

AI LED, REAL TIME RISK MANAGEMENT



An introduction to potential benefits of implementing the AIRE platform across existing NHS data sources, and the possibility of real time individual patient risk management.

A FEW THINGS ABOUT EITX

Background

In 2016, the largest motor insurer in the UK was looking to take the next step in their fight against motor claims fraud. Already established as the industry leader, they had approached all the established providers of fraud prevention and detection solutions, but nothing was more advanced than their existing capability.

A fortunate meeting with Dr Stefan Blackwood of Eitx led to the creation of the AIRE Platform, and a 2x improvement in their system driven detection rates. The solution was developed in 3 months, produced a return in 20 minutes and won an industry award for innovation.

Having signed an exclusivity agreement for personal insurance in the UK, the same technology has now been proven in Israel, outperforming all the industry suppliers - in fact, it was the only solution able to handle Hebrew and the complex insurance structure that exists in Israel

The Insurance Fraud Problem

Motor insurance fraud costs the UK an estimated £2BN a year, adding +£50 to the average car policy.

Over the life of a claim you build up a large portfolio of information about who, when, where, why and how, but you start with very little. Each new piece of data needs to be considered on its own merits, and in conjunction with everything you already have - and not just for this claim, but for every claim you have ever had! This picture can develop

over several weeks or months, but it may be the very last piece of data you get that highlights the risk of a fraudulent claim.

The problem is further complicated by the reality that fraudsters are constantly changing and evolving to avoid detection. However, by combining cutting edge predictive models with our bespoke Machine Learning capability, we have been able to identify potentially fraudulent claims more quickly, and with better accuracy than the other solutions in the market.

Like motor insurance risk, identifying medical risk is complicated and requires an understanding of multiple factors in real-time, along with their inter-relationships, to build a complex picture of emerging risk. Data is king, and being able to access any data that is available, regardless of source, becomes a critical success factor.

The potential benefits of successfully bringing together all available data sources and historical outcomes into one single patient risk assessment are numerous and well understood, and yet the prize has always been beyond current capabilities and budget

Imagine improved treatment outcomes if when treating a patient, you had access to properly filtered data having undergone a full actuarial review - not just from your Trust, but meaningful data on lifestyle and social care, enabling a much more holistic treatment response. Imagine the assessment of risk developing in realtime as new data becomes available at the finger tips of every medical practitioner.

The AIRE platform - How it's different, Why it's better

Imagine the cost savings possible if you had the ability to schedule resource in line with emerging risks and demand.

Imagine if all the data available within the NHS was put to work to improve the NHS

The technology and knowhow required to do this is available today and accessible at much lower cost than large corporates would want you to believe.

WORKING TOGETHER WE BELIEVE WE CAN UNLOCK NEW INSIGHTS

The Data Challenge for the NHS

Over time, the NHS has built up a complex technological infrastructure, with new systems layered upon old creating ever increasing technological friction and data barriers.

The resulting fragmentation of data, with information distributed among countless legacy systems, makes robust analytics and insight generation extremely challenging. Apart from the constraints this puts on using data to build predictive capacity plans, reduce costs or improve efficiency, it also creates a significant obstacle to utilising the latest developments in Machine Learning and Artificial Intelligence (ML/AI)

To improve outcomes and achieve a truly integrated, multidisciplinary system of care, the NHS must either find a way to bring all its data sources together to build a single effective data lake, or utilise technology that is able to work across all these systems - the latter being the less disruptive and ultimately cheaper solution

The AIRE platform was specifically designed to cope with missing, dirty and erroneous data - it absorbs the data debt you have and doesn't ask for data in any specific format. If data is

missing the system compensates, if data is corrupt, the system will ignore it and carry on.

KEY ELEMENTS OF OUR SYSTEM WORK TOGETHER TO CREATE A UNIQUE CAPABILITY

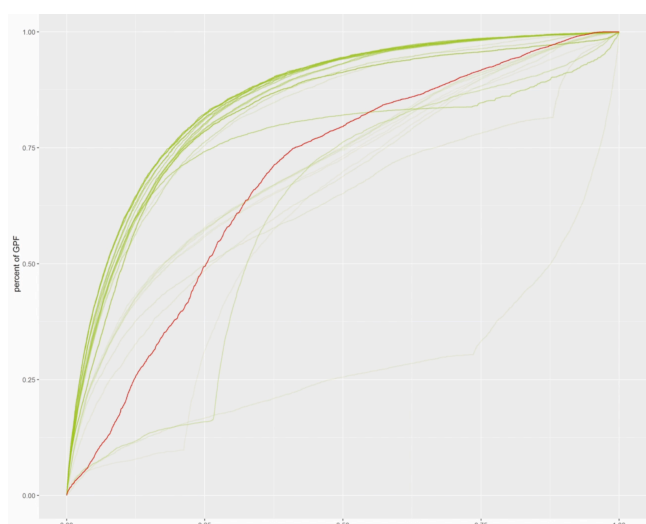
AI at the Heart of the Solution

Whilst AI should never be positioned as a 'silver bullet', it brings the ability to constantly optimise performance even when using complex analysis of rapidly changing environments

Our AI approach has been developed entirely in house specifically to meet the challenges of emerging risk in complex data sets.

