Arya.ai

WHITEPAPER

DEEP LEARNING IN INSURANCE

DRIVING TRANSFORMATION TO THE NEXT-GEN

AI and deep learning technologies in insurance - applications, use cases and adoption guide

INTRODUCTION

The adoption of data analytics in insurance is not something new, and many companies have already embraced analytics technologies. More recently, the past few years have seen Artificial intelligence and machine learning begin to transform core insurance processes. The growing use of these technologies has taken center stage also because products and services based on the concepts of AI and deep learning offer more personalized experiences, lower operational costs, and help drive revenue expansion.

This whitepaper explores some of these use cases, applications of AI and ML technologies and provides guidance for adoption of these technologies.

ARTIFICIAL INTELLIGENCE IN INSURANCE

Data analytics and allied technologies study data and draw patterns from it. Artificial intelligence goes a step further to arrive at conclusions, understand concepts, self-learn and also interact with humans.

The ability to learn from historical data, and continually relearn via a feedback loop with current data as an input, all towards better predicting future outcomes - is the fundamental pillar of every insurance company. The Artificial Intelligence (AI) framework is a collection of several related technologies such as:

- **Big Data Analytics:** Use of advanced analytic techniques against very large, diverse data sets in different formats, different sources, and in different sizes
- **Natural language processing:** Programming computers to understand, interpret, and respond in written text or speech
- **Machine learning:** An approach to realizing AI by training computers to identify patterns in data and/or predict outcomes
- **Neural networks:** Algorithms that mimic the human brain which can identify, classify and analyze diverse data, and can find patterns from complex data
- **Deep learning:** Branch of ML which comprises self-learning models that can draw conclusions from data, and solve problems without being trained

All these frameworks have a significant advantage in speed and accuracy over the statistical modelling tools usually used by insurance companies. This edge that AI provides can transform business models of the insurance sector.

DEEP LEARNING FOR ENHANCED DATA INSIGHTS

Often, insurers club the concepts of machine learning (ML) and deep learning under the AI umbrella. It is critical to understand that deep learning goes beyond traditional machine learning towards emulating the human mind. It is highly complex and data-centric; however once deployed, deep learning can help analyze structured and unstructured data to recognize patterns and behaviors, and help with informed decision-making.

Moreover, the “Digital customer” behaviour has changed drastically, expecting on-demand, seamless digital experiences in all aspects of their life.

These new data streams combined with decreasing cost of storage/ computing can help derive customer insights that can be monetized across various aspects of the insurance value chain. Thus, deep learning has the potential to revolutionize almost all functional aspects of the insurance industry and provides a compelling incentive for insurers to remain invested in technology.

AUTONOMOUS LEARNING SYSTEMS: INNOVATIVE OPERATING MODELS

The current workflow tools and applications learn in a unidirectional manner, and hardly gain anything from 'feedback'. With growing complexities in data and dynamicity in behaviors, the systems need to adapt and learn along with the users.

Once the system is trained, the AI algorithms can optimize themselves through continuous learning (interrupts and triggers). Smart platforms can reduce the time to re-train the algorithms and leverage the efficiency of the system within shorter periods.

DEEP LEARNING IN INSURANCE: MOST COMMON APPLICATIONS

Overall, insurers have started introducing AI in the following areas:

Customer discovery and acquisition
Intelligent algorithms can analyze the digital-trail of transactions to identify prospective customers and specific aspects of their lifestyle that can be insured

Sales and Marketing
Predict customers who are likely to churn, offer tailor-made products and services, cross-selling/ up-selling

Operations
Automatically analyzes insurers' unstructured data using NLP techniques. The verification and assessment of the large amounts of data can be automated to identify patterns. A pattern recognition algorithm can help insurers make informed decisions faster and also to identify fraudulent claims. The DL/AI technologies can drastically reduce the time taken in claims processing.

Underwriting
Insurance practitioners traditionally categorize customers into groups to which a risk assessment and associated pricing is applied. As AI/DL technologies lend insights at a truly personal level, the pricing and risk assessment can be unique to each individual policy, leading to personalized underwriting.

Regulatory and compliance management
AI applications can address common challenges and issues that compliance officials face regularly. They have the potential to increase effectiveness and efficiency of regulatory compliance programs. Most common applications of AI are seen in reducing false positives, addressing human errors and lowering compliance costs.

