DATA: FRIEND OR FOE OF THE ML SCIENTIST?
LEARNING TO SAMPLE

Article: Dr. Jennifer Prendki
Letter from the Editor

ASIF RAZZIAQ

It is evident that Artificial Intelligence is revolutionizing how we live, making its way into every industry and transforming the way we work. AI has transformed how we do things, from music recommendations in the entertainment sector to computer vision impacting the transportation sector and even helps with early disease diagnosis in the healthcare sector. Therefore, we are bringing a Magazine series, ‘Marktechpost AI Magazine,’ featuring the latest applications of AI in various domains.

This is the first version of the ‘Marktechpost AI Magazine,’ and the theme is ‘AI in Fintech.’ We will be featuring various Fintech leaders from the business and tech community. We will be covering various topics under Fintech where AI is being used.

Marktechpost is an AI News Platform providing easy-to-consume, byte size updates in machine learning, deep learning, and data science research. Our vision is to showcase the hottest research trends in AI from around the world using our innovative method of search and discovery.

We welcome feedback from the AI community! Share your thoughts at asif@marktechpost.com

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Marktechpost is an AI News Platform providing easy-to-consume, byte size updates in machine learning, deep learning, and data science research. Our vision is to showcase the hottest research trends in AI from around the world using our innovative method of search and discovery.
FinTech is about combining Finance with Technology in the delivery of financial services.

The equation may be viewed as Financial + Technology = FinTech

On the “Fin” side it should be noted that the core business essence of a financial institution (be they a bank or insurance firm) is to provide a contractual service that takes a risk for an appropriate price or to decline the risk. A FinTech startup needs to solve a problem that results in a better outcome for the end customer and/or the financial institution in terms of the business offering and service.

The Tech side of the equation relates to delivering the solution in a digital manner that may scale efficiently.

It may seek to enable a better customer experience, or automate away repetitive tedious tasks and make them more cost-efficient or enhance the risk management process. The other challenge for FinTech is that the financial services sector is generally one of the most heavily regulated sectors in the world.

Regulatory Technology or RegTech has emerged as a fast-growing subsector whereby Machine Learning solutions may play a key role in efficiently enabling financial services firms to comply with regulatory obligations whilst onboarding clients and also undertaking financial activities and preventing fraudulent activities.

Artificial Intelligence technology, in particular, Machine Learning and Deep Learning are making and are set to continue making deep inroads into the FinTech sector. This is from retail banking, insurance (Insurtech), RegTech, asset management, and investment banking. All sectors of financial services will be impacted dramatically and even more so as AI continues to expand and further develop across the Edge of the Network with standalone 5G networks and the Metaverse on the horizon.

Some analysts believe that as many as 40% of roles across banking may be disrupted by Machine Learning in the next few years. One thing that is highly likely is that the AI journey for the FinTech space is set for an exciting period of rapid digital transformation.
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My current team's objective is to make ING a safer and more compliant bank using advanced analytics solutions in order to better protect our customers and the society at large. Essentially, we are developing analytics solutions that support our efforts to detect and prevent different types of financial crime activities, from anti-money laundering (AML), to counter-terrorist financing (CTF), to fraud and cybersecurity.

Interview Conducted By: Imtiaz Adam

What is the role of your current team?

With a master degree in computer science and nearly two decades of experience in building and delivering IT, big data, and advanced analytics solutions, Dor Kedem has been working in the last 7.5 years with ING Bank in Amsterdam to help ING’s customers to stay a step ahead in life and in business. Filling in various roles across the bank including in wholesale banking, retail banking, digital sales, customer interactions, and financial crime, he is currently leading teams of data scientists and data engineers in one of ING Analytics’ tribes.
Data Science is a key part of our bank’s increasing effort to identify and prevent financial crime activities. Over the last three years, ING has rolled out a global approach to Know Your Customers (KYC), including increasing our KYC workforce from roughly 2,500 to 4,000 employees. That was part of a wider global KYC enhancement program aimed to standardize our governance and develop global solutions for a global KYC policy. Reflecting on the program, advanced analytics capabilities have the potential to address some of the risks we face as a bank, by supplementing our more traditional AML efforts and by supporting our KYC investigators. Financial crime challenges cannot be tackled merely by adding more analysts or even more hand-written rules. With the increasing expectations from our society and our regulators to act upon and prevent financial crime activities, we need to do better, and data science can help our organization become more efficient in this field.

Data science and machine learning techniques in the KYC, fraud, and cybersecurity domains support our efforts in three main ways: first, they enable us to identify new types of potentially suspicious outliers and to go beyond the obvious patterns of criminal activity, which are becoming increasingly sophisticated in the digital era. This means we can remain a step ahead of our societal threats. Second, they help us empower our KYC investigators, providing them with important insights and context to the alerts we generate, accelerating their investigation, and supporting them in tackling their growing scope of responsibility. This better and more efficient process can also be translated to a better customer experience, such as in the case of customer onboarding, customer due diligence, and transaction screening. Lastly, and most importantly, these efforts keep our customers and our society safe. By deploying these solutions, we can prevent or help to mitigate the risk of our customers becoming victims of fraud or money laundering schemes.

In my previous team, we focused on using analytics to drive our digital sales and customer interactions to always be relevant and personal, and to create a differentiating experience for our customers. The intention was to ensure that every customer’s engagement was driven and enriched by analytics. This included all customer journeys, from opening an account and logging in to the app or website, to more advanced offerings such as taking a lending product or a mortgage. One example for a project I was leading in this domain, aimed to empower our internal data analysts and to improve their understanding of our customers. The core idea was to help our analysts build advanced analytics models to become more relevant to our customers while adjusting our offerings to our customers’ needs, without a strong involvement of a data scientist. We called this the “Model Factory”, and it enabled these analysts to build propensity and engagement models (i.e. “How interested a customer may be in...”) in a structured manner. Each model was reviewed, validated, monitored, governed and GDPR-compliant, taking into account datasets and customers which we were permitted to use and engage for these models’ purpose – without having to reinvent or redevelop the model building pipeline every time.
These propensity models helped us to meet our customers’ expectations, to understand the current stage of our customers’ journey, and to suggest the right customer the right offer at the right time. This helped not only our customers by having a more relevant engagement with their bank, and not only our bank in driving our KPIs while helping us to be more relevant, but interestingly, also the third side of this triangle which was crucial for the adoption of the product – our data analysts and their customer journey expert stakeholders.

After building the model, the analysts did not simply get a context-less “Model-says-this” list of customers who would receive our offering as they previously did with their selections. Instead, the analysts received a detailed explanation of the factors that led a model to identify which customers are interested in an offer. It outlined in general strokes (without revealing customer data) the different customer personas so that they could focus their message and communication channels. It gave them an indication which type of customers they may have previously missed in their former manual selections, and what was the expected lift (how much better is the customer selection) and uplift (how much will my engagement make a difference) for choosing a set of customers. Armed with all this information, the final decision regarding who to engage using which message and channel remained with the analysts. Ultimately, rather than taking away from the analysts’ responsibility and automating their work, this product empowered our analysts and their stakeholders to become better customer journey experts.

As a lead data scientist and product owner for this project, I think that there are two key lessons for data scientists from building such product for internal usage, which could generalize well to your readers:

The first lesson addresses the role data scientists play in developing & delivering such products, and thinking beyond “model performance”. There are some models where if it has 85% accuracy, the next question would be “can you make it 87% accuracy?”, but those are few and limited to well-established use cases and structured ecosystems. Usually, the next question is: “What does this model output mean for your users, and what can we do to transform the day-to-day experience of people who engage with this model?”. Data scientists need to apply a wide variety of skills from data visualizations & dimensionality reduction, model explainability, feedback loops, segmentation, uplift & causality analysis, and much more to bridge the gap between the statistical capability and the impact they wanted to make. And in the case of internal stakeholders, this means helping users to become literate in analytics applications in business, to gain confidence in the data scientists’ delivery, and to reinvent their work processes in the way envisioned by the development team.

The second lesson addresses that an analytics product team needs to address the concerns not only of the stakeholders who pay you to build the product, but also of the people who will use it and help to make it a success. It sounds trivial, but personal and genuine concerns such as fear of automation and potential job loss, loss of agency, and job satisfaction to an AI solution that “takes the fun of my work” or a concern to meet my personal and business objectives with the new tool. All these concerns need to be addressed head-on in a continuous problem-fit – solution-fit alignment and dialog with your users throughout the product lifecycle (See ING PACE here or here to learn how we do it at ING).

I think both learnings can be summarized to creating a shared alignment and commitment from all parties to be successful, to take it on ourselves to bridge our gaps, create that alignment, and to help each other to be successful, regardless of what our role or title is.
What are your thoughts on the career journey and development of Data Scientists in ING?

Since joining the bank over 7.5 years ago, I have been pleasantly surprised at how innovative the bank has been towards digital adoption and how using analytics as a driver for innovation, driving our strategic goals, and creating new business models and customer value. ING has given me the opportunity to get exposed to various banking domains, from wholesale banking and market making, to retail banking and enhancing the experience of the individual customer, and to tackle AML & fraud challenges for financial institutions. In each of these domains, I have learned more about what it takes for a data scientist and an advanced analytics product in the banking domain to be successful.

We have a job career framework in ING for data roles, where we highlight the skills and development opportunities for data scientists at each stage of their career. What I found helpful at different stages of their roles, is that generally speaking:

Junior data scientists tend to grow by developing their craft, their statistical and programming knowledge, and their capability to work effectively in teams.

Intermediate data scientists tend to grow by demonstrating their credibility and ability to develop and deliver for their team and their business, learning what it takes to be successful.

When data scientists grow to a senior level, they are exposed to several career and development paths, where they can discover what drives their passion and in what ways they can further their careers to lead, principal, and team lead roles.

Some are more focused on the technical aspects and the alignment between data science, model & product delivery and machine learning engineering. Some focus on research and applying cutting-edge research in their business domain. Some focus on the creation of business alignment, using data science and visualization for storytelling and creating value for their users, and leading products. Others are more on the coaching side and leadership, helping more junior members of the team develop their skills and capabilities. Every senior is expected to exhibit some of these elements at some level, but finding your passion for your work – that’s the engine that drives your career forward.

Readers of this interview who are interested in this topic may find the publicly available report *The Care & Feeding of Data Scientists* by Michelangelo D’Agostino & Katie Malone interesting, which details interesting ways in which data scientists and data science managers can drive the careers of their employees forward.

What about your thoughts on the future of Data Science in Banking?

Digital adoption in banking is only going one way. Transformation in the way we work and provide services to our customers is constantly accelerating, even more so by the new reality Covid-19 imposed on us all. As digitalization expands, and the level of service our customers expect increases, so too does the role data science and advanced analytics play in enabling a better customer experience and to deliver the objectives of the bank.
As data science becomes more mature in banking and fintech, banks are getting better at understanding the areas where advanced analytics can be used to transform their business and the use cases where analytics can be applied successfully. Banks become better at providing what’s required with respect to data warehouses and analytics platforms to deliver impact. Banks become better at forming impactful and interdisciplinary analytics teams, holding them into account to realize value for the bank and to detail a return on the investment of analytics products, rather than focusing on developing proof of concepts for uncertain future potential.

That last one is crucial in the transformation analytics teams are facing, and not just for the banking domain. With the burst of specialized analytics by the myriads of Fintech companies, every internal analytics group in the field will need to justify their existence and their added value to their company, especially compared to the offerings 3rd party analytics solutions providers would make. This would mean that everyone, from large organizations to analytics teams and individual data scientists, are transitioning away from the “honeymoon period”, and are required to show they are worth the effort.

Banking as a field has become very agile and technology driven. Since I arrived at ING in 2014 I have found it to be an increasingly innovation-driven environment. In an era of low interest rates, increased regulations that enable open banking, and the prosperity of fintech companies & start-ups, banks must apply a continuous innovation culture to drive value for the customers, and the bank. It is an exciting field which I am grateful to have been a part of, and very keen to see how the future and AI developments will transform this industry for the benefits of all banking customers.
Financial Technology, referred to as FinTech, is a term that describes novel technologies that aim to automate and improve the customer experience and business performance of financial services.

