



Case Study: Insurance

A Flood of Data Informs Underwriting – Using AI

A global reinsurer relies on machine learning and data science to analyze risk for flood insurance.

In the insurance business, assessing risk is not an exact science. Underwriters must painstakingly review an entire portfolio to understand their exposure, draft endorsements and price coverage.

Cognizant helped a global reinsurance company examine how to make underwriting more efficient and productive, by reducing the time underwriters must spend on manual work and expanding the range of data that informs decision-making.

At a glance

We built an AI-driven solution to perform predictive, data-based underwriting analysis for a reinsurer planning to enter the U.S. flood insurance market.

Outcomes

Our solution combines flood hazard maps, GIS data, and the frequency and cost of historical claims to model risks across a portfolio. We:

- Modeled a potential market with 83% accuracy.
- Generated a ten-fold reduction in throughput time in underwriting.
- Improved case acceptance by 25%.

Artificial makes it real

For decades, the U.S. government has been the insurer of first recourse to homeowners at risk of floods. In 1968, the Congress made flood insurance available to homebuyers and businesses for the first time; five years later, it made purchasing such insurance mandatory for properties in a flood plain or other at risk areas.

Private insurers and reinsurers can together provide a valuable source of funds for recovery after catastrophic events, especially in areas affected by a massive storm. In 2016, the government decided to make its database of historical information on the nation's flood plains publicly available for the first time, with the goal of encouraging insurance companies to underwrite some flood risk.

Providing flood insurance represents a significant opportunity for insurers. However, as with writing any policy, the risk must be framed within acceptable parameters and balanced by accurate pricing. Our client wanted to examine the risk of reinsuring specific tranches of risk for its insurance clients, as well as to write individual policies for homeowners and businesses.

A space for new solutions

Our client wanted a clearer view of flood risks, including the ability to model risk factors by geography down to individual Zip or Zip+4 codes. They sought to understand the size and scope of the U.S. flood insurance market, and turned to us to develop intelligent algorithmic processing to aid the underwriting process and boost efficiency.

We analyzed flood hazard maps developed by the National Flood Insurance Program as well as publicly available census data and housing information. Our solution overlays that geospatial data with data from geographic information systems (GIS) and our client's internal databases of historical claims.

Parameters include changes in population and the number of homes in areas, along with historical changes to designated flood zones.

Our Artificial Intelligence team used "R" software with ArcGIS for geospatial data extraction. We used one U.S. state for our proof-of-concept, then scaled the model to all 50 states and Puerto Rico. We conducted Bayesian distribution analysis to identify potential attributes that affect market opportunity and risks for areas down to individual Zip+4 codes. We then depicted these risks in a dashboard with visualizations built on the RShiny platform.

AI: Intelligent underwriting

Now, by using natural language processing to automatically examine digitized documents and combining that information with geospatial data on flooding, our client can more accurately assess the frequency and severity of flood risk by geography. Our AI-driven machine learning solution leverages subject matter expertise with data science to make predictive underwriting faster, more efficient and more accurate — a competitive advantage for our client.

Our client can now understand who has coverage and where, and model what factors could drive the market, including behavioral patterns. This allows granular analysis of risk by policy, assigning risk scores to individual homes or businesses. Our solution revealed a potential market with 83% accuracy, allowing our client to more accurately define risk and refine its policies, and it promises to improve case acceptance rates by 25%.

Since 2016, we have developed numerous other use cases for this client, including models for reviewing health and medical records to evaluate risk in a portfolio of policies for life and health insurers, and examining risks in the automobile insurance marketplace.

For more information, visit www.cognizant.com/ai.

About Cognizant Insurance

Cognizant's Insurance Practice is one of the largest industry verticals that partners with insurers to evolve their business and technology landscape and enable end-to-end digital transformation. Thirty-three of the top 50 U.S. insurers and seven of the top 10 global insurers rely on us to help manage their technology portfolio across multiple business entities and geographies. We serve the entire range of lines of business within life, annuities, and property and casualty insurance. Our consulting-led approach, deep domain expertise and partner ecosystem enable clients to address the dual mandate of "optimizing the business" while "driving digital at scale." From large-scale core system transformation to adoption of cutting-edge technologies like artificial intelligence, analytics, blockchain, automation and machine learning, we partner with insurers to envision and build the digital insurer of the future. Our partnership includes helping insurers build their own technology platform with the capabilities they need or providing one for them, incorporating digital solutions to achieve immediate results. Learn more at www.cognizant.com/insurance.

About Cognizant Artificial Intelligence Practice

As part of Cognizant Digital Business, Cognizant's Artificial Intelligence Practice provides advanced data collection and management expertise, as well as artificial intelligence and analytics capabilities that help clients create highly-personalized digital experiences, products and services at every touchpoint of the customer journey. Our AI solutions glean insights from data to inform decision-making, improve operations efficiencies and reduce costs. We apply Evolutionary AI, Conversational AI and decision support solutions built on machine learning, deep learning and advanced analytics techniques to help our clients optimize their business/IT strategy, identify new growth areas and outperform the competition. To learn more, visit us at www.cognizant.com/ai.

About Cognizant

Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 195 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at www.cognizant.com or follow us [@Cognizant](https://twitter.com/Cognizant).



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