Bringing clarity and colour to reconciliations

With artificial intelligence and machine learning maturing rapidly, the number of use cases in financial services is rising. We caught up with **SmartStream**'s Chief Technology Officer, Andreas Burner, to discuss how reconciliations have jumped to the top of the tech agenda, how AI can support the most complex aspects of processing, and what the firm's Innovation Lab is cooking up next

Recent developments in deep learning have caught the eye. Literally. They're potentially transforming the way film and TV programmes are created, enhanced and experienced.

BBC researchers are currently experimenting with generative adversarial networks – setting two artificial neural networks against each other in an attempt to turn grey scale into awesomely realistic colour. As each algorithm learns to up its game against the other, the image is colourised in a matter of seconds – a process that would take hundreds of artists, working frame by frame, weeks to achieve. It's not that it can't be done, but the time and cost are prohibitive for most projects. The obvious application of this

gladiatorial machine learning technique is in enhancing old movie footage where much of the detail is lost in monochrome. But it's the future ability for viewers to use Al to customise their experience that's really exciting.

So what's this lesson in movie making got to do with financial services? Well, SmartStream is intent on using AI and specifically machine learning to achieve the same jaw-dropping speed and accuracy in financial services – metaphorically colouring in the missing elements in data to give firms a realistic picture of their liquidity in real time and, potentially, transforming their business with as yet unknown applications.

Al has matured to the point where it can be widely deployed to address some of the most problematic aspects of data processing, such as reconciliations, which involve multiple parties and countless daily transactions. To give an idea of the volume of processing that requires, one major SmartStream client bank alone handles \$4trillion a day.

Even before COVID-19 knocked the business world sharply off course, simplifying the complex reconciliation process was becoming a big priority for financial institutions. The pandemic has only added to the number of electronic, low-value transactions that need reconciling. In the past banks, have written off many of these small-value bad recs because it's just too time consuming and costly to investigate them properly. They need help and SmartStream's innovation labs are delivering it.

Crosshead to break copy In September 2019 at Sibos in London, SmartStream unveiled SmartStream AIR, a Cloud-native, AI-based reconciliations platform – the first market-ready product to come out of its Innovation Lab in Vienna.

AlR solves a number of problems. Given that it's a Cloud-native and Cloud-hosted platform, new users can be up and running on the system within minutes of setting up a profile and receiving their login details. It then enables them to manage their reconciliations on an ad-hoc basis and provides accurate results quickly. Very quickly. Processes that would typically have taken days or even weeks can now be managed in under 10 seconds.

The Lab is staffed by a multidisciplinary team of highly trained mathematicians, applied data scientists and computer scientists, led by SmartStream's chief technology officer Andreas Burner.

"AIR is a Cloud technology, so it's quite easy to roll it out. Firms just subscribe to it and they can get full access within an hour," says Burner. "These days, with COVID-19, it's pretty tough for organisations to purchase and install hardware, because people are just not on site – they are working from home in many cases. We didn't anticipate that, of course, but in the times we are living in, it's actually the optimal solution for organisations that quickly and easily want to verify their data."

Once access is granted, SmartStream

The full picture: "We take a holistic appr says Burner AIR automatically configures the system, ready for a new user.

"Within seconds, AIR understands how columns belong to each other, what the values are, where the reference dates are, and so on. We've reduced it to just uploading files and getting an immediate result," says Burner.

SmartStream's Al doesn't have a binary black and white (bad/good) view of data. Like the movie making algorithms, it uses its catalogue of learned experience to identify where the nuances are missing and then paints in the detail to create a vivid picture. In the event that a reconciliation has to be processed manually because of an incomplete data set, SmartStream's Al reviews the manual matches and learns patterns within the data to identify the appropriate broker, counterparty, or department. This is already in use with one major client where it's had an immediate and significant

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impact on manual matching. It has reduced cost across some of the organisation's business lines by up to 50 per cent.

"We are running a proof of concept for one bank that is having problems with the quality of its data – either data is missing, or perhaps brokers delivered bad guality data," says Burner. "We have implemented one of our machine learning libraries to try to identify everything that is missing and retrieve it from other systems. You cannot imagine how successful that is. It's such a simple thing, but when the workflow of the bank is huge, having that pre-process means everything, from then on, is straight through, with less manual touchpoints for users and much more quality for managers. It's really impressive."

ARTIFICIAL INTELLIGENCE

Burner also believes in the importance of ensuring that data is neutral, removing any inherent bias, but this is a work in progress – in financial services and beyond.