The core essence of Financial Services (banking and insurance) is to take a risk for the appropriate price. The greater the risk the higher the price and vice versa. If the risk is too high the institution may decline to take the risk. From there onwards, the financial services business then depends upon a smooth customer journey and experience whilst also protecting the firm as financial services is one of the most regulated sectors in the world. FinTech firms need to balance the approach of leveraging technology to improve the customer experience whilst ensuring that they also effectively manage risks and ensure compliance with the applicable regulatory rules.

FinTech tends to relate to algorithms and software that resides via the customer’s personal computers or smart mobile phones. Some observers believe that the advent of the financial crisis in the 08/09 period (1) and the aftermath in the following years (the great recession, Eurozone crisis) was a catalyst to accelerate the development of the FinTech sector as was the emergence of 4G mobile technology (2), and as digital proliferated the emergence of big data (3).

The rise of the FinTech sector has been impacting the entire spectrum of the banking services and technology sector and a vast amount of investment from the venture capital sector has flowed into the sector.

Consultancy.eu report that the amount of venture capital invested globally in the first half of 2021 hit in excess of $52 Bn that is near to the record annual amount of $54 Bn experienced in 2018. The most substantial deals entailed Robinhood the wealthtech firm from the US raising $3.4Bn, Nubank a Brazilian digital bank raised $1.5Bn, Klarna of Sweden raised $1.9Bn across two rounds, and Trade Republic a German wealthtech firm raised $900 (4).

Another report from KPMG reported record-breaking VC investment in fintech in the first half of 2021 (confirming the $52.3Bn figure above) and global US$98 billion in fintech investment (M&A, PE and VC) in H1’21, compared with $121.5 billion during all of 2020 (5).

Substantial investment flows into the FinTech sector have continued into Q3 2021 with BCG reporting that “Q3 2021 fintech investment is 90% higher than all 2020 funding, totaling $34.4 billion globally.”

“Megadeals, or funding rounds equal to or over $100 million, are driving the dramatic growth in investment seen in 2021; 101 megadeals were made in Q3 2021 alone, totaling $23 billion—a 250% increase over the same quarter in 2020” (6)
There has been continued speculation by market analysts and observers as to whether or not the Tech majors will make strategic inroads into the FinTech market. It should be noted that these are the same firms that also possess the strongest AI teams and biggest sets of data about the population at large hence they would have an advantage in terms of understanding their customer's purchase behaviors and brand loyalties.

Some market analysts believe that Machine Learning may disrupt as much as 40% of existing banking roles!

The insurance sector has also been impacted by an area referred to as Insurtech with the likes of chatbots as virtual personal assistants, Machine Learning algorithms for automating parts of the claims processing for example with auto accident claims.

As financial institutions need to comply with complex regulations and legal obligations another key area that has developed alongside FinTech has been termed Regulatory Technology, or RegTech as AI technology solutions may assist the onboarding of clients whilst enabling the financial institution to meet the obligations of Know Your Customer (KYC) and Anti-Money Laundering (AML) requirements as well as checking for anomalies that may indicate the presence of fraudulent behavior.

## What is the role of data in FinTech?

As digital services have rapidly expanded then so too does the digital footprint. And hence as the volume, veracity, and variety of data grows, so too we need to apply Data Science capabilities to make sense of the data to manage risks and improve the customer journey and experience.

Data is referred to as the new oil, but like oil, data needs to be processed and cleaned before it can be used.

It all starts with data and access to quality data. This needs to be aligned to the goals and objectives of the business.

## What areas of AI apply to FinTech?

For the purposes of this article, we define AI as the umbrella term whereby we are dealing with the area of developing computing systems that are capable of performing tasks that humans are very good at (for example recognizing objects, recognizing and making sense of speech, and decision making in a constrained environment).

Machine Learning is defined as the field of AI that applies statistical methods to enable computer systems to learn from the data towards an end goal.

Deep Learning refers to the field of neural networks with several hidden layers. Such a neural network is often referred to as a deep neural network.

Neural Networks: are biologically inspired networks that extract abstract features from the data in a hierarchical fashion.

An example of Deep Neural Networks that has been making a major impact across the AI sector is Transformers with Self-Attention that has transformed the Natural Language area (e.g. BERT, GPT-3) and is starting to make its impact on Computer Vision with Vision Transformers (ViT), chemistry and biology with Alpha Fold II, and time-series with temporal fusion Transformer models.
As stressed above the author would today add Transformers with Self-Attention as a key area under Deep learning that is impacting the Financial Services sector and also consider a special area for Federated Learning with Differential Privacy as a key to helping unlock siloed data with the potential for collaborative learning across decentralized data on devices or other local servers whilst preserving user privacy.

In essence, we have the following core areas in Machine Learning:

**SUPERVISED LEARNING:** a learning algorithm that works with data that is labeled (annotated). For example learning to classify fruits with labeled images of fruits as apple, orange, lemon, etc.

**UNSUPERVISED LEARNING:** is a learning algorithm to discover patterns hidden in data that is not labeled (annotated). An example is segmenting customers into different clusters. Semi-Supervised Learning: is a learning algorithm when only when a small fraction of the data is labeled.

**REINFORCEMENT LEARNING:** is an area that deals with modeling agents in an environment that continuously rewards the agent for taking the right decision. An example is an agent that is playing chess against a human being. An agent gets rewarded when it gets a right move and penalized when it makes a wrong move. Once trained, the agent can compete with a human being in a real match.

- It should be noted that Reinforcement Learning and Deep Learning have been combined to create an area of AI known as Deep Reinforcement Learning and this is a field that has been driving many of the cutting-edge breakthrough achievements in AI such as the AlphaGo victory over the then human Go World Champion Lee Sedol in 2016.(9)

- Active-Learning is a form of semi-supervised learning and relates to a situation where algorithms can actively query a teacher for labels. It is defined by Jennifer Prendki as "... a type of semi-supervised learning (where both labelled and unlabelled data is used) ... Active learning is about incrementally and dynamically labelling data during the training phase in order to allow the algorithm to identify what label would be the most informational for it to learn faster."
It is important to recall that the modern AI market (Machine Learning and Deep Learning) is in its relatively early stages and many market analysts expect this sector to undergo rapid growth as we move into the era of standalone 5G networks, Edge Computing, and the AIoT, namely AI convergence with the Internet of Things (IoT).

A major driver of this will be the fact that standalone 5G networks will allow for a massive increase in devoicing connectivity with machine-to-machine communication at scale, ultra-low latency, and technologies such as Augmented Reality and Virtual Reality that struggle with 4G due to latency to work as intended with standalone 5G thereby allowing the rise of the Metaverse with 5G enabled glasses.

**Defining the intelligent automation marketplace.**

Enterprise investment in the IA market—which includes Artificial Intelligence, Machine Learning and RPA—is growing rapidly. Overall spending is expected to reach $232 billion by 2025 compared to an estimated $12.4 billion today.

**Source for infographic: Imtiaz Adam, attributing data points from KPMG**

It is interesting to note the rapid projected trajectory in the Intelligent automation market from 2022-2025 which coincides with the expected arrival of standalone 5G networks at scale.
The forecast from Statista above would equate to approximately 9 internet-connected devices per person on the planet by 2025!

IDC Seagate forecast that we’ll be creating 175 Zetabytes of data in 2025 and approximately 30% of that data will be consumed in real-time! That is almost the entire amount of data that was generated in 2020 alone will be real-time data!

Hence Machine Learning and Deep Learning technology will be essential to make sense of the data and to help manage the network system (5G and the internet).

It will lead to a fundamental transformation of banking and insurance services as we’ll be able to use predictive analytics to forecast risk and problems before they occur and hopefully react to stations before they become a serious incident or problem. This risk mitigation should help decrease insurance claims and also make it easier to understand the credit situation of a company in near real-time when it is applying for loans or raising equity finance. Rather than looking at historical accounting data from three to six months ago we may evaluate what is happening to a firm and its overall sector in the current time and use that to make better forecasts forwards too.
How does Fintech apply Artificial Intelligence (AI)?

In FinTech, AI technology is applied towards improving the customer experience with:

- Machine Learning models that may enable better customization and targeting of tailored services

- Customer experience with Natural Language Processing (NLP) with virtual assistants including chatbots, and sentiment analysis.

- Computer Vision has been applied to assist with the Regulatory Technology (RegTech) for customer onboarding with Face Detection and Recognition from documents such as a copy of the customer’s passport or driver’s license and matching that with a selfie image for Know Your Customer (KYC) purposes or also for payment via face recognition or biometrics for mobile phone banking security.

The above are just a few examples.

Source for the image above: Imtiaz Adam
Further examples of AI across the subsectors of FinTech are set out below:
• **RISK MANAGEMENT AND LOAN AND CREDIT AUTOMATION**: the very essence of Finance is to take a risk for an appropriate return (price). We may refer to this as a risk-adjusted returns. The greater the risk the higher the price and vice versa. AI can help financial firms assess risk, price it and manage it. Examples may entail Deep Reinforcement Learning (10), Random Forests(11), and XGBoost(12,13).

• **MARKETING AND CUSTOMER EXPERIENCE**: chatbots using Transformers with self-attention mechanism(14), segmentation, targeted offerings, sentiment (Transformers with Self-Attention for NLP, K-Means and K Medoids(15) for clustering and segmentation, K Nearest Neighbour(16), Logistic Regression(17) for marketing campaigns)

• **TRADING**: trade execution, sentiment, identify patterns, risk management (Deep Reinforcement Learning(18), Evolutionary Algorithms(19), Transformers(20,21))

• **PORTFOLIO AND INVESTMENT MANAGEMENT**: portfolio optimization to maximize returns for the given risk. Automated portfolio management with passive index replication, alpha generation with factor investing (or smart beta). This impacts across Wealth Technology and also robo-advisory services with asset management companies. Examples may include XG Boost(22), Deep Neural Networks(23,24,25) , Deep Reinforcement Learning(26,27)

• Reg Tech KYC and AML, Fraud detection and anomaly detection. Trader oversight. For example, Jamie Dimon, CEO of J.P. Morgan, states that using AI in fraud detection alone saves his bank $150 million per year(28). Examples of techniques that are used include XGBoost(29), Autoencoders(30), and GANs(31), Convolutional Neural Networks for Know Your Customer (KYC) checks with face detection(32) and recognition(33).

• Due Diligence and legal document review to classify text (Transformers with Self-Attention(34), LSTM(35)) Payments for example biometric verification and payment by face with Convolutional Neural Networks(36,37). Note that there have been challenges with spoofing to attempt fraud(38) albeit payment by face has been gaining pace in certain parts of the world(39). Fraud detection (see RegTech above).

• Facial recognition for both payments and RegTech (KYC and AML passport or driver license document verification) may be impacted by Vision transformers (ViT0 in the future(40).

• Insurance and insurtech chatbots with Deep Neural Networks(41) Transformers with self-attention mechanism(42), underwriting insurance plans with Generalized Linear Models (GLMs) for greater interpretability in underwriting pricing of risks(43) and automating part of the claims assessment process for example with auto insurance(44,45).

• Cyber Security is a key area for financial services. Techniques such as Light Gradient Boosting(46), Deep Neural Networks(47) including Stacked Autoencoders(48) Networks are examples of approaches that have been considered for Cyber Security.
What is next for AI and Fintech?

The next evolution for AI and Fintech could be the following:

More emphasis on explainable and interpretable AI. Decision-makers want to understand the reasons for the output of the model and not just rely on a black-box approach.

Causality and reasoning. This is a key area as we note that correlation does not always imply causation. Understanding the relationships and causal inference will be key in areas such as autonomous cars and healthcare. It is also key in financial services.

Responding to dynamic environments and ongoing learning beyond the initial training set.

Learning from smaller data sets in the training environment.

Resource and computational optimization with neural compression.

The need to scale AI across sectors of the economy where data privacy is key and data is increasingly decentralized (for example across mobile devices or other siloed across local servers) is a key challenge in certain sectors. Machine Learning requires access to data to scale and deliver successful results. At the same time, there are restrictions via regulation across the EU, UK, and the US plus elsewhere relating to data and confidentiality in particular in related sectors such as financial services and healthcare.

