USE OF ARTIFICIAL INTELLIGENCE IN THE INSURANCE INDUSTRY

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Abstract

Artificial intelligence (AI) can have a significant impact in the insurance sector, where manual activities and errors, along with large volumes of data, can reduce productivity. Employees must follow complex steps to analyze claims, which makes AI-based solutions essential for automating this process. In this context, the design, implementation and evaluation of two AI-based solutions aimed at improving insurance case management in Romania are presented. AI technology aims to simplify the process of managing health insurance cases, while also aiming to verify and evaluate claim documentation, with the aim of improving health insurance services. Implementing AI solutions in the insurance industry can reduce expenses by about 400 billion dollars, and the use of AI can lead to process optimization and improved customer experience. Commercial systems in the health insurance sector demonstrate the feasibility of conversational agents, with technology providers offering chatbots on a subscription basis. Users only need to activate the service and make some changes to get a working system. Companies and non-profit organizations, such as Symptoma, Florence, Sensely and Infermedica, have developed conversational agents in the health sector. These solutions will be presented after an international competition review, which will assess the feasibility of implementing a natural language processing system for managing texts about symptoms of insurance company customers.

Keywords: insurance, artificial intelligence, technology, health.

1. Introduction

The insurance industry is regularly challenged by complex processes and large volumes of data, which affect the efficiency of human resources. Claims management, which involves centralizing and evaluating documents, is often a manual, time-consuming and error-prone process. Artificial intelligence offers an innovative solution to automate and optimize these processes, benefiting both insurance companies and customers.

Integrating artificial intelligence into insurance can transform claims management by quickly analyzing documents, facilitating the identification of fraud and errors. This leads to more efficient claim processing, reducing waiting times and increasing customer satisfaction. AI also enables more accurate risk assessments, tailoring insurance policies to the specific needs of each customer.

Artificial intelligence improves the efficiency of claims processing and optimizes insurance companies' internal processes by automating repetitive tasks, freeing up human resources for strategic activities. This leads to increased productivity and reduced operational costs. AI also allows for the personalization of customer experiences by analyzing behavioral data, providing recommendations and products tailored to individual needs, which increases loyalty and strengthens the bond with the insurer.

Artificial intelligence systems bring important benefits to the insurance sector, optimizing risk assessment and rate setting. Machine learning algorithms allow for rapid data analysis, helping companies offer competitive prices and attract customers. AI also improves claims management by automating information verification, which enhances the customer experience and reduces costs. Another major advantage is the ability to identify and prevent fraud. AI algorithms play a crucial role in the insurance industry, helping to identify fraud and optimize resource management by automating repetitive tasks. They improve efficiency and processes, providing a competitive advantage and contributing to increasing the performance and profitability of the sector.

Artificial intelligence in health insurance improves claims processing and medical record management by quickly analyzing data, reducing waiting times and administrative costs, and providing personalized recommendations for claims management. Artificial intelligence solutions can improve efficiency and transparency in the Romanian insurance sector, benefiting both companies and customers. However, implementing these technologies requires large investments and employee training. It is crucial to improve services and increase competitiveness compared to other countries in the region.

2. The insurance sector and the application of artificial intelligence

The analysis of the use of artificial intelligence in optimizing health insurance services is crucial, with a significant impact on the economy. Improving efficiency and accuracy in this area can positively influence companies' risk management and the quality of life of customers, highlighting the socio-economic importance of this topic[5].

Automating manual processes, through AI solutions, can reduce the time to process claims, thus improving the customer experience and increasing their satisfaction. In addition, companies can reduce operational costs, which allows them to offer more competitive rates and expand their customer base.

The use of artificial intelligence in data management and risk assessment improves fraud detection in the insurance sector, where fraud causes significant financial losses. AI solutions can quickly identify suspicious patterns, thus reducing losses and maintaining the financial stability of companies. In health insurance, AI is also optimizing claims processing, speeding up the process and providing accurate verification of medical records, reducing uncertainty for customers during difficult times.

