CONSCIOUS', AI SCIENTISTS WARN

MIT researcher Tamay Besiroglu joined OpenAI cofounder Ilya Sutskever in warning that some machine learning AI may have achieved a limited form of sentience, sparking debate among neuroscientists and AI researchers. "It may be that today's large neural networks are slightly conscious," tweeted Mr Sutskever, who co-founded OpenAI alongside tech billionaire Elon Musk. The comment drew a strong response from leaders in the field, including Professor Murray Shanahan from Imperial College London, who said: "In the same sense that it may be that a large field of wheat is slightly pasta." Mr Besiroglu, defended Dr Sutskever's idea, claiming that such possibilities should not be derided or dismissed.

Source: yahoo

THIS CUTTING-EDGE, EMOTIONAL AI VOICE CAN FLIRT AND SAY 'I LOVE YOU' - AND SOUNDS A LITTLE TOO REAL

To commemorate Valentine's Day, the company shared a lengthy audio clip that shows off the emotive power of its AI-enabled voice 'bot. While it's still just working off a pre-programmed script, let's just say the gap between human and AI expression is closing fast. Maybe we're just hung up on love in particular, because it's just one of many human emotions Sonantic's AI is designed to persuasively vocalize. Speaking with The Verge, company CEO Zeena Qureshi described its algorithm tech as "Photoshop for voice," capable of emulating a range of feelings from anger and fear to happiness and exuberant joy.

Source: syfy

TAKE A LOOK INSIDE A ROBOT FAST-FOOD KITCHEN WITH FULLY AUTONOMOUS OVENS, FREEZERS, AND CLEANING SYSTEMS THAT DON'T REQUIRE ANY STAFF

Hyper Robotics is building 40-feet robotic fast-food kitchens filled with fully autonomous machines which don't require human staff. Hyper Robotics cofounder and CEO Udi Shamai told Insider that it takes one month to produce one kitchen and the company is aiming to build ten a month. Production is still in the early stages. "You can place it anywhere you want," Shamai said. "It's like a huge vending machine." Frozen food can be stored in the kitchen's freezers until the robots take it out, defrost it, and cook it for customers. Every 40 minutes, a non-chemical ozone water system cleans the entire kitchen, which Shamai said was the most challenging part of building the kitchen. "It's bulletproof in terms of no insects can come in, and no bacteria," Shamai said. Metal detectors and AI cameras check the food for any mistakes.

Source: businessinsider

SOCIAL INNOVATION

AI FOR POSITIVE IMPACT

DAVID LEONG

Principal Lecturer (Industry),
Republic Polytechnic
Singapore

01 *Your thoughts and views on the disadvantaged groups on employability issues and what can be done to help them.*

Due to disability and/or lack of financial resources, the disadvantaged groups are constantly lacking behind in their employability. The main reason is because of the lack in the opportunity to reskill and upskill in the competitive job market. As countries progress, it makes sense to improve economic productivity to increase GDP growth. Hence, highly skills workers with good qualification and training are often sought-after by companies to produce better goods and services. This virtuous cycle will go on and on over the years and even decades.

Unfortunately, low income jobs often require little skills. These jobs are quickly replaced by autonomous machines in factories around the world. One good example will be factory operators assembling hard disks in a production line have been replaced by robots.

02 *The types of schemes that could be considered and formulated by policy makers to help address employment and education issues.*

Working towards 'full' employment require a nation to create job demand, manpower planning and management, harmonious industry relations, flexible wage system, retraining and skills upgrading, having a good socio-political environment and perhaps a well-balanced foreign labour policy.

In term of retraining and skills upgrading, we have the SkillsFuture Singapore (SSG) to drive and coordinate the implementation of the national SkillsFuture movement, promotes a culture and holistic system of lifelong learning through the pursuit of skills mastery, and strengthens the ecosystem of quality equation and training. Together with educational institutions and training partners, this agency ensures that students and working adults in Singapore have access to high quality, industry-relevant training throughout their life.

We also have the Workforce Singapore (WSG) under the Ministry of Manpower to oversee the transformation of the local workforce and industry to meet ongoing economic challenges in Singapore. This agency promotes the development and employability of all levels of the workforce. While it's key focus is to help workers to secure quality jobs at different stages of life, the agency also addresses the needs of business owners and companies by providing support for these companies to stay competitive.