Federated Learning with Differential Privacy is viewed as a key potential solution to enable Machine Learning to scale across sectors such as Financial Services, Healthcare, and the soon to emerge Metaverse (which is key given the concerns raised about data privacy and massive data harvesting across social media platforms today).

Examples of key frameworks for Federated Learning with Differential Privacy include:

TensorFlow Federated (49)
OpenMined.org (50)
Flower. dev framework (51)

The Flower framework claims to be agnostic towards different coding and hardware architectures and may provide an exciting opportunity to truly scale Federated Learning across mobile devices for collaborative learning.(52)

Federated Learning is starting to emerge in areas such as credit analytics (53) and open banking (54).

There are predictions that the FinTech revolution will spread into the following areas over the course of the next few years:

Climate Change and Climate Finance as our policymakers seek to pull back from financing fossil fuel energy and undertake a massive energy transition towards greater emphasis on renewable energy, green hydrogen, advancing battery storage, smart grids, and electrification of vehicles. Plus finding ways to leverage financial technology to assist protect our forests and coral reefs whilst maintaining environmental standards.

The AIoT whereby finance is increasingly invisible, frictionless, and embedded.

The Metaverse will rise alongside the AIoT and will be experienced via 5G-enabled glass technology.
The rise of invisible banking with frictionless services and touchpoints as FinTech and payments will increasingly be in the form of embedded finance. For example, in Uber, one does not need to carry cash nor a card for payment. It is done digitally via mobile.

Source for image above: Imtiaz Adam

The Metaverse with 5G enabled glasses will completely transform all sectors including banking and insurance. There is a view that it will relate mostly to gaming and social use cases. However, one will be able to have personalized interactions with pop-up bank managers, advisors, and AI agents to explain more complex products and with 3D visualizations of services and products. Neural Translation will help remove language as a barrier.

The author envisages that by 2025 the entire financial services sector will look very different from how it does today in particular as standalone 5G networks scale and Edge Computing enables the rise of the AIoT. We’ll be able to conduct real-time credit analytics on manufacturing companies and predict risk before it occurs and make an intervention before something goes wrong.
Long-term autonomous cars may result in a material change to the auto loans market as fewer people drive cars, and the insurance sector as risk from accidents hopefully decreases. In addition, property portfolios may be impacted as there is less demand for car parking lots and inner cities are redesigned. This is likely to occur anyway as physical retail is being impacted by the internet, mobile, and soon the metaverse. Moreover, the impact of climate change on our urban environments and the role of smart cities. Banks, insurance companies, and asset managers, in general, will all be impacted and will need to plan forwards and dynamically adapt to both the challenges and the opportunities that will arise.

Source for image above: Imtiaz Adam
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THE INVESTMENT ASSOCIATION, AI AND FINTECH

SPOTLIGHT INTERVIEW WITH

GILLIAN PAINTER
(Head of Membership and IA Engine: The Investment Association)

Interview Conducted By: Imtiaz Adam
**WHAT DOES THE INVESTMENT ASSOCIATION DO?**

The Investment Association (IA) is the trade Association for Investment Managers in the UK. Our 270+ asset and wealth manager members consist of large and small independents as well as those that are owned by banks or backed by insurance companies. Collectively, they manage over £9.4 trillion of assets on behalf of their clients in the UK and around the world. That is 13% of the £75 trillion global assets under management.

The IA advocates on behalf of the industry. Acting as a voice and conduit to the regulator and government in the UK as well as in Europe and internationally. We not only provide in-depth expertise on all areas of regulation and policy but convene members to question and debate the waterfront of issues affecting our sector with tech and innovation being a principle focus for all our members. We provide education, thought leadership, and support on all aspects of policy and regulation affecting the sector.

**WHAT IS THE ENGINE?**

Engine was set-up to fuel the adoption of technology within investment management, for the benefit and changing needs of clients. It is a wholly owned subsidiary of the Investment Association.

We are working with 150+ FinTech firms and partners across the investment value chain to open up tech-driven possibilities, actively connecting the investment management industry with start-ups that can offer real solutions to real problems that impact different parts of the business such as operations, distribution, compliance, and investment.

Engine is the only known central hub and repository of buy side focused FinTech globally. We have an expert advisory panel made up of 28 industry professionals from Investment management and associated service providers that play a key role in our accelerator programme, titled the Engine Innovator Programme, and actively seek to work with Engine’s FinTech firms.

We support our FinTech firms with a plethora of initiatives that allow them to promote their cutting edge solutions to our IA membership and the wider investment management industry:

**SOLUTIONS DIRECTORY** – acts as a central repository for solution providers. It has a filtering functionality that allows you to search by tech area, asset class and value chain positioning

**CONTENT PROMOTION** to our investment manager members and the wider industry

Speaking opportunities at Engine’s TechTalk events

**SPARKS PROGRAMME** – a one month programme to identify, validate and develop pre-seed start-ups in the investment management space

**TECHTALK SPRINT SERIES** – short sessions with FinTech firms to explore key challenges within the industry and how they can be addressed
Another key area of focus for Engine is identifying FinTech across the UK and internationally to ensure that we have oversight of the global FinTech landscape. In order to achieve this we have a co-working space called The Engine Room in Birmingham and also hold close relations with other FinTech organisations up and down the UK. We have established a Global Partner Programme which has seen us sign MOUs with key financial organisations across the globe in regions such as Abu Dhabi, Dubai, Qatar, Saudi Arabia, Singapore, Japan, Hong Kong and Australia.

The Global Partner Programme facilitates the sharing of FinTech insights between countries and allows us to exchange a wide range of opportunities for FinTech firms in the UK and internationally, it also allows us to access and engage with the best tech and innovation that is emanating from the regions.

**WHAT IS THE INNOVATOR PROGRAMME?**

The Engine Innovator Programme is our six-month programme for FinTechs that want to accelerate their immersion in the investment management industry. Following a thorough two-stage selection process conducted by our Engine Advisory Panel, five best in class firms are selected to participate in each cohort of the programme. We have currently just completed the application round for our fifth cohort of the programme, the five successful applicants will be announced at our EmTech Global event taking place in London in March 2022.

Firms that participate in the cohort gain direct access to the industry, including 1-2-1 meetings with each of the 28 industry experts on the Engine Advisory Panel. They also benefit from software discounts and promotion through a range of channels as well as access to IA member committees and policy workstreams.

The advisory panel connections alone have resulted in a number of trials, POC’s and contracts for participating FinTechs and the additional mentoring that participants receive from the advisory panel is ideal for helping them ensure that their products are as streamlined as possible.

*Since the launch of Engine 20 firms have gone through the Innovator Programme.*
Within investment management we see FinTech addressing a number of areas including investment decisions, customer experience, operational efficiency and regulatory challenges.

Solutions within our sector are incredibly diverse and address all aspects of the value chain, we see lots of activity in the data space especially around ESG data and the implementation of such data into portfolios. We have also witnessed increased activity around tokenised assets and distributed ledger technology. Other areas of focus include Digital distribution and personalised portfolio construction, better client engagement models, and data enabled customer centric strategies that harness data science capabilities.

From a FinTech perspective asset management is a smaller area of focus than the sell-side but it is an incredibly important area for innovation, especially when you consider that asset managers in the UK manage over £9.4 trillion with investment managers owning nearly 40% of UK PLC and we continue to be the largest centre in Europe for investment management.

The adoption of FinTech is about a real cultural change and that takes time to develop but we have seen fantastic growth in the identification of tech firms operating in this space and take on approximately 4/6 new FinTechs every week that have an investment management focussed solution.

It is all about education, information, connectivity and collaboration, and we are here to support a UK, regional and global conversation. The UK has always been a country of innovation and despite the pandemic, the UK has comfortably retained its position as a global leader in the financial services and FinTech sectors. The FinTech sector has held up extremely well and we are still the top-ranking investment destination in Europe. In 2019 the UK financial services firms spent £95bn on Technology. The UK FinTech sector generates revenue of £6.6bn per year and investment into UK FinTech stood at $4.1bn in 2020 – more than the next 5 European countries combined.

FinTech is thriving across the UK with an estimated 2,500 tech firms in operation and whilst London holds the largest number of FinTechs, the clusters up and down the UK outside of London are incredibly important. There are 25 FinTech clusters identified including Edinburgh, Cardiff, Belfast, Birmingham, Bristol, Cambridge, Manchester, Leeds, and Newcastle that each have a fantastic ecosystem of entrepreneurs and tech firms.

The recently published Khalifa review identified a 5 point plan to ensure that the UK maintains its position as the best place to start and grow a fintech business looking at policy and regulation, the five areas are: skills, investment, international and national connectivity.

"FINTECH IS THRIVING ACROSS THE UK WITH AN ESTIMATED 2,500 TECH FIRMS"
HOW RECEPTIVE ARE ASSET MANAGERS TO WORKING WITH FINTECH STARTUPS?

There is a real desire amongst senior management within investment management to embrace and embed technology within their organisations. Investment managers know now more than ever that it is important to stay current and if they are not prioritising innovation and working with more agile smaller tech providers then they risk losing a potential significant competitive advantage.

The pandemic has on the whole accelerated digital strategy and tooling but restricted budgets have caused some temporary reprioritisation. We have the solutions and the growing desire to onboard and implement and we are now seeing a real drive from firms to digitise. There are also a number of initiatives that seek to push forward the adoption of FinTech such as ENGINES BEST PRACTICE PAPER and the TECH NATION FINTECH PLEDGE.

WHAT IS THE ROLE AND POTENTIAL FOR FINTECH IN THE INVESTMENT MANAGEMENT SECTOR?

FinTech has already begun to transform our industry in a myriad of ways, some of which we have already discussed. Covid has forced institutions to adopt tech within their organisations and has subsequently accelerated the adoption of FinTech and general interest from institutions in exploring the art of the possible.

In the next 12-18 months we are going to see significant technological change but I have learnt you cannot predict the future, the future requires a change to the existing infrastructure and traditional approaches are no longer fit for purpose. It is collaboration and innovation from front to back office that will ultimately facilitate change along with an open mindset on tech being driven down from the top of organisations. One thing I do know is that the client has and will continue to change and we need to be in a position to better meet those needs.

In the next twenty to thirty years a huge £5.5 trillion will be transferred down to the Millennial and Gen Z generations in “The Great Wealth Transfer”. As these generations are very much so tech natives our industry needs to be ready to meet the changing needs of the end client, in this case our industry needs to ensure that they stay ahead of the tech curb and push ahead with FinTech adoption.
There is huge potential for FinTech moving forward, we currently see a heavy focus from retail investors and institutions on ESG and we most definitely see that as an area where FinTech can assist and add immediate value. A lot of FinTechs are focussing on ESG data, investment managers are specifically looking at solutions that can map ESG data against their portfolios and also allow them to be transparent in the ESG factors associated with their supply chains.

Data in a more general sense is another area where FinTech will transform the investment management space. 90% of all the data in the world has been generated over the last two years so it is very clear to see that there is an immediate need for change and transformation within this space. AI and NLP will play a key role in the harnessing of mass data, we have already seen a number of investment managers utilising such tech and adoption in this space will inevitably increase over the coming months and years.

Innovation will be required throughout the value chain and it is essential for organisations to have a can do attitude. Our industry has a long way to go but we are most definitely moving in the right direction.

DO YOUR MEMBERS BELIEVE THAT AI IS PLAYING A GREATER ROLE ACROSS THE SECTOR?

Absolutely, over a number of years we have seen the rapid development and implementation of AI across the investment management industry. A substantial number of institutions already utilise FinTech solutions that have AI at their core and due to AI’s ability to work through incredible amounts of data and complete tasks outside of a humans abilities, we anticipate that usage and adoption of AI will continue to grow across our industry and many others.

