



## INSURING THE FUTURE: BENEFICIAL AI USE CASES IN THE INSURANCE INDUSTRY

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The National Association of Mutual Insurance Companies consists of nearly 1,500 member companies, including seven of the top 10 property/casualty insurers in the United States. NAMIC member companies write \$391 billion in annual premiums and represent 68 percent of homeowners, 56 percent of automobile, and 31 percent of the business insurance markets.

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# NAMIC ISSUE ANALYSIS

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## INTRODUCTION – THE NEW ERA OF RISK AND TECHNOLOGICAL OPPORTUNITY

The property/casualty insurance industry is currently experiencing unprecedented times – navigating a new era of risk and grappling with how to utilize and leverage rapid technological advancements. In terms of risk, property/casualty insurers are experiencing the confluence of extreme weather, inflation and economic uncertainty, legal system abuse, and regulatory challenges. Extreme weather events are increasing in frequency and intensity, and more people are moving into areas considered to be high risk for natural catastrophes. Though the inflation rate declined to 3.4 percent at the end of 2023, after peaking at 9 percent in the summer of 2022, inflation in areas most closely aligned with insurance costs has not slowed at the same pace as general inflation. In terms of legal system abuse, the industry has experienced a rise in class action lawsuits coupled with nuclear verdicts and third-party litigation funding, driving up costs for both insurers and consumers. Finally, insurers are experiencing numerous challenges throughout the regulatory process.