"Data neutrality is one of the critical subjects in machine learning and AI," he says. "This is because machine learning and AI learns from data, and that data typically comes from humans. So, if that data is biased, the machine learns from that."

The old programming watchword 'garbage in, garbage out' carries added weight these days.

"It's important to understand how AI and machine learning decides, on what basis, and then to remove the bias from that data. Really objective criteria is needed in these troubled times," says Burner.

Exploring the use cases

While AIR is SmartStream's most obvious application of AI and machine learning, it's certainly not the only SmartStream business unit benefitting from the Innovation Lab's ground-breaking work. Ensuring that each of its offerings maintains its focus on solving users' problems is central to the team's product and services strategy. This makes a lot of sense. According to Gartner, by 2022 only 15 per cent of all AI projects will be successful. Many AI systems are coming to market, but they don't always meet the use case and provide a return on investment.

So, what else is Burner and his Lab team working on to cure the industry's headaches? One area of acute focus is the ongoing struggle around managing unstructured data. SmartStream is working on adding support for unstructured files – emails, PDFs, and large volumes of payment messages – which continue to trouble capital markets firms. The processing of this unstructured data is a complex and manually-intensive task, especially for larger institutions, which typically employ hundreds of back-office professionals to address the challenge.

SmartStream's TLM Reconciliations Premium is a platform used primarily in the back office to ensure the accuracy of information flowing between systems and to identify risk and breaks in the process. It uses Al in several ways, one of which is to automatically improve data quality as it loads into the system. Through supervised machine learning, TLM enriches data using information from previously resolved breaks. Data patterns are analysed to identify the best department or business entity for investigation. This process can significantly improve break resolution efficiency as the trade is presented to the optimal business entity first.

"What we're seeing is that the number of transactions is continuously going up. All banks, and many of our customers, have really big problems in terms of coping with this," says Burner.

"Al and machine learning can help them if we specifically define tasks that are really simple for it to do, but which, at the moment, banking staff are doing throughout the day. With reconciliations coming in, when there are breaks, who is following up on them? When there are exceptions, who is processing that? A simple transaction comes in and it needs to be allocated to a person or to a group. Does that data belong to you

You don't just want a data record. You want to know when it comes in, what the quality of the record is, who works with it? We want to increase the quality of the data by taking a holistic approach

or to me? Is it based on currency? US Dollar goes to you, and Euro goes to me. That is the kind of thing that AI and machine learning can simply take over. If you replace these very simple tasks with AI, you can make really good savings and efficiency gains. The workflows are much quicker because it's straight-through processing if you have AI doing the allocations."

Managing the process

It's not just SmartStream's product suite that's being boosted by advances in AI; SmartStream Managed Services is another business unit drawing on machine learning to further enhance its proposition. Many clients have their own technology teams who manage the TLM product, for example, but SmartStream's Managed Services offers them an attractive alternative that taps into the company's considerable expertise. And it's been able to manage a lot of the processes that would have been performed by people in the past through the introduction of Al. By taking over the complex configuration of products, it reduces time-to-market and much of the manual effort involved in delivering a solution to clients.

Ultimately, Burner sees AI and machine learning as a fantastic way to mitigate risks, something not in short supply in the post-COVID economy.

"What a reconciliation really does is reduce a risk for an organisation," says Burner. "And you want to identify any risk as quickly as possible.

"These days, the big companies have data lakes, where all the applications store their data, and those data lakes have a lot of control points. Whenever an application writes data to that data lake, you need to ask 'is there an exception already or is that a valid transaction?'. To illustrate, when you go to an ATM, to get money, and something happens at the ATM, it's so beneficial for the bank to understand, at that very moment, what's happened - not an hour later, when it hits its books. You want to have it as guickly as possible. With our products, because they're so easy to set up, they're the perfect tool to have a lot of control points throughout the organisation. And the more control points you have, the less risk, and the earlier you identify it.

"That's our ultimate goal. To really make it simple to have those control points, everywhere in the organisation, that automatically detect any exceptions or disputes."

Burner returns to the filmmaking analogy. "Based on the picture and how it is moving, AI is identifying that, for example, certain waves have to be blue. So, it's correlating the movement with the colour that this particular grey needs to be. It's a good example of machine learning and AI not taking the direct approach. It's not just looking at the grey, and trying to colour it; it's getting much more information around it to identify the right end result. That is also what's needed in the banking world. You don't just want a data record. You want to know when it comes in, what the quality of the record is, who works with it? We want to increase the quality of the data by taking a holistic approach."