AI has a vast number of applications within the investment management industry, natural language processing can be used for the quick extraction of data from documents, advanced analytics can be used to analyse complex data sets, and techniques such as robotic process automation can be used to automate a number of middle to back office batch processes. The IA have done significant research into AI and published a paper in collaboration with EY and Clifford Chance last month titled “AI and the investment management industry” which can be read here.
Kevin Levitt leads global business development for the financial services industry at NVIDIA. He focuses on global trends in accelerated compute and AI across financial services – including fintech, retail banking, credit card, and insurance. Previously, Kevin led sales and business development organizations at two fintechs: Credit Karma and Roostify. He also helped comScore, a digital measurement and analytics firm, grow into a publicly-traded, multinational organization, where he served as senior vice president of the financial services practice. Kevin holds a B.A. from American University in Washington and an M.B.A. from the R.H. Smith School of Business at the University of Maryland.

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AI is enabling digital transformation across the financial services industry, from fintech and investment firms to commercial and retail banks. With AI, banks can better protect their customers’ accounts, secure payments, improve return on investments, and personalize content, investments, and next-best-action recommendations for their customers.

At the same time, the Financial Services industry is at a crossroads, in between mounting financial pressure due to an increase in risk tied to financial volatility, a higher volume of customer service inquiries, and the need to further develop digital engagement and channels given today’s COVID-19 environment that has many branches consolidating or shutting down.

Financial services firms are planning to increase their AI investments across infrastructure, model development, and deployment. This will transform the banking experience for customers.

AI assistants will use natural language to fulfill customer requests, such as paying bills online, transferring money, or opening accounts. Insurers will use AI to quickly resolve claims and create more accurate policies for their members. With AI and HPC, banks can respond faster to fluctuating market conditions and protect customer investments. And digital twins of payments and transaction systems can improve anti-money laundering (AML) and know-your-customer (KYC) systems, ensuring security and transparency for account holders.

For customers, there has been a major shift towards digital engagement in the last several years. Accelerating at a rapid pace, consumers are becoming more accustomed to using digital channels when dealing with all aspects of life. They’re using mobile banking apps, artificial intelligence (AI) infused virtual assistants to share immediate security alerts, and they’re even transferring money between accounts using just their voice.

In many cases, consumers today are interacting with AI and not even realizing it. It’s as simple as waking your home voice assistant with a “Hey” or using speech-to-text functions, both of which are built using elements of Conversational AI.

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**WHAT IS CONVERSATIONAL AI?**

Conversational AI is the application of machine learning to allow humans to interact naturally with devices, machines, and computers using their own speech.

As a person speaks, the device works to understand and find the best answer with its own natural-sounding speech.

It may sound simple, but the technology behind conversational AI is complex. It involves a multi-step process that requires a massive amount of computing power and several complex models that need to run in less than 300 milliseconds to deliver a great user experience.

Conversational AI is primarily based on three key processes:

- **Automatic Speech Recognition (ASR)**, which takes words spoken by a person and converts them into readable text.

- **Natural Language Processing (NLP)**, which reads written text, understands the context and intent, and then generates an intelligent text response.

- **Text-to-Speech (TTS)**, which converts the NLP text response to natural-sounding speech, with human-like intonation and clearly articulated words.
VIRTUAL ASSISTANCE WITH CONVERSATIONAL AI

The increased amount of remote work today means more people are staying home and organizations face increased workloads to process much larger volumes of calls. Conversational AI can be personalized, customized to the user, and available day and night.

With a virtual assistant, customers can have a conversational, human-like dialogue with intelligent, instantaneous responses about all types of inquiries such as account-related issues, product applications, transaction inquiries, and claims.

Larger, more complex systems with access to a user’s information can understand, search and respond. They know the context of each user’s previous interactions, they can be nuanced and make cultural references, word-play, adapt the tone of the conversation and even integrate with product recommendations.

A virtual assistant can also support customers with disabilities. For customers who are unable to interact with a keyboard or read a screen, conversational AI can provide a solution for every customer’s specific needs.

UK-based NatWest’s digital assistant, Cora, is handling 58% more inquiries year on year, completing 40% of those interactions without human intervention. According to Juniper Research, 90% of customer interactions will be automated by 2022, saving banks $7 billion by 2023.

USING CONVERSATIONAL AI TO REDUCE FRAUD

Call centers can be a weak spot when it comes to fraud defense, with a reported over 80% of fraud going undetected.

Customer service agents are focused on just that - delivering the best service to the customer. Scrutiny or suspicion of a customer’s activity can risk lower customer satisfaction and lost revenue.

Conversational AI can be used to identify fraudulent account activity like identity theft by using sentiment and confidence analysis, pattern recognition, and voice-based identity authorization.

Through intent processing, NLP is also able to detect application fraud, whether exaggerated claims, illegitimate claims, or misrepresentations in applications to get lower premiums.

OPTIMIZING THE CALL CENTER WITH CONVERSATIONAL AI

Conversational AI can significantly impact the customer service experience.

Just a one-point decline in a business’ customer experience score can equal $124 million in lost revenue for multi-channel banks.

Customer service agents can deliver an improved customer experience with AI. Enabling agents with real-time insights can both reduce their workload and deliver a speedier interaction for customers. It can generate personalized, recommended offers and next-best-actions for each customer based on their individual data. And it can transcribe calls, take notes for the agent, reduce their post-call reporting time and allow the agent...
While conversational AI is still becoming more popular, a shift towards e-commerce and a digital-first customer experience means people are increasingly using AI in their day-to-day activities.

**46 percent of people** use AI every single day, **23 percent of customer service organizations** are using AI-powered chatbots and **62 percent of consumers** say they’re open to using AI to improve their daily experiences.

By reducing fraud, delivering smoother, faster customer interactions through a virtual assistant or better enabled agents, conversational AI will play a key role in delivering a better customer service experience.

And the demand for conversational AI is only going to keep growing, with the market estimated to reach a value of $16 billion by 2024. From an improved customer experience to fraud detection to bank process optimizations, the future of banking will depend on AI.
Serhat Aydogdu is an investor at D4 Ventures. He was formerly a VP at Goldman Sachs. Serhat holds an MBA in Finance from Columbia Business School.
TELL US ABOUT D4 VENTURES AND YOURSELF.

D4 Ventures is an investment platform envisioned by entrepreneurs for entrepreneurs.

At D4 Ventures, we primarily invest in the future of commerce and the transformation of financial services. We like to invest in the early stages, where we bring the most value-add to our portfolio companies.

I am a curious learner. I studied electrical engineering and cut my teeth at a start-up as the fifth employee there. And I loved the experience of wearing different hats every other day.

Then, I went to New York to study MBA at Columbia Business School. It changed the course of my career and helped me get into Goldman Sachs.

After five years in banking, I moved into VC investing at a newly established firm called Centricus in London. My focus at Centricus was all things fintech and consumer-focused businesses, which is a continuum for me at D4 Ventures.

WHAT DO YOU FOCUS ON IN AI AND FINTECH?

I am a true believer in the immense power of AI / ML in augmenting human capabilities, enhancing efficiency, speed, and accuracy of processes and transactions. When I assess an AI start-up, I expect it to offer at least 10x improvement with the products/services that it offers.

In fintech, the two areas that I focus on are financial wellness and financial inclusion.

They go hand in hand anyways, but the former is essentially about availing people and SMEs to have unrestricted access to all financial products.

The latter is about opening the world of finance to society. In my mind, it will be much easier with the help of DeFi and Web 3.0 projects. There is so much to do in the intersection of them with AI / ML. One area is integrating machine learning techniques to DeFi protocols for execution, liquidity pooling, yield farming, etc.

WHAT ARE THE CHALLENGES FOR AI STARTUPS IN THIS SPACE? (DATA STRATEGY MAYBE?)

Learning is a process of inputs and outputs and it is no different in AI / ML. As we all know, machine learning is a data-hungry technique. From my observation, it is difficult for start-ups to access relevant data sets for their learning engines in a convenient and affordable way. In addition, there are also privacy concerns, which might restrict access to data sets. Hence, data strategy is pretty important.

But it is not in start-ups’ hands alone. It needs to be a collective effort by companies, governments, and society to produce such data sets and make them available for use by start-ups. Certain countries (e.g. China) might tend to take a top-down approach in providing access to large amounts of data sets. From my observation, it is one reason why Chinese start-ups find it easier to build products and offer them to their customers in a more cost-effective way. The difference in the initial cost of access in both time and capital is reflected along the journey of start-ups.
From my perspective, there are two trends in fintech and they support each other.
1) Personalised offerings and
2) Decentralisation. More and more products are tailored towards individual preferences and to address specific needs. Decentralization would allow that goal to be attained via the participation of all individuals versus those services being offered by a small group of centralized institutions.

Decentralization will continue to be a big theme. It is just starting. We will see dramatic changes in the way large corporations function and their relationships with the rest of society. AI / ML will continue to make a significant contribution here. I envision a world, in which access to data and use of it is much easier than it is today.
That’s not a secret to anyone anymore: training a Machine Learning model requires data, and if you rely on common wisdom, usually a lot of it. Model not performing? Easy, just get more data and train again. That’s a trick most practitioners are guilty of using when an angry manager demands an explanation as to why that fantastic 95%-accuracy that was promised to her months ago is still nowhere to be found. And yet, it’s not like it is just an excuse: more data does help models learn, especially larger ones (read: deep neural nets).

In his famous course “Nuts and Bolts of Applying Deep Learning” of 2016, Andrew Ng explains in detail the relationship between the volume of data and the performance of the model (through a plot called a learning curve). In this course, he clearly demonstrates the positive impact of larger datasets and compellingly justifies the reliance on larger models, which, while more greedy, naturally have the potential to retain more of the information available in a dataset.

And yet... even those larger models eventually saturate and stop learning. That said, nothing really surprising there. It’s like saying that even though reading more books will help you become an expert at [insert here your favorite topic], you will eventually reach a point where finding novel information in a book becomes close to impossible. With larger datasets, we’re more likely to find novel information; but
finding novel information becomes more and more challenging over time because of the law of diminishing returns. That’s the main reason why vehicles from the best autonomous driving companies in the world are still scouting the streets of San Francisco, in desperate search of that handful of rare data points (such as an accident or a toddler crossing the street alone) that will help their algorithms operate at a delusive 100% accuracy. And the main reason why YouTube is full of videos of Teslas killing innocent deer even in 2021.

At *Train AI 2018*, Andrey Karpathy told the story of his brutal encounter with the real world of Machine Learning: upon joining Tesla in 2016, data, he explained, suddenly started causing him to lose a lot of sleep. His work as an ML scientist was nothing like what had been described to him in college: the data was just a mess, and no one, or nothing, was going to help him. 75% of his time was now to be spent doing janitorial data work. And yet, in spite of the frustration, he realized quickly that his efforts were not vain: by spending the same amount of time on data cleaning / data preparation, he would observe a double-digit boost in the performance of his model, as opposed to just a few meager percents in improved accuracy by spending that same time on model optimization. Model tuning was overrated.

This opened the door to the “novel” Data-Centric AI movement which Andrew Ng has recently become the celebrity ambassador of. A much-needed assertion that Data Science truly starts with data, something that the ML community paradoxically knew all along but somehow refused to evangelize and even almost demonized. After all, data preparation is still one of the least popular parts of ML, and you’ll be hard-pressed to find an aspiring data scientist saying they can’t wait to spend nights and days cleaning data. The problem is that this is the single most dangerous mistake in Machine Learning nowadays, a mistake that Data-Centric AI attempts to address.
DATA-CENTRICITY IN AI ISN’T ENOUGH

So there you have it: we all know that data is king, and that with no data, we can’t have good ML models. We need to acknowledge data as a first citizen in AI, and that’s precisely what Data-Centric AI is all about. Yet spending time on data scares us, or even repulses us. And it doesn’t take long to find a good, first understanding of why: preparing data is a messy, time-consuming, manual process that you can easily tear your hair over. In one word: it’s low-tech, and as highly-trained engineers and scientists, we loathe the idea of wasting time on something that is beneath us, undeserving of our time. What if, though, instead of treating data prep as a necessary evil, we decided to do with it what we tech people do best: incorporate the use of technology into data preparation itself? That’s the necessary-yet-uncomfortable change the industry needs to make data the driving force in AI, instead of making it the bottleneck.