Research is essential for innovation and adaptation in the face of rapid technological change. Companies that adopt advanced technologies, such as artificial intelligence, gain a competitive advantage by being able to better respond to customer demands and quickly adapt to the market. A 2025 report (Precedence Research) predicts that the AI market in insurance will reach $80 billion in the next ten years, highlighting the economic opportunities in this sector and the relevance of the topic discussed – see figure no. 1.
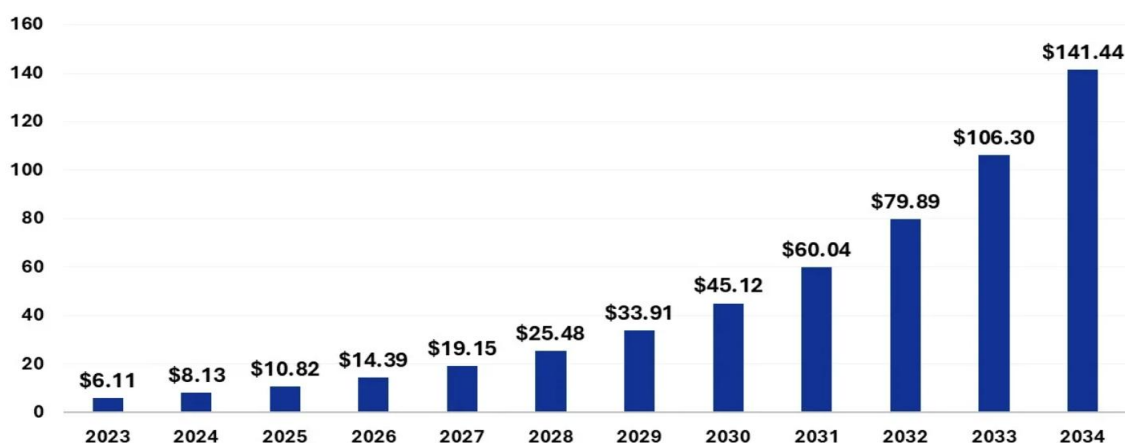

Figure 1 – Market size using AI technology in insurance and estimation
Source: Preluat din Precedence Research. (2025). Accesat în martie 2025, [9]

The insurance industry has been profoundly influenced by advances in artificial intelligence (AI) technology, which has revolutionized risk assessment, underwriting, claims processing, and customer service.[1] Insurance companies are using AI to optimize their operations and improve customer experiences, while remaining competitive in a changing marketplace. AI's ability to analyze big data and identify patterns enables insurers to make informed decisions, resulting in

more accurate risk assessments and personalized offerings. It is estimated that by 2030, AI will increase the productivity of insurance processes and reduce operational costs by up to 40%.

3. Using artificial intelligence in commercial applications for health insurance

The introduction of commercial AI systems in the insurance sector should begin with a presentation of companies that have integrated these technologies into most of their processes. Then, specific solutions available for optimizing health insurance-related processes will be discussed, as well as for improving efficiency in detecting car damage through image analysis and estimating repair costs[2].

Lemonade, founded in 2015 in the USA, uses a fully digitalized distribution and customer interaction model, with human contact limited to complex situations. The company uses artificial intelligence, including chatbots and machine learning algorithms, to automate sales and claims management processes. Approximately one third of claims files are resolved automatically, without employee intervention. Lemonade offers a narrow set of insurance products, which facilitates processes.

Next Insurance is an American company that uses modern technology, including artificial intelligence, to carry out its business[3]. Customers can purchase policies and report claims through mobile apps and the website, and the information is processed using complex neural networks. The company offers a variety of insurance products, especially for civil liability.

Metromile, founded in 2011 in San Francisco, offers an innovative approach to auto insurance, based on customers' driving habits instead of the policy's validity period. The company uses mobile apps and artificial intelligence to personalize offers and determine premiums based on distance traveled, not time. The claims management process is also assisted by artificial intelligence.

Developing technical solutions for distributing insurance contracts is not reserved only for insurance companies. A relevant example is the broker PolicyGenius in the United States, which facilitates access to various types of policies through an online app. Customers can enter their personal information to receive offers from several insurance companies. Additionally, PolicyGenius uses an artificial intelligence-based chatbot to provide customer assistance during the purchasing process.

These were four companies implementing new technologies, each developing its own solutions. The technology provider ForMotiv is also mentioned, which offers an artificial intelligence-based system for behavioral analysis. This system evaluates user interactions with websites to predict future behaviors, including fraud risks and payment delays[4]. A thorough analysis of commercial solutions in the insurance sector was carried out, with a particular focus on motor insurance. The Solera Qapter solution, provided by the market leader Solera-Audatex, was examined, and three other alternative commercial systems were identified using the Source Forge search engine.

In the health insurance sector, four commercial solutions for managing medical symptom information were identified, starting with the leader Symptoma. Competitors were analyzed using a technique based on a predetermined number, examining the solutions available on Source Forge. This detailed analysis was essential to use them as a reference point in the development of the systems proposed in the research.

Symptoma is an application dedicated to diagnosing diseases through symptom analysis. Founded in 2009 by Jama Nateqi and Thomas Lutz, based in Salzburg, Austria, it has evolved into an essential tool for obtaining relevant medical information, and is recognized as a leader in the field of symptom-based diagnosis. Symptoma is a chatbot-like search engine that helps users find information about diseases based on their symptoms. It facilitates initial diagnosis for patients and provides directions for exploration for doctors. Users can analyze symptoms, laboratory test results, and complications associated with various diseases. The interface is similar to a social media chat,

allowing users to describe symptoms in natural language, and the chatbot collects relevant information about the patient. Thus, Symptoma becomes a useful tool in the medical decision-making process[6]. The interface creates a "patient record" that includes reported, denied, and uncertain symptoms, as well as possible causes. Users can initiate specific tests by chatting with a virtual agent who asks questions about symptoms. Symptoma distinguishes itself by personalizing searches based on symptoms, age, location, and gender, thereby improving diagnosis and the quality of patient care.