Similar schemes can be considered by developing countries, where government provides incentives to unemployed or low-wage workers for skills upgrade, or the opportunity to reskill for another new job role, and also providing incentives to employers to encourage their workers for such upskill/reskill trainings.

- To be continued next page.

SOCIAL INNOVATION

AI FOR POSITIVE IMPACT

with **DAVID LEONG**

Principal Lecturer (Industry), Republic Polytechnic, Singapore

03 The role of technology like AI to help institutions perform their tasks to manage the disadvantaged groups across the value chain (upstream / downstream).

I believe data analytics can be used on past census data or internal revenue service (or similar authority) collected annually to identify group of individuals who are unemployed and/or belonging to low income/disadvantaged group. This approach may require the government to leverage AI technology to manage big data and perform analytics on these group of individuals to identify and predict their earning capacity, healthcare conditions and well-beings before genuine social welfare services can be provided to them. Even for developed countries, balancing the unequal wage gap is truthy a very difficult problem to be solved. Instead of just distributing the nation's wealth to the disadvantaged groups of individuals, smaller step such as working with institutions and companies to provide the platforms for workers to retrain and equip them with better skills to handle advanced machinery could be a more feasible solution. Likewise, AI technology can be use in other social welfare sectors, such as housing, healthcare, elderly care, childcare, etc. to serve the disadvantaged group better.

04 What do you think will be the key success factors of using AI for this purpose?

- improving efficiency in the application process (in social welfare context)

- improving the productivity of the government agencies

- lowering the cost of administrations (reducing manpower cost)

05 What type of human-machine engagement model needs to be done ? How do you maintain the balance between machines and humans for this type of beneficiary evaluation and social impact assessment?

Apart from robotics and autonomous vehicles, many AI applications are working in the background of a web application or software.

In many ways, the human-machine engagement in present days is so transparent that humans do not often notice that AI algorithms are running in the background of a smart application to collect and process data.

We do not see many world-wide protests of specific AI application being used in the industries, or protest by unions of autonomous vehicles replacing buses and taxis, as long as these smart AI apps can perform repetitive or specialised tasks that can produce results that are much better and accurate than a human.

The fact is users and consumers have already been accepting AI as part of their daily life. No doubts some existing jobs will soon be replaced by AI, government should foresee such onset and roll out trainings for workers to constantly upgrade and recalibrate their skills for more demanding job that cannot be handle by AI in the near future.

As the advancement of AI progresses over time, so does the effort for the government and companies to constantly train and retrain their workers for in-demand jobs.

Nevertheless, the key concerns to AI is not in its ability to accept and adopt by humans, but in the extents of ethics and data privacy.

APPLIED AI
- WHAT IT REALLY MEANS IN PRACTICE

THE BACKGROUND

In the 70 years since Alan Turing released Computing Machinery and Intelligence, Artificial Intelligence (AI) has gone from a theoretical concept to an integral part of our everyday lives. From recommending what to watch next on Netflix to revolutionizing the way we diagnose life-threatening illnesses such as cancer, there are few areas of our lives that AI has improved or, at the very least, impacted.

Businesses of all sizes and types are also leveraging AI to not only develop new products and services, but optimize back office processes and boost productivity everywhere from newsrooms to the manufacturing floor.

WHAT EXACTLY IS APPLIED AI?

The term "Applied AI" encompasses all the activities underlying the operationalization of AI from experimentation to production. In other words, applied AI is not just about the theoretical coverage of AI/ML, but it runs on your actual data and delivers real-world results and outcomes.

AI is making machines around us smarter. While this is common knowledge, what many don't understand is that artificial intelligence is more of a concept, and applied artificial intelligence is what puts AI to work in reality. Applied AI leverages the capabilities of software applications and powers machine learning, making it highly accurate and adaptable. It is applied AI that is transforming business processes as well the modern society.

Applied AI works by combining large amounts of data with fast, iterative processing and intelligent algorithms, allowing the software to learn automatically from patterns or features in the data. Having a robust analytical framework in place is critical for ensuring data flows in and out of the AI are fully integrated, highly accurate and rapidly flowing.

WHY APPLIED AI IS IMPORTANT AND RELEVANT

Applied AI doesn't have to be 'exclusive' only to those who are technically competent or experts in AI/ML programming languages. Low-code/no-code machine learning platforms allow non-AI experts to create AI applications from predefined components. Such platforms are based on an intuitive graphical user interface in designing the application and visual programming as opposed to hard-coded programming techniques. When it comes to developing AI solutions, increasingly, more people will be able to create AI applications and use AI technology, freeing up highly trained coders to focus on the hardest problems.