While the Data-Centric AI movement was slowly taking shape, the world of industrial ML was dealing with one of its most serious crises yet: the scale of data it was suddenly dealt with. After decades of complaining about a severe lack of data and several related AI Winters, the industry suddenly went from not being able to experiment with some of the most advanced ML algorithms (most of which were developed as early as the 60’s or 70’s) to drowning in an ocean of not-so-clean data - and the least that can be said is that we were not prepared for it. Luckily, the response was fast, and we’ve observed in the past couple of years an explosion of new MLOps initiatives, ranging from feature stores to hyperparameter tuning or ML observability solutions. Sadly, the solutions for data preparation remained themselves quite conservative, and in spite of a handful of new companies offering better manual annotation tools or frameworks for human-in-the-loop machine learning or auto-labeling (which hardly generalized beyond the most mundane use cases), few innovations (with maybe the exception of Snorkel) seemed to bring the change necessary to move the needle significantly.

TIME FOR A CHANGE: NOT ALL DATA IS CREATED EQUAL

While most confuse data preparation for data labeling, data prep is in fact, an industry on its own; we just failed to realize it because of our perception of the problem. Just like the baker that claims to make home-made bread from scratch but fails to realize that the flour and yeast that he uses are themselves the product of a complicated process including not just the miller but also the tractor manufacturer, ML experts have to realize that getting high-quality training data might, in fact, require a lot more expertise and know-how than building a model, and that getting the right annotations are just part of the story. Think about it: getting perfect annotations for a faulty dataset will result in the same garbage-in-garbage-out problem. That’s not all: while most people know that “bad data” can lead to disastrous consequences, few people realize that our datasets are plagued with “useless” (irrelevant or non-informative) records that just make us waste time, money, and energy to process. That’s quite a chilling realization in an age where most industries are trying hard to reduce their carbon footprint while the high tech world turns a blind eye towards sustainability.
In 2019, the research team at Alectio wanted to validate a hypothesis that had the potential to change the way we perceive data prep forever: we wanted to prove once and for all that the training data that was used to train a model mattered to the training process, even for similar data quality. If the informational value would vary across records, then it would mean that selecting the data strategically could help make models learn - and converge - faster, and potentially help us move away from the myth that high volumes of training data are a prerequisite to ML.

The experiment below, while simple, made the case in a meaningful way. Each of the violins in the violin plot shows the accuracy of the same simple classification model trained 30 times with different training samples of the same size. Even when initialized with the same parameter values, we quickly observe that different training samples lead to different performances on the test set, illustrating that the size of the sample alone can’t explain performance - there is no unicity of a learning curve for a given model, and the data that is chosen matters.

But that’s not all: upon comparing the various violins, we note an overlap in performance: some of the samples with a size of 20% of the entire dataset not only compare to the samples of size 80% but even outperform them. The ultimate finding lives in the fact that about 30% of the samples of size 80% outperform the baseline (the model trained on the full dataset), which in this case lead to an 89% accuracy. Not only does the performance depend on the sample; the best performance is reached when some of the data is removed, pointing clearly to the existence of harmful data within this dataset.

Classification model trained 30 times with different training samples of the same size
If the previous seems like a theoretical argument, it is fairly easy to prove that it is not. For instance, those of our customers using synthetic data to train their computer vision models report an average of 4% drop in model performance when using a dataset of synthetic data instead of natural data of the same size. While to this day researchers are still trying to explain why, a first pointer might be found in some recent research coming out of University of Buffalo to attempt to identify synthetic pictures of human faces generated by GANs from real ones. In this study, researchers were able to show that synthetically generated faces would typically not have round pupils, suggesting that the roundness of the eyes would be one potential way to discriminate between fake and real data. More generally though, it opens the door to understanding better why neural nets - which, while modeled on human cognition, actually tend to struggle on different things than we humans do - might still struggle to learn as well from synthetic data as they do from natural one; it should also be considered as proof that humans are unqualified to manually curate a training dataset for a model that everyone openly recognized is still a black-box for us - after all, we’re the ones so easily fooled by GANs, not neural networks!

If selecting the right data matters, how then can we get better at selecting the right data? There is no easy answer to that question, but there are certainly a few ways to make a first step in the right direction. Active Learning, an incremental semi-supervised learning process invented decades ago to respond to a need to reduce the amount of labels required to train a model, can actually be upcycled as a smart selection tool once incorporating ML into the approach. But we’re just at the beginning of a new and exciting phase in the history of ML. With the study of catastrophic forgetting, we’re getting closer to understanding why some records lead to unlearning, and with ML-driven data curation, we’re making significant progress in ranking training data from most useful to most detrimental. All with one goal in mind: moving from a passive Machine Learning paradigm to a Machine Teaching one where a ML model will first assist another by Learning-to-Select, before eventually becoming a coach to that other model. Then, and only then, we will be well on our way to Artificial General Intelligence.
Xavier Gomez is the founder and Chief Operating Officer of INVYO. Before INVYO, Xavier worked for banks (as a Director in Credit Suisse), in different top management positions (wealth management and investment banking) between London, Paris, and Zurich, and in Pictet as a global, multi-asset portfolio manager.

Xavier is a regular columnist on BFM Business TV (french CNBC TV) about Fintech and Finance.

Xavier has a master's degree from ISC – Institut Supérieur du Commerce (Master Graduate School Management – Finance) in 2000. He holds a certification from the Massachusetts Institute of Technology (MIT) specialization Fintech (2016) and is a graduate of HEC Paris in Private Equity (Leadership Executive program in Private Equity in partnership with France Invest - French Association of Private Equity) in 2017. Moreover, he holds a certification from MIT in Cryptocurrency and Digital Assets.
TELL US ABOUT YOUR JOURNEY IN FINTECH.

Since 2008, I have faced different top management issues due to the raising of regulations in the banking sector. I had to implement all these new regulations in my management positions (trading, advisory, portfolio management, treasury) with the support of innovation and digital solutions to preserve resources.

My second awareness was that the world was in a technological transition and my discovery of the megatrends of investments to come. We were taking so long to collect, analyze and understand the data that I said that we could not continue in this way with all the new technologies that are emerging. We were taking too long to set up investment solutions to take advantage of a major trend (Fintech, Artificial intelligence, Nanotechnology, mobility, etc...)

My return to business school made me aware of the technological issues facing the finance industry and society in the future. I am certified from Massachusetts Institute of Technology (MIT) specializing in Fintech and I graduated from HEC Paris in Private Equity (Leadership Executive program in Private Equity). This return to school was a revelation both in terms of meeting and vision of the world. Moreover, we decided with my partners and a former colleague to create INVYO.

I realized that the usual data provider that provides its customers with a standardized platform (not scalable or customizable). The usual data is “basic data” (mainly focused on one activity). Also, teams still must spend time looking for the data within the database. The heart of INVYO’s activity is rather centered on the contextualization of the data to provide “smart data”’. In other words, thanks to our tools, we can share actionable data that adapts to the uses of your teams. INVYO develops solutions for the exploration, control, and visualization of data. We put technology at the service of your business needs with powerful tools (sentiment analysis, data visualization, and media intelligence).

WHAT ARE THE KEY DIFFERENCES BETWEEN TRADITIONAL BANKING/FINANCIAL SERVICES AND FINTECH?

Financial technology (Fintech) is used to describe new tech that seeks to improve and automate the delivery and use of financial services. Technically speaking, Fintech is a space where financial services are delivered through a better user experience using cutting-edge technology. TechFin, on the other hand, is where a firm that has been delivering technology solutions launches a new way to deliver financial services.

Fintech is innovative, customer-centric, and streamlines complex financial processes, making it more accessible to people. Moreover, due to a more optimized business structure, fintech companies can offer products and services that are up to 10 times less expensive than traditional banks. In simple words, any business using these services to enhance or automate their work and procedures of course must be about finance. The use of advanced technology to provide financial services to consumers and business — from buying and selling cryptocurrency, to authenticating electronic payments, mobile banking and insurance to cryptocurrency and investment apps are what fintech is all about.

The rise of fintech has forever changed the way companies do business. From crowdsourcing to mobile payments, there have never been as many decisions for business people as there are present. It’s never been less expensive to set up your business as well as to extend it.
With the growing competition on the market, quick customer engagement will be a must. Credit scoring: The majority of currently used credit scoring systems are outdated. Their decisions are based on a supposed customer base, including demographics, age, marital status, possible preferences. AI and ML usage for decision making, compliance, and proactive customer marketing will be adopted to reduce churn and improve customer experience.

Insecurity, the increased use of AI by cyber defense tech companies will provide proactive mechanisms for fighting off attacks and protecting valuable data from hackers.

Many of you might not agree that Fintech is secure enough to rely on your business. Well, on the contrary, Fintech one is way safer than traditional banking. According to several consulting firms, traditional banks are quite slow when it comes to adopting cybersecurity measures. Now since Fintech’s foundation is based on these services, adopting cybersecurity won’t be such a problem. Also, cyber-criminals find it fascinating as well as easier to penetrate the systems of large and conventional banks. Do you know why? It’s because the institution doesn’t focus on technology as often as our very own fintech technology.

At first, the traditional financial services see fintechs as enemies to their businesses. The attitude of banks has evolved to make them partners able to improve customer experience.

Finally, traditional financial players to innovate apply the concept of “co-opetition” with fintechs. The co-opetition is a collaboration or cooperation of circumstance or opportunity between different economic actors who, moreover, are competitors. They organize hackathons or call for projects to sign some partnerships with the most agile fintech to tackle some customer experience problems.

As AI continues to be a growing force within fintech, experts believe its usage will spread across more sectors, increasing crossovers which will inevitably result in tensions - most specifically in access to data. The pandemic has also caused an accelerated shift away from physical and towards digital communication, affecting the entire financial industry.

But the motivation to increase AI within the sector will ultimately be driven by how much financial services organisations invest into upskilling their workforce. This upskilling is required to get real value from democratizing insights.

Moreover, Financial architecture is changing fast with start-ups able to build quickly and, thanks to cloud computing, at low cost. The pace of evolution of incumbent banks and financial institutions is constrained by significant regulation and dated technology. For start-ups, education on new, disruptive trends is key to building trust and changing mindsets at legacy organisations. This contrast in approaches to innovation leaves many existing financial offerings vulnerable to the deflationary effects of disruption. Artificial Intelligence (AI) will play a key role in this, as currently observed with the disruption of Credit Rating agencies.

IT legacy organisations governed by tight regulations have slow and cumbersome procedures that are being displaced by quick-moving start-ups – speeding up the process and reducing the costs of onboarding (KYC, Anti-money laundering), using AI to accelerate lending decisions, pay on-demand for no more monthly pay days, trade finance and working capital management, to mention but a few.

Process control and optimization (PCO) utilizing process mining and management tools will help traditional financial players make business processes more efficient and increase overall productivity. Customer Experience improvements utilizing virtual or robot assistant chatbots powered with AI and Machine Learning will respond within seconds.
With the growing competition on the market, quick customer engagement will be a must.

Credit scoring: The majority of currently used credit scoring systems are outdated. Their decisions are based on a supposed customer base, including demographics, age, marital status, possible preferences. AI and ML usage for decision making, compliance, and proactive customer marketing will be adopted to reduce churn and improve customer experience.

Insecurity, the increased use of AI by cyber defense tech companies will provide proactive mechanisms for fighting off attacks and protecting valuable data from hackers.

**WHAT DO YOU THINK ARE THE MAIN DIFFERENCES IN THE EMERGENCE OF FINTECH ACROSS VARIOUS COUNTRIES?**

Emerging markets are leading the way. According to the Global FinTech Adoption Index from EY, the adoption rate is around 80% in both China and India. Close behind are Russia and South Africa, both with 85% adoption. Among developed countries, the Netherlands, the UK, and Ireland lead in adoption, reflecting in part the development of open banking in Europe.

While the UK and US have specific fintech apps, fintech in China lives within Super Apps. Super Apps like AliPay provide a whole range of consumer services, including financial ones, in an end-to-end experience delivered through one platform. These integrated social, financial, and commercial apps were allowed to grow in China but could also be shut down by the government if it chose to.