Each element of our solution is 'tuned' in near real time to take account of all the latest available data and performance outcomes.

When combined with ReTiNA®, our Real Time Network Analysis capability, we are able to build a range of predictive models that can be applied to everything from clinical outcomes to administrative insights; able to combine historical data with real time events to give the very best view of emerging risks - automatically tuned through Machine Learning to ensure the best possible insight



The green lines show the system 'hunting' performance improvement against the bench mark (red line)

Where we see opportunities to apply the technology within the NHS

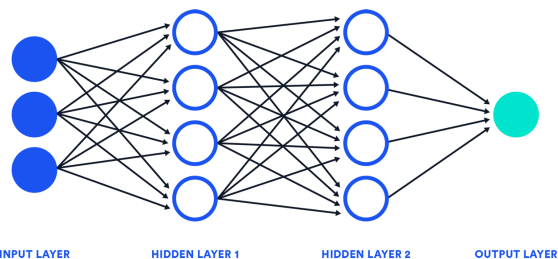
It would be impossible for a rules based system to be able to track and respond to changes in treatments within the NHS, but a system with Machine Learning at its core would be more than capable to monitor these and optimise outputs in real time

Transparent Neural Processing

The use of Neural Networks when looking for patterns in large data sets isn't new, and they are very useful components of any solution, however, they also have some challenges when it comes to auditing results. Typically, this approach is referred to as a 'black box' because whilst the scores they produce are useful, it is nearly impossible to understand how the score was created. In areas where personal data is prevalent, this approach can be a problem when trying to prove an absence of racial, gender or age bias for example.

Our Neural Networks have been developed to be as useful in terms of results, but fully auditable when it comes to understanding how a score was calculated. This also gives us a unique ability to combine our risk ratings with a Plain English reason as to why any risk have been highlighted or referred.

Within an NHS setting, this would enable us to give very clear explanation as to what risks have been identified, and what the key drivers of any referred risk might be. In this way, we are quickly able to turn risk ratings into actionable responses, whilst still leaving the practitioner in control.



Typical Neural Nets are not 'auditable', producing a score without an accompanying explanation. Ours is Transparent and provides plain English reasoning

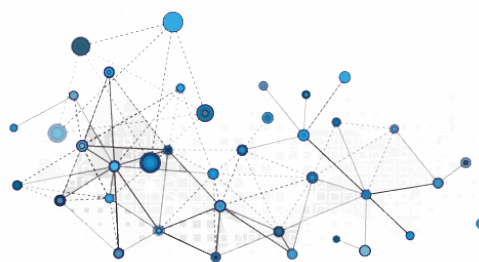
Probabilistic Graph Networks

Knowing how people, events and data relate to each other is a very powerful analytics and visualisation tool, identifying inferred risk by association, and clusters of potentially risky activity/relationships are required capabilities when assessing risk in very large organisations.

Our solution takes this approach a step further by not just identifying where links exist, but by assigning each of these links specific risk probability based on all known outcomes. This approach is mathematically complex but we have developed a methodology that means we can not only do it for large networks, but we can also do it in near real time.

By taking this approach, we are able to differentiate between a link that may be an email (strong) and a link that may be an address (weaker as people move) This can significantly reduce erroneous referrals and enable better stratification of risk

Within the NHS this would ensure removal of background noise in data, and facilitate focus on the things that clearly matter within the risks being considered



In today's connected world, connections are common, the challenge is to understand which are important

Proposed approach for delivering a POC

Ability to digest existing data without the need to sanitise

Data is the fuel required to make optimal, evidence-based decisions. Having any portion of your data assets removed from your analysis will inevitably result in sub-optimal outcomes. At Eitx, we take on your historical data debt, and create the interfaces required to bring the data you have, straight into our system as it is, without the need for you to sanitise or update what you already have

Removing this barrier allows POCs and projects to move on more quickly, and establish early wins that can fund further progress

Proof of Concept (POC) Trial

For any project to prove its utility there needs to be a POC. The extent and duration of the POC will depend on us gaining access to meaningful amounts of data to prove the utility of an AI approach. This in effect means large amounts of data that human operators could not meaningfully analyse, model and interpret in acceptable timeframe without considerable errors.

If the USPs outlined above are of interest to the NHS then the next action would be to examine the feasibility of a POC. Our workflow for a POC would generally follow the format below:

- Phase 1 - Developing a Statement of User Need and building Key User Requirements
 - This would happen over 2 x key stakeholder workshops
 - Phase 2 - Development of POC systems requirement and developing measures of effectiveness
 - Phase 3 - Supervise data and calibrate performance specifications
 - Phase 4 - Run 1st trials and review interim results
- Test and adjust data supervision and performance specification as a result of early findings
 - Run 2nd phase trial of the system and develop POC performance report
 - The report will cover the key finding and outline an indicative systems specification for an Initial Operating Capability of a working system
 - This report will outline indicative costs and implementation contingencies and dependencies