Audit and loss control
AI models can compile large volumes of data and automatically recommend enhancements of important controls, detect failures in real-time and take corrective action. The technologies can also automate repetitive tasks, identify hidden patterns of fraud and create red flags where mandatory processes were bypassed.

DEEP LEARNING IN INSURANCE: USE CASES

Autonomous Underwriting Module

Arya.ai's AUM was deployed at one of India's largest private Life insurance companies, to support new business with faster underwriting responses, and ensure higher policy counts without increasing underwriting expenses or impacting claims performance.

Outcomes

- 46% Automation of current manual underwriting in addition to current rule engine processed cases
- 44% Reduction in TAT from sourcing to issuance
- 48% Improvement in UWs productivity with assisted case assessment on complex cases
- 18% Improvements in channel conversion ratios

Underwriting

Automated Claims Processing

We deployed ACP module at one of the leading general (non-life) insurers in India, to work as an intelligent claims assessor, to streamline the claims process, standardize decisioning and deliver a superior customer experience, while maintaining consistency in decision quality.

Outcomes

- 63% of claims are now processed nearly instantaneously for cashless channel
- 30% reduced cost in claims processing
- 72% reduction in overall TAT in claims processing
- Observed reduction in claims leakage

Claims

Decision Audit Module

A leading health insurers in India partnered with Arya.ai, for leveraging DAM to automate the claims audit of TPA decisions, identify errors and leakage at claims processing.

Outcomes

- 100% claims pool auditing within few minutes saving more than 5192 man hours per month
- 3.5% pool raised for further questioning due to decision errors or high variance in amounts
- Standardized decisioning to eliminate inconsistencies in claims decision making

Audit

Claims Fraud Monitoring

One of the leading Private General Insurance Business in India implemented Arya.ai's CFM module, to increase fraud monitoring coverage, efficiency and improve ROI of the investigation process. Objectives also included adapting to newer fraud trends without human intervention or inputs.

Outcomes

- 54% increase in value of frauds prevented
- 70.27% improvement in hit ratio with limited iterations
- 43% reduced cost to find a rupee fraud
- Autonomous evolution of CFM to handle new fraud patters

Fraud

KEY STEPS TO FULL SCALE ADOPTION OF AI

Getting new initiatives off the ground has never been easy for insurers. Insurance companies have traditionally operated in silos, adopting proprietary software and following stringent data security practices. While adopting a new technology, an organization may often overestimate its benefits and, at the same time, underestimate the prerequisites for its success.

To open the door for AI initiatives, insurance companies must ensure systematized coordination between people, processes and technology to leverage the benefits of machine learning and AI.

However, insurers have to invest in technology today, and reinvent their business to remain relevant in future. Industry leaders must pursue strategic long-term growth over short-term maneuvers. Driven by this imperative, some insurers have opened up their data sets and partnered with startups to explore the benefits of AI.

It might take a while for the new framework and technologies to mature before delivering a handsome Return on Investment (ROI). The only way to validate this premise is to put it to test.

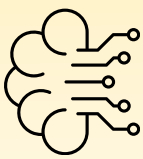
6 Steps

Rapid expertimentation

Generating/gathering training data sets

Strategic growth vs short-term benefits

Creating internal competency and resources



Enabling a man+machine ecosystem

Investing in smart tools

Rapid Experimentation:

Understanding the limitations of deep learning provides critical context to design use cases. The best way to understand the capability of a certain technology is to experiment.

Many pilot projects make the mistake of spending too much time on setting up the experiment than on running and learning from it. The risk and cost of inaction is higher than that of pursuing a mediocre use case. We recommend implementing multiple pilot-projects at once instead of rolling them out one after the other. For example, a pilot-project on Customer Discovery can be implemented along with adoption of new Customer Support tools. The two use cases complement and yet do not interfere with each other.

An organization can attempt deep learning either at the task level (classification, recommendation etc.) and/or at functional level (underwriting, claims processing etc.). The actual application of deep learning depends on the end objectives — reduction in operating costs, and increase in revenue and efficiency.

Generating/gathering training data sets:

The efficiency of an DL algorithm depends on the quality and size of the training data sets. A continuous stream of transactional data is often not enough to train the machine. The data needs to be indexed and labeled appropriately for the machine to make sense of it.

Let's take the example of credit card transactions. The raw data might not be enough; each transaction needs to be identified as either 'genuine' or 'fraud' so that the algorithm can identify trends that can distinguish the two types. Sometimes, these data sets are not linear but relational – for example, to monitor the risk (fraud or compliance), it is important to understand the context of the entities; this context would be gathered from third-party sources or from another dataset internally.

Strategic growth vs short-term benefits

There is always a trade-off while having to choose between complex use cases and simple ones. Complex use cases can take longer pilot times but can deliver higher ROI. On the other hand, simple use cases take lesser effort and resources but deliver short-term business outcomes. Hence, the product development roadmap becomes an important consideration while adopting deep learning technologies. The best approach is to plan the product development with small upgrades such that the ROI/outcomes can be demonstrated at every product upgrade.

Creating internal competency and resources

An AI initiative will be successful if it is not only supported from the top down, but also the bottom up. It is essential to start educating and upskilling staff on data science and machine learning technologies and initiatives. Although insurers may embark the ML/AI journey with an external partner/vendor, it is important to create in-house resources and experts to extend the learning to other aspects of the business.

This can reduce the customization, tuning and integration cycles. Additionally, it is also crucial to develop strong AI product development skills to better manage future 'AI' investments. Developing strong SMEs internally can accelerate adoption and deliver better business outcomes.

Enabling a man+machine ecosystem

It is important to test the outcomes generated by AI algorithms through manual validation. The AI predictions must be compared with actual outcomes to understand the effectiveness of the algorithm. Comparing this outcome with current work flow results will help the AI system with continuous learning.

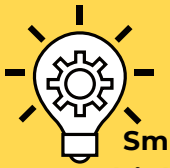
Alternative options of feedback must be created for the AI system to validate its outcome, particularly for use cases where reasoning is crucial. For example, while determining medical admissibility of claims application, it is important to consider the mandatory documentation before processing the claims.

A man+machine ecosystem can gather enough relational information to design a complex system to automate such high level tasks in future.

Investing in smart tools

The success of technology adoption is correlated to the tools used; smarter tools drive higher adoption. The same logic applies for deep learning product development. Smart tools can reduce go-to-market time and increase productivity.

Enterprises should look for intelligent tools that can enhance the efficiency of the resources they invest in and help reduce build cycles



Smart tools can not only automate multiple, complex tasks but also enable insurers to deliver within short periods

Continuous communication between multiple steps in the product development cycle is important for deployment and stack replication. Using smart platforms can reduce the time to retrain and leverage the efficiency of the systems.

CONCLUSION

AI technologies present the biggest of opportunities, and toughest of challenges for the insurance industry. Not all companies are equally well suited to adapt these technologies, but those who fall behind might fall behind their competitors. This also has triggered insurers to realign their strategies and move ahead of their competitors. Also, with the shift in the customer landscape, transformation seems essential.

The most immediate impact of AI can be felt in improved efficiencies, and automation of customer interaction, underwriting and claims processing. Over time, however, its impact will be felt across key areas such as identifying and assessing risks and opening up new revenue streams. Insurers need to look at not only allocating adequately to investments in technology, but also ensure that these investments align with the requirements.

Deep learning technologies stand out as a powerful tool in this mission. However, it would be wise to start small, monitor the outcomes and continually optimize the systems till maturity. Insurers will probably have to work with multiple technology partners along this journey, but the key to success lies in creating robust in-house expertise in planning the assimilation of these technologies.

ARYA.AI

Arya.ai offers an easy to use 'AI Operating Platform' for insurers to automate and augment expert decision making using autonomous AI across core functions - underwriting, claims, audit & risk monitoring; all on the same platform. The modular construct of the platform allows insurers to scale one function at a time and offers utmost flexibility to centralize the control on AI assets like - Models, Data pipelines, APIs, Security Guidelines etc.. This makes it the only AI platform required to achieve organization wide adoption of autonomous AI. Arya brings in the best of both worlds - products & platforms onto a single unified technology stack.

since 2013 | One of the early players to use deep learning for insurance

14M+ | Life and Health claims processed

12M+ | Life and health policies assessed

1.1M+ | Audits performed in insurance

Arya in news and mentions

NASSCOM®

AI Game Changer Award, 2019

Forbes

Founders listed in Forbes Asia 30 under 30, 2016

CBINSIGHTS

Top 61 AI companies Globally, 2019

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