Some experts had some doubts about the success of the concept of Super Apps in fintech because of the cultural differences in consumption between the West and Asia. But these experts forgot that emerging countries adopt the latest technologies to meet customer needs. Fintechs in emerging countries have understood that the customer experience is a major asset. It was therefore logical to export this concept because the needs of customers in Western countries are the same today. Namely being able to enjoy payment, e-commerce, and savings services without any friction.

The breadth and depth of these Super Apps is far wider and deeper than elsewhere in the world, and this is particularly true in terms of the scale they can achieve. For example, AliPay is used by 800 million Chinese people, which is more people than live in the whole of the US and the EU combined.

**DO YOU HAVE ANY ADVICE FOR PEOPLE THINKING ABOUT MOVING INTO THE FINTECH INDUSTRY?**

I strongly believe in educating people during their life. EdTech is the emerging Megatrends to invest in. This is the reason why people should sharpen their skills during all professional life to be up to date regarding the transition and new trends.

If we follow the Theory of innovation from Joseph Aloïs Schumpeter, we see the acceleration of innovation cycles. The innovation cycle gets shorter and shorter. Employees must be trained in technological changes and the only way is continuous training throughout professional life. This is the reason why I invite all talents to participate in MOOCs, Webinars, or executive programs on AI, Fintech, and blockchain to understand the changes they will soon be facing.
Klas Bäck is the CEO and a co-founder of Pagos Solutions which builds intelligent API-driven microservices delivering the payments data and insights companies need to optimize and scale better and faster while still focusing on what is unique to them and their business. Previous roles include Vice President of Product Strategy, Business Development & Markets at PayPal and General Manager of International and Payment Strategy for Braintree where he built out international operations from scratch to include local services in 49 countries. He has also held leadership positions in a number of other payments-related companies over the past twenty years, including Digital River as well as Netgiro.
What is Pagos AI and how does it fit into the modern fintech ecosystem?

Pagos is a data and insight SaaS platform tailored to drive better performance and optimization of its customers’ existing payment infrastructure. Pagos’ data platform and API-driven microservices give customers access to payment data visualizations, automatic notifications on payment trends or problems, and up-to-date payments details to better manage their customer flows, track cost, and drive more sales. In addition, the company provides a number of tools to easier take action on further optimization such as Network Tokenization, Account Updater, and more.

Tell us how Pagos AI uses intelligent payment infrastructure to help e-commerce businesses. How does Pagos AI use data science and analytics to build a better experience for businesses?

Payments intelligence is about using payments data to increase awareness of what is happening with its customers, providing advice and insight on what needs attention, and enabling action to address risks and opportunities. Quickly identifying patterns and then making predictions and recommendations are what AI and data science make possible which allows teams to be more efficient at addressing challenges and taking advantage of opportunities in a way that only the largest, most sophisticated companies with large teams have been able to do. In the end, this translates to better customer relationships, more revenue, and lower costs.

How has the application of AI and data science empowered the fintech sector?

Financial services provide a critical function to allow for capital and money to flow to where it is needed, allowing consumers and businesses alike to use their money in the most efficient and beneficial way possible. Decision-making and risk-taking in financial services are traditionally hard: instead of using data in a real-time and targeted way, many traditional financial services companies rely on approximations, using very limited inputs. This means that large parts of the market are left underserved by financial services companies, whether it is the inability for consumers to quickly get credit or even get a bank account, or for companies to obtain working capital, manage fraud, or optimize their transaction processing. Fintech uses AI and data science to ensure that all parties in the ecosystem can make better decisions faster, enabling a more inclusive economy and greater scale, helping both consumers and companies get the services they need and want with less friction.

Based on what you have experienced, what is the digital innovation in fintech and AI technology that will mark 2022?

2022 will see the deployment of AI and data science to streamline and personalize customer experiences, automate more operations, and augment the decision-making ability of teams, whether to identify problems or opportunities. Companies will use AI and data science to understand their customers, manage their risks, and optimize their finances. Any problem that involves leveraging a company’s own data for better outcomes will be attractive, from Snowflake to Tableau to Pagos.
Explain how the integration of e-commerce payment platforms with Pagos AI products can bring improvement to their payment processes.

Most merchants and companies selling online are struggling to understand all the details, data, and insights of their own payment processing performance, therefore leaving a lot of money at the table. With Pagos’ simple-to-use APIs or no-code solutions, a company can start unlocking value in their payments data and get actionable insights to do more—and better—with less, and without having to change their current payment processing partners.

What’s next for Pagos in terms of expansion globally?

Pagos is already working with companies from all corners of the globe. Currently, we are focused on launching and enabling more microservices for complementary needs across the payment transaction lifecycle and using ML/AI to unlock more intelligence around the payments transactions. We are also working on adding additional no-code data integrations to help our customers do a lot more, a lot faster.
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Marktechpost is an AI News Platform providing easy-to-consume, byte size updates in machine learning, deep learning, and data science research. Our vision is to showcase the hottest research trends in AI from around the world using our innovative method of search and discovery.
Adam Delgado is the founder of a Toronto-based recruitment company called North Technology People that specializes in placing tech professionals across Canada in a contract and permanent capacity. He has 12+ years of experience working in the tech recruitment world for various organizations in Australia, Asia, UK, and North America and has a passion for networking and meeting new people.

Nearly every single conversation I have with tech founders, VPs and Directors over the last 24 months starts with them saying something like “we want to hire the best people”. That’s great, but guess what? Every tech company on the planet is looking to hire the best people and if you haven’t already heard, the demand for AI, Data Science & Software Engineers has never been higher.

In writing this article, I had the pleasure of speaking with:
• Sauvnish Bains, Chief of Staff at Flybits
• Alyssa Faller, Director, People & Culture at Flybits.

• Various other VPs and Directors in the tech industry who have not been approved by their employers participate in this article.

While we’re on the topic, I’d like to take this opportunity to thank Sauvnish and Alyssa for their time. Before we get into the details, let’s take a step back for a moment and understand how we got here.

Why is the tech recruitment market so competitive at the moment and why is it so hard to attract good people?
There are a few reasons.

One answer is simple supply and demand—there are more jobs than there are qualified tech professionals to do the work. The recruitment market is kind of like a fruit shop. If there is a shortage of bananas, the price of bananas goes up.

It’s the same with tech, if there is a shortage of Machine Learning engineers in Toronto, the salaries of Machine Learning engineers in Toronto are going to go up as everyone tries to compete for the best people.

As you will soon discover, big salaries are not the only thing candidates are chasing these days.

Another reason for the tech talent shortage is all the big US tech companies are growing their technology teams and attracting a lot of the best talent. This means the SMB tech companies can’t hire the best people because they are getting paid crazy money by big tech. Further to this point, If you are in the Canadian tech industry, you will have noticed a lot of big US tech companies have opened offices in Canada in 2021 as a way to diversify their talent pool.

VC money is also adding fuel to the fire (it’s great to have the investment in tech) but all these SMB and startup tech companies that received funding are now looking to hire and grow their teams and there are only so many developers to go around.

Another factor contributing to the talent shortage is new emerging technology markets. AI and Data Science are just two of the latest technology markets created that have seen tech professionals diversify their skill set and move into these new areas which has left a hole in the market that their skills used to cover.

The final nail in the tech talent shortage coffin is COVID (I promise we won’t talk about it too much). While some industries like hospitality and live entertainment have been smashed to pieces, COVID has actually increased the demand for tech professionals because the world has turned to technology to solve and soothe some of the problems caused by the pandemic. Think about the gig economy workers using mobile apps or e-commerce companies seeing huge increases in sales or the digital meetings and millions of hours that’ve been watched on Netflix. All these tech companies now have more users and services to deal with which means it’s hiring time. Say it with me now- Big Tech + COVID + Emerging Markets + VC investment= the biggest tech talent shortage in the modern era.

I’m not saying it’s a good thing or a bad thing, I’m just reporting on current market trends and conditions. In my humble opinion, if you struggled to hire tech talent this year, I fear it’s only going to get worse in 2022.

Time for some good news...

One of the most exciting things about the technology industry is that there’s always something new just around the corner and the SaaS (software as a service) BOOM over the last decade has seen the emergence of what I’m going to call “EverythingTech”. That’s FinTech (Financial), BioTech (Biology), LegalTech (Legal), EduTech (Education), RegTech (Regulation), RealTech (Real Estate), Green/CleanTech (Green/ Clean energy) I’m sure there are many more but you get the gist.

These mini tech sectors have created their own ecosystem in the SaaS space and solved some really interesting problems for consumers and businesses that clearly weren’t getting done in the enterprise market.

While SaaS is a rapidly growing industry, emerging technology sectors like AI, Data Science, Blockchain/ DeFi and Quantum Computing are now at the forefront of innovation and technical resources in these niche areas are now probably the hottest resources on the planet. Now we’re all on the same page about what the tech industry looks like at the moment, let’s talk about my area of expertise, Technology Recruitment.
The recruitment industry has gone through some pretty significant changes in the last 18 months but what is probably a more accurate statement is that the candidate market has gone through some big changes. The shoe is now on the other foot, candidates are ghosting, offers are getting countered and companies that are not innovating or keeping up to date with trends are going out of business and are not able to attract the right people. Long gone are the days when a hiring manager could say to Jane the front-end developer "Jane, why do you want to work for blah.com?" It's 2021 Mr. Hiring Manager and the reality is that Jane is interviewing for 3 other front-end developer positions and probably close to securing multiple job offers. It's a candidate/buyers market now and the odds are not in favor of Blah.com.

The hiring manager should probably be saying, "Jane, what are you looking for in a new job role?" "What motivates you?" "How can Blah.com help you achieve your career goals in the next 12-24 months?"

Hopefully, Jane can learn a few new things in her role with Blah.com and maybe even progress into a manager role. If this is what Jane is looking for, Blah.com has a good chance of hiring her. The key here is you need to know what buttons to push and what questions to ask. If hiring managers and recruiters are not asking questions about candidate motivations and career objectives in this market, you're going to have a hard time closing the candidate because you don't know what they want.

When I talk about 'what buttons to push' I'm referring to why someone would want to leave their current role or what they are looking for in a new job role. Everybody is different and has different motivations. It's up to the hiring manager and recruiters to know from the first conversation what each candidate is looking for.

As a rule, people resign for a few main reasons:
- Money
- Learning and development
- Job satisfaction
- Career progressing
- Culture
- Bad leadership or management

If you're a tech company with a good brand, solving interesting technical problems with a good culture, and are paying competitive salary figures, you should be able to retain good people. With all that being said, big tech companies can always throw money at someone to poach them and I've personally spoken to software engineers that are entertaining offers from $250k-$450k from big tech companies.

Another thing to point out is that if you're not getting candidates excited about working for your company or telling them about the interesting technical challenges or problems they will be solving, there is a high chance they will lose interest in the role and interview for a company that will challenge them in a technical capacity.

Let's change gears now and talk a little more about the AI and Data Science markets. Artificial Intelligence is a broad term and will mean different things to different people, including Machine Learning, Computer Vision, Robotics, Natural Language Processing, or Neural Networks. Data on the other hand is pretty straightforward and covers job roles like Data Scientists, Data Engineers and Data Analysts. Both Data Science and AI certainly fit the category of "buzzwords" and are both high growth areas within the technology industry.

Understanding how to leverage Data Science and AI to solve business challenges and deliver value is something a lot of executives and founders struggle with and I'm almost certain some companies are "getting into AI or Data Science" for fear of being left behind.

Where we've seen the most significant increase in demand for AI and Data Science skills is in the fintech and banking space because that's quite literally where all the money is.

People often think "AI will take our jobs" but the reality is that AI (for now) is a tool that humans can use to automate a business process or system. Data Science on the other hand is all about extracting business insights and actionable intelligence from the Data. A good Data Scientist should be able to tell a story to the executive team about why their user base is declining or where they will get the best ROI for their digital marketing. The executives don't want all the nitty gritty technical details, they want actionable insights to increase profits, users and revenue.

Below you will find interviews with various business leaders from the Canadian fintech space.
WHAT WERE SOME OF THE MAIN HIRING CHALLENGES FOR THE BUSINESS IN 2021?

Alyssa Faller
Since COVID, we’ve adopted a new approach to talent attraction and onboarding practices. When hiring many people in a virtual world, you have to onboard them exceptionally well; all the little details matter. We are now building out digital onboarding strategies and practices for the new world of work in a Hybrid approach. Virtual onboarding is undoubtedly not something that Flybits was doing for all hires pre-COVID.

Sauvnish Bains
One of our biggest challenges has been growing and scaling our technical & engineering teams in Canada. COVID opened up virtual and remote hiring around the globe at a completely new scale, resulting in even tougher competition for technical talent. We’ve seen a lot of US companies opening up offices in Canada, and even more opening up their hiring to Canadian tech talent. This was happening before, but not at the scale you see now since remote work became the norm. We’ve really doubled down on building an attractive culture for global talent and focused on ensuring we have an exceptional candidate experience through candidate surveys and ensuring every individual and manager is responsible for the culture and brand. Flybits also has 2 programs in place for internal talent development. The 1st is our co-op program, where we hire junior engineers and spend a lot of time training & mentoring them. The 2nd is a leadership and mentorship program for more senior engineers interested in exploring team leadership and management positions; we allow them for 3-6 months to directly manage a few co-ops to explore if people management is something they enjoy.

WHAT ARE YOUR CURRENT HIRING STRATEGIES AND PROCESSES?

Sauvnish Bains
Prior to COVID, we were a primarily in-office culture. Since then, we’ve completely changed our hiring strategies and processes to focus on global remote hiring and the benefits that come with it. We’ve developed our hiring strategies for technical talent in specific locations in Europe and South America where we’ve built engineering, and also continue to use our immigration program that allows us to sponsor international candidates who want to relocate to Canada.

WHAT ARE YOU CURRENTLY DOING TO ATTRACT TALENT?

Alyssa Faller
We want to ensure every touchpoint in the interview process with Flybits is enjoyable and structured. We want candidates to know what is coming and to be treated well throughout the process. Every individual we interview needs to be treated as a possible future hire, who aren’t quite at the right technical level but are a great culture fit; we make sure we keep in touch with them and invite them back to interview for the role when their skills improve.

Sauvnish Bains
We are focused heavily on developing a strong company culture, ensuring the most positive...
WHAT RECRUITMENT STRATEGIES AND PROCESSES HAVE CHANGED OR BEEN IMPLEMENTED IN THE LAST 12-24 MONTHS?

Alyssa Faller
Here at Flybits, we want to demonstrate a strong Employer Brand and Culture. We want to ensure people feel like they are part of something bigger, happy, successful, and supported. Flybits has implemented our summer hours program to support mental health and work-life balance. Every 2nd Friday, the company will finish at noon; it’s received a great response and shows our employees we value them and their work-life balance. Employees appreciated the extra time off.

Sauvnish Bains
One of the biggest things for us in the last 12-24 months has been accessing a global talent pool and hiring international candidates. It’s given us access to some great talent and helped us build and grow the team. We also mapped out the candidate and employee journey to identify gaps and explore how we can improve and speed up our hiring process.

WHAT ADVICE DO YOU HAVE FOR FINTECH COMPANIES LOOKING TO ATTRACT AND HIRE TALENT IN AI AND DATA SCIENCE?

Alyssa Faller
Culture is not ping pong tables and free lunches. It’s how you engage with your work community, how these people work together and solve challenges. Leaders are essential to showcase work culture examples, but it’s also down to the individual. Culture is also the ins and outs of the organization. Its widely shared beliefs support the organizational structure and strategy - it’s how we speak to one another, how we work together, and how we demonstrate our vision and values.

Sauvnish Bains
One thing I would say is ‘to be as clear as possible when talking about an individual’s impact, the value they are going to bring to the team, and the development opportunities they will have’.

The HR function of tech companies has evolved past ‘compliance’ and is focused on people, culture, and employee experience. It’s a competitive market for these roles specifically, and as much as you need to focus on the candidate experience, it’s also critical to have a retention strategy built around employee experience that provides an environment for employees to succeed in, and grow and develop their careers.
Alyssa Faller
Each candidate interviewing with us has taken the time out of their day to participate in our Talent Attraction process and show interest in our organization. We also try to get feedback to people ASAP and ensure our interview process is informative, valuable, and timely.

Sauvnish Bains
We ensure we understand all the candidate touch points throughout the interview process through offer and acceptance. Providing detailed feedback to the candidates we interview is also important so the candidates know how they can improve and it also leaves the door open for us in the future to follow up with them and explore other opportunities. We value this time and have started to offer gift cards to candidates who make it through to the final interview stage but don’t get the job as a small token of our appreciation.
Spiros Margaris is a venture capitalist (Margaris Ventures), futurist, keynote speaker, and board member. He is a senior advisor to—and investor in—several companies in the fintech, insurtech, cybersecurity, healthcare, and AI sectors. Two of the fintech start-ups he has advised have become unicorns (valuations of over $1 billion).

Spiros is the first international influencer to achieve the “Triple Crown” ranking. In 2021, Onalytica named him The Key Opinion Leader in Fintech. That same year, MarkTechPost included him, for the third time, in a list of the Top Artificial Intelligence Influencers to Follow. In 2020, Onalytica ranked him as the No. 1 Global FinTech Influencer, while Refinitiv (Thomson Reuters) ranked him as the No. 1 Finance Influencer. In 2018, Onalytica ranked him as the No. 1 International FinTech, Blockchain, and AI Influencer.

Spiros has been a keynote speaker at international fintech and insurtech conferences and has also given a TEDxAcademy Talk. He published a white paper on AI, “Machine learning in financial services: Changing the rules of the game,” for the enterprise software vendor SAP. In 2019, he was the first non-IBM keynote speaker at the largest IBM event in Europe, held at the IBM Sys-

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TELL US ABOUT YOUR JOURNEY IN FINTECH AND AI

My exposure to fintech and artificial intelligence (AI) stems from my involvement in the fintech industry and my company investments. The financial industry as a whole (as well as, obviously, the fintech industry) increasingly deploys more and more sophisticated AI machine learning (ML) algorithms to better serve customers with personalized solutions. The industry also uses the power of AI for fraud detection and customer intelligence. I strongly believe that fewer and fewer companies will have the ability to compete successfully without the use of AI as part of their business plans.

To give my involvement in the AI space more flavor, I can talk about one of my portfolio companies, the cybersecurity startup Mediastalker.ai. Using Mediastalker’s AI/ML platform, they can instantly detect and stop audio-visual items that have been pirated. With their technology, they restore the value of a company’s media portfolio, which can be damaged by piracy. Thus, through medistalker.ai’s work, the clients strengthen their power, becoming better at negotiating media deals, securing their IPR’s revenue, and maximizing the IPR’s financial benefits. Mediastalker is determined to become the global leader in market share with their anti-piracy solutions for IPRs of media content; they already are the global leader in terms of technology.

TELL US ABOUT ‘MARGARIS VENTURES’

Margaris Ventures invests (or co-invests), primarily globally, in fintech and insurtech companies that have already shown strong business traction. By traction, I mean that the companies have demonstrated a strong customer demand for their offerings and very strong future growth. These days, I am involved in a much wider scope of industries than just the fintech and insurtech space, now including players in IPR media protection (as mentioned above) and healthcare; even so, fintech still holds the biggest piece of my portfolio. In my position as an investor, I often take the role of advisor to the founders I invest in because they also seek my fintech expertise and global network. This advisory role includes being a sounding board for the management, validating, for example, their growth strategy as well as also acting as a “coach” to the management.

AS A VC WHAT ARE SOME OF THE CHALLENGES YOU FACE IN CHOOSING A COMPANY FOR FUNDING?

One challenge is evaluating the future valuation potential of a startup beyond the potential hype of the market they operate in. As an investor, one can fall in love with the startup and its management but be blinded by the demand by other investors for the company, therefore overpaying for the promised potential. In my eyes as a VC, selecting a startup and determining which company to trust with your money is more art than science, though of course, most investors—including myself—do their due diligence and try to analytically evaluate the true value of a company by using the numbers at hand as well as an analysis of the market in which they operate and compete.

One important factor in our evaluation is the trust value we instill in the management. This means that we hope the startup will continue to execute as they did in the past, hopefully growing even stronger with the newly entrusted money. Of course, that kind of trust is a soft factor that is difficult to quantify, but as with all things in life, we rely on everything from facts, numbers, and experience to gut feelings and...
hope to make good investment decisions. In addition, we hope to also have a little luck in the process because there are many outside factors (such as seen with COVID-19 or any market correction) that we cannot control that can seriously impact our investments. Even so, I must add here that, regardless of what is happening in the market, good management should know how to deal with the situation and, at best, even win market share.

WHAT ARE THE BIGGEST AND IMPORTANT CURRENT TRENDS IN FINTECH?

The biggest trend, still in the beginning stages, is the rise of embedded finance. Non-financial companies provide their customers with financial offerings outside their core competency and what they are known for. For example, the retailer, Walmart, embeds fintech solutions to help them better contend with their competition, not to mention, more importantly, in my opinion, to provide even cheaper and better financial offerings for its customers than what they can find from banks and credit card issuers. Embedded finance is only just beginning; every non-financial company that is large enough and has a large enough customer base will be able to leverage fintech solutions to compete and collate their offerings.

WHAT DOES THE FUTURE OF FINANCE LOOK LIKE IN THE NEXT FEW YEARS?

As answered above, we will see more players wanting to seize a piece of the financial market cake. That will be difficult for some banks and fintech companies who will see profit margins and market shares come under pressure. Banks and fintech companies will not have the ability to compensate for lost revenues by selling other items like non-financial companies can and will do. The increased competition among banks, fintechs, tech giants, and non-financial companies will have a very positive impact on consumers because prices for financial services will fall as the competition increases; additionally, more offerings will be available, and more innovations will come.

PLEASE SHARE SOME MOVIES THAT HAVE INFLUENCED YOU THE MOST

I am a movie buff, and I love this question. I will name three movies that still inspire me and remind me of things often easily forgotten along our journeys as entrepreneurs, investors, and, most importantly, as human beings. These movies include in their stories essential elements that I believe are key to succeeding, staying human, and thinking of the less fortunate. In the end, we all want to make a difference; helping those who are less fortunate is a great start.

It’s A Wonderful Life (1946)
https://www.youtube.com/watch?v=iLR3gZrU2Xo

The Founder (2016)
https://www.youtube.com/watch?v=AX2uz2XYkbo

McFarland, USA (2015)
https://www.youtube.com/watch?v=j-VAOlIHE6Q&t=12s
In this interview Imtiaz Adam (Guest editor of Marktechpost AI Magazine) talks with Amy French (Director, Level39). Amy gives insight into Level39: what they do, the start-up ecosystem they support, and the impact they have on the fintech space.

Level39 is the most connected community for tech startups and scaleups, offering space, infrastructure, and ecosystem support to over 180 companies. Launched in March 2013, Level39 now occupies 80,000 sq ft in the iconic One Canada Square tower in Canary Wharf, providing its members access to high-quality space, facilities, and proximity to some of the world’s most influential financial services firms, investors, and corporates.

As a subsidiary of Canary Wharf Group, developer of the largest urban regeneration project in Europe, Level39 offers an environment and hub for fast-growth tech businesses in Canary Wharf. Since launching, Level39 has been home to some of the most ambitious and innovative businesses in the tech sector. It offers flexibility and scalability to its members, enabling them to grow from a team of one, to a team of thousands, all under one landlord.

Recently, Level39 has worked alongside partners such as Innovate Finance, Code First Girls and InChorus, to support industry initiatives and events that champion its ecosystem. This year, Level39 hosted Innovate Finance’s ‘Fintech as a Force For Good’ forum, provided space and support for Code First Girls coding courses and 2021 CodeFest conference, and joined the launch and Steering Group of InChorus’ Fintech For All Charter.
Level39 member companies operate across a variety of sectors including fintech, cybersecurity, smart cities, and more recently, life sciences and medtech. The community consists largely of fintech businesses, developing solutions within payments, wealth management, trading, and financial wellbeing and inclusion, many of whom join Level39 to engage with the corporates and financial services firms on their doorstep in Canary Wharf. Level39 also offers its members access to a wide network of mentors, investors, and partners working across its tech verticals, to best support their growth and help navigate the large corporations.

Level39 is an **Endorsing Body** for the Startup & Innovator visa routes via the Home Office, offering opportunities for tech entrepreneurs to establish and grow their businesses in the UK and London.

We are proud to be home to many inspiring leaders in tech, including globally-recognized scaleups such as **eToro**, **Bankable**, **Datatonic**, and more. Our alumni include cyber security and digital risk management business, **Digital Shadows**, and international challenger bank, **Revolut** – both who joined Level39 with a handful of staff in 2013 and 2015 respectively, quickly scaling out of Level39 and transitioning into larger, self-contained HQs in the wider Canary Wharf Group portfolio.

Canary Wharf Group is the largest sustainable developer in the UK and has publicly announced its **pathway to Net Zero Carbon by 2030**, which as a subsidiary, Level39 actively contributes to. Sustainability is in our DNA as a business and as we look ahead to our community of the future, it will be exciting to see how sustainability intersects with the growing tech community of Canary Wharf. Several of our members are actively engaging in the Net Zero agenda, including **Utilidex**, **Unifi.id**, **Green Wallet and NeuralRays AI**.

In recent months, we have welcomed Life Sciences and MedTech to Level39. Level39 houses companies such as **NetScientific** and **Congenica**, and recently **welcomed the Lt. Governor of Maryland to Level39**, discussing the Life Sciences agenda of both cities and the future of the sector.
Imtiaz Adam, founder of an AI startup, Deep Learn Strategies Limited (DLS). MSc, MBA. Studied Computer Science with a focus on AI. Prior experience at Morgan Stanley, BHP Billiton, American Electric Power (AEP), and National Grid Group.

YOU POSSESS A DIFFERENTIATED BACKGROUND IN RELATION TO AI. HOW WOULD YOU DESCRIBE YOURSELF?

I would describe myself as a hybrid Data Scientist and business strategy / corporate strategy professional. My experience combines advanced analytics, modelling, deal structuring and negotiations, advisory, Investment, trading, marketing and strategy formulation, and implementation. My broad-based background covers finance, statistical modeling, Machine Learning, marketing, and also law. There is an increasing need to be able to blend the AI side along with the business and legal aspects. To bring Machine Learning into production environments at scale (in areas such as FinTech) where regulation is a key aspect that one must be aware of.

I am able to act as a bridge between the Data Science and business teams and implement Machine Learning projects that deliver on the Return on Investment (ROI). A substantial amount of my work has been with the Environment Social and Governance (ESG) and policy side too. Moreover, I was working with ESG and applying analytical approaches to the sector way before it was fashionable.

Furthermore, I served as founder and served as global head of the Carbon Trading and Climate Finance business at Morgan Stanley where I played a role in pioneering Green Bonds, structured debt, and Principal Private Equity investment into the clean infrastructure area.
In relation to Artificial Intelligence (AI), I studied across the spectrum of AI from Symbolic Logic, Machine Learning, Evolutionary Algorithms, Bayesian Networks to Deep Neural Networks.

I was also able to attend an extra elective in IoT and mobile services whereby I learned about Edge Computing and 5G and my team and I have worked with AI on Edge Computing with mobile as well as with the NVIDIA Jetson and Xavier too. I strongly believe that the convergence of AI and IoT enabled by standalone 5G networks will drive a great deal of innovation across FinTech, AI, and all sectors of the economy this decade.

In the past, we undertook projects across the retail, marketing, healthcare, and manufacturing sectors. This was all a great experience to learn about the different approaches and problems that we face in Data Science and how to create solutions for them.

Our focus now is on Climate Finance.
We are branding the platform as Deep Alpha Strategies (DAS).

We deeply reduce costs for issuers of green finance and deeply increase the value for the investors. We have built our own end-to-end platform that entails the HyperLedgeder Blockchain platform to tokenize green finance and hence reduce the costs of issuing as well as the ability to create a secondary market. This in turn will allow for asset managers to create diversified portfolios. We also apply state-of-the-art AI (Machine Learning, Deep Neural Networks, Knowledge Graphs, and Graph Databases) towards Natural Language and Time-Series. We enable asset managers to understand the market and manage their risks whilst seeking to maximize returns from portfolios that exclude fossil fuels.

Following COP26 UN summit, our policymakers around the world have a stated aim to shift financing away from fossil fuels and into an energy transition with renewable energy investment set to scale massively. There is also the need to undertake substantial investment across other sectors such as transportation, agriculture, and water infrastructure. Given that many of our economies are struggling with the impact of the Covid crisis there is a real opportunity to drive an economic recovery with next-generation technology that may also align with ESG objectives.

The numbers are vast. McKinsey quotes the IEA with a projection that US$4.4 Trillion per annum of investment is needed for multiple years to hit the decarbonization targets. Microsoft commissioned a report via PWC that set out that we could achieve the following by applying AI to energy, transportation, agriculture, and water by 2030:

CAN YOU EXPAND ON THAT?

HOW DO YOU DO THIS?

WHY CLIMATE FINANCE?
• 38 million jobs increased by 2030, an increase of 1%;
• US$5.2 Trillion GDP growth, or 4.4% growth;
• A reduction in GHG emissions of 4.4% or 2.4 Gigatons CO2 equivalent that is equivalent to the projected GHG emissions of Australia, Canada and Japan combined annually for 2030.

At the same time, we are on the verge of the standalone 5G network revolution that should start to scale over the next few years, in particular 2022-2025.

Accenture strategy team have set out that 5G technology may result in vast economic growth across the US with the creation of 3 million jobs. In 2021 BGC forecast that 5G will create 4.5 million jobs and US$1.5 Trillion of GDP growth across the US this decade.

AI technology alongside standalone 5G networks will drive the combination of AI meets the Internet of Things (IoT) whereby we will experience the AlOIoT that will, in turn, spur a period of rapid innovation across our cities, homes, workplaces including financial services and also enabling a great deal of opportunity to displace old inefficient plants with new, more efficient and clean technologies with reduced carbon footprints.

WHAT IS THE FUTURE EVOLUTION OF FINTECH AND AI OVER THE NEXT FEW YEARS?

As mentioned above Climate Finance and ESG related activity will be key to the sector going forwards.

Furthermore, I believe the following will trends will be key drivers:
• Embedded finance will continue to scale (the rise of invisible, frictionless financial services);
• Federated Learning with Differential Privacy will be increasingly important in the era of the Metaverse, 5G enabled glasses, and the FinTech sector to enable the scaling of Machine Learning whilst protecting data privacy;
• The interface will change from mobile phones to 5G enabled glasses technology with Mixed Reality technologies working as intended with standalone 5G. Augmented Reality, Extended Reality, Virtual Reality struggle with the latency of 4G networks. We’ll have new experiences, services, and solutions at the limit of our imagination;
• The above will occur in the Metaverse and across the AIoT;
5G enabled glasses fused with AI capabilities across the Edge (on the device) will become our digital interface across FinTech and other sectors.

This will not only be for retail including e-commerce and gaming but also the business enterprise sector. For example, one will be able to do due diligence and review a holographic 3D model of a renewable energy plant and its associated financial and technical parameters. One will be able to call on an AI-enabled virtual agent to assist in the process of explaining technical financial products including 3D visualizations of how the product and service will perform in terms of risks and returns. Language as a barrier will increasingly disappear as Neural Translation will be applied in near-real-time enabling productive business negotiations across the world.

We are about to go through a period of change in financial services and indeed our entire economy and society will be greater than the past cumulative 200 years compressed into less than a decade.
Marktechpost welcomes Imtiaz Adam onto our Chief Advisory Board and as a guest editor and article author for the Marktechpost AI Magazine. Imtiaz brings a broad-based experience that spans AI and Data Science, business experience that ranges from marketing to finance, law school, and an ESG background.

Imtiaz joined Morgan Stanley as an Associate and was then promoted to Vice President and Executive Director in less than two and a half years as he built the Carbon Trading and Climate Finance business. Imtiaz has worked with big data sets and advanced analytics in the energy sector over an extensive period.

Imtiaz is very committed to diversity and ethics in AI as well as the potential for AI to align with and promote ESG causes, including the societal need for advancing healthcare, education, and skills training. Imtiaz is an advocate for more women in Tech and Data Science. For example, during the Covid Lockdown in the UK, he mentored and trained eighteen Data Science students via online video sessions and coding projects. Twelve (2/3rds) of the group of aspiring Data Scientists were women.
RANKED AS LEADING AI INFLUENCER:

- Marktechpost.com 2021;
- Ipfconline.com placed 7th most influential in Digital and AI 2021;
- Onalytica Who’s Who in AI 2021;
- Industry Wired AI influencers to follow 2021;
- Engati AI Influencers to follow 2021;
- Analytics India Magazine 2020;

SENIOR MANAGEMENT, BOARD & ADVISORY POSITIONS PAST & PRESENT:

- Founder Deep Learn Strategies Limited, DAS;
- Co-Founder TEESG;
- Founder, Global Head Morgan Stanley Carbon Trading & Climate Finance;
- Advisor to UK Government via Capital Markets for Climate Initiative (CMCI);
- Advisory Board Newcastle University Law School;
- Board of Directors International Emission Trading Association (IETA);
- IETA Chair EU Emissions Trading Group;
- IETA Chair Green Bonds and Climate Finance Working Group;
- Climate Bonds Initiative Advisory Panel;
- Co-Founder and Vice President European Carbon Investors and Services (ECIS); International Carbon Investors & Services (INCIS) merged with CMIA;
- Board of Directors MGM International LLC via Principal Private Equity investment;
- Board of Directors Morgan Stanley Clean Development LLC.

Extensive experience across analytics and modeling, marketing, and business development including renewable energy at BHP Billiton, American Electric Power (AEP), and National Grid Group including working on a US$3.2 Bn acquisition financing deal, sub-sea power cable project financing, convertible bonds, derivatives.

SPEAKER AT MAJOR EVENTS INCLUDING:

- During WEF in Davos 2019 on a panel on AI;
- Delivered guest lectures on AI at London Business School to the MBA students;
- Wonderland AI Summit 2021;
- Canadian Artificial Intelligence, Machine Learning Data Science Engineering (CAMDEA) AI Mastermind 2021;
- CAMDEA AI & FINTECH 2021;
- IEEE Canada AI Session 2021;
- AI for FinTech, Financial Executives Network Group (FENG) Houston 2021;
- World Show AI & RPA Dubai, MENA 2021;
- AI Berlin Meetup (2020);
- AI for Finance, Paris, France, (2019, 2020);
- FinTech Summit Bordeaux, France (2019);
- World Show AI & 5G Doha, Qatar (2019);
• Global AI and RPA summit Berlin (2019);
• AI & Analytics Amsterdam (2019);
• AI World Congress, London (2019);
• Six United Nations Conference of the Party (COP) summits at Business NGO sessions;
• Capitol Hill Washington DC, USA to 39 cross party Senators on Climate Change;
• UK Parliament, House of Commons Energy & Climate Change Select Committee expert witness testimony on Carbon Trading & Climate Change;
• BM&FBovepsa (B3 S.A.), Sao Paolo, Brazilian Stock Exchange on Climate Change, Solar Power & Wind Power investment;
• International Energy Agency (IEA) on Climate Finance and Carbon Trading;
• OECD Catalysing Investment in Low-carbon, Climate-Resilient Growth;
• Inter-American Development Bank (IADB), Green Bonds & Climate Finance, Santo Domingo;
• Shanghai, China, Wind Power Conference;
• Development Bank of South Africa (DBSA), Johannesburg on Green Finance;
• Finextra, Finexpo London - Green City Speaker.

SPEAKER AT MAJOR EVENTS INCLUDING:

• Marktechpost;
• BBN Times;
• KDnuggets;
• CNN, Al Jazeera, Channel News Asia television;
• WSJ, Fortune Magazine, New York Times