> 66
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> *Did you know that by 2024, more than 65% of applications will be developed using the low-code/no-code development approach. Also, by the same year, it is expected that more than 75% of large enterprises will use at least four low-code/no-code development tools.*

> 66
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> *During the global coronavirus crisis, the need for software development has driven growth in demand for low-code/no-coding development platforms. As a result, the worldwide low-code development technologies market is projected to total $13.8 billion in 2021.*

EXAMPLES OF APPLIED AI PROJECTS IN PRACTICE

At our Centre for AI Innovation (CEAI), we help facilitate non-technical but experienced senior executives and managers design, develop and implement AI solutions on a no-code/low-code platform. This is done over a 3-month Certification in Applied AI programme (CAAI), that allows project owners to own their IP asset and sandbox in their organisation with their own prototype (TRL 4 - 6).

Examples of the Applied AI projects from Cohort 1 of the CAAI programme are listed below:

1. Talent Management

- Veterinary students personalised learning
- Personalised coaching systems
- Employability skills tailored for job-seekers
- Student and academic programme data management
- Postgrad students progress monitoring
- Lesson plan and teaching skills
- Staff talent assessment

2. Green Technology

- Building and Equipment monitoring : predictive maintenance
- Harmful algae bloom early warning signals

3. Market Insights

- Profiling businesses and people and matching needs in events
- Supply chain insights to optimise marketing decisions

4. Investments & Social Finance

- Shariah compliant risk-return analysis for equity securities
- Evaluate startups to look for potential unicorn elements
- Evaluation and monitoring of donor recipients / social impact
- Sustainable reporting insights for PLCs with ESG parameters

5. Socio Political Decision System

- Assess sentiments and fundamentals associated with a country's social & political issues

6. Healthcare and Well-being

- Tracking and monitoring the health care status for the elderly through IOT / Analytics
- Digital dental diagnostics and automating the personalised oral health of patients

7. Project Planning & Management

- Cost-benefit analysis of projects with risk-based scoring and recommendations
- Management of a large portfolio of assets across the value chain

8. Governance, Risk & Compliance

- Anti-bribery / fraud risk assessment system
- Assess food standards via Food Safety analytics:
- Predicting the likelihood of contractual breach between two or more parties on a transaction/project

Important Note: The above listings are non-exhaustive and some cases have been grouped together because of similar clusters or/and these are handled by more than one individual.

BENEFITS OF APPLIED AI

Several benefits like accuracy, cost-saving, and better decision-making come bundled with Applied artificial intelligence. In a dynamic business landscape, these are the benefits applied AI offers to industries:

- Better Decision Making: A lot of tasks would happen smoothly if machines had human-like judgment capabilities and that is exactly what applied AI brings to the forefront. It ensures reduced errors, predicts close to accurate outcomes, achieves end-to-end process automation, and creates a smart ecosystem.

- Accuracy and Precision: Applied AI bridges the gap between the digital world and the machine world while reducing errors, social ethics, and human bias in the process.

- Sharp Efficiency: Throughout all the stages of business processes, Applied AI accelerates efficiency while saving time, effort, and money.

- Augmenting Human Skills: Applied AI helps in automating mundane and repetitive tasks to free up employees. While computer systems powered by AI handle tedious tasks, employees can devote their time and effort elsewhere to increase the business ROI.

- Increased Profitability: Applied AI boosts profitability by identifying and solving complex business problems, faster than humans, through its machine learning capabilities.

WHAT'S NEXT?

Low-code/No Code Applied AI solutions help organisations significantly reduce the time to market of AI solutions, allow significant cost savings on hiring software and AI/ML experts, yet, it offers the speed, simplicity, and flexibility of ready-made software solutions in a customised manner.

An interesting perspective is that no/low-code AI platforms can help any organisational set-up to kick off an AI initiative; especially for the majority of organisations that lack a formalized AI practice. Such available platforms help them build better applications and solutions quickly without any coding experience or infrastructure, at a much lower cost and more visible impact.

Learn more about related topics:
- What you need to know about the **Centre for AI Innovation** (CEAI)
- A **2-minute video overview** on CAAI
- Read about **Certification in Applied AI** (CAAI)

Source: CEAI, M Nazri

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