Infermedica offers symptom checking features similar to Symptoma, but it is distinguished by integrated services such as triage, retrieval and API. The "Triage" module helps patients analyze symptoms and connect with the right medical services, and the "Retrieval" module improves communication between patients and doctors, simplifying admission and data transfer, which reduces administrative time and increases the efficiency of medical information management. The third module, the API, allows users to access the advanced functionalities of Infermedica's intelligent core, facilitating the development of personalized solutions for healthcare challenges, tailored to the needs of medical organizations[6].

Infermedica is distinguished by a friendly interface and clear instructions for medical self-assessment, facilitating the use of the platform. Using natural language processing technology, it explains the reasons for symptom questions to users, increasing confidence in diagnosis. It also provides access to an extensive database of pediatric medical information and various functionalities for more effective symptom management. The platform offers various resources, including personalized triage and information about medical conditions, being a trusted source for patients and doctors. Infermedica, unlike Symptoma, has extensive functionalities and allows integration with patient management systems, also providing user statistics for optimizing medical processes. However, Infermedica does not support the Romanian language, in contrast to Symptoma[6].

Florence is a simple conversational agent that interacts through existing chat platforms, such as Facebook Messenger or Skype, without requiring a dedicated interface. It offers three types of functionalities: treatment plan tracking, health assessment and interaction with medical organizations or institutions. Florence is a chatbot created to support health management and medication programs. It provides users with notifications and answers to health and medication-related questions, including details about usage and possible side effects. In addition, it provides reminders to help users administer their medications at the right time. Florence is a health monitoring tool that allows users to ask about symptoms and receive information about causes and treatments. It offers additional resources, such as health tips and campaign information, and can connect users with healthcare professionals. It functions as a virtual assistant, helping users manage their health and follow prescribed treatments through an accessible conversational interface.

Sensely offers an advanced conversational agent for use in the healthcare supply chain, particularly in the health insurance industry. It facilitates claims processing and generates a PDF report with the interaction information. The chatbot brings significant benefits to both insurers and policyholders through its efficient integration into this sector[6].

Sensely provides customer support, reducing administrative costs for claims processing and insurance creation. The technology improves the user experience by providing personalized information and advice in real time, thereby increasing customer loyalty and satisfaction. Sensely is an application that helps users manage stress, anxiety and other health issues, supporting recovery and health care. It provides information on physical health, chronic disease management and promoting a healthy lifestyle. Its functionalities include symptom assessment, chronic patient care,

insurance services and mental health assessment. A major advantage of Sensely is its advanced interaction and service personalizâtion.

4. Conclusions

The insurance industry faces challenges in terms of operational efficiency, claims management and fraud detection, due to traditional processes that are often slow and inefficient. Artificial intelligence represents an innovative solution, allowing the automation and optimization of these processes, which brings advantages to both companies and customers. Machine learning algorithms can improve activities such as risk assessment, claims processing and policy administration.

The study highlighted the importance of integrating advanced technologies, such as artificial intelligence (AI), in the Romanian insurance sector. This not only decreases processing time and reduces human errors, but also contributes to greater accuracy in daily activities. In an environment characterized by rapid digitalization, insurance companies must adapt to increase operational efficiency and remain competitive. Without implementing AI, they risk losing competitive advantages and growth opportunities.

In the insurance industry, customer trust and satisfaction are essential. Artificial intelligence (AI) can significantly improve the services provided, allowing companies to respond quickly and efficiently to customer requests. By implementing AI solutions in customer service, insurance companies can provide personalized support, leading to a better customer experience and increasing loyalty and trust in the long term.

In the insurance industry, providing fast, accurate, and personalized service is essential for customer satisfaction. Artificial intelligence can help companies respond more efficiently to customer requests, thus improving their experience and increasing loyalty. By implementing AI solutions in customer service, insurance companies can provide fast and efficient support, strengthening trust in the long term. Fraud detection is becoming essential, and AI systems can quickly analyze data to identify fraudulent activities, protecting companies from financial losses and contributing to a safer business environment for customers.

Research in the field of artificial intelligence (AI) applied to insurance is essential for advancing knowledge and innovation in this sector. The integration of AI in the Romanian insurance industry is vital for competitiveness and adaptation to market changes. The adoption of these technologies allows companies to improve operations, reduce costs, combat fraud and provide higher quality services, thus contributing to long-term sustainability and modernization of the industry.

Most healthcare platforms support Romanian, but Infermedica and Sensely stand out for their user-friendly interfaces and integration with insurance systems. Symptoma supports Romanian, but does not connect to these systems, and Florence does not support Romanian, although it has other languages available. These aspects influence the competition in the development of conversational agents for health insurance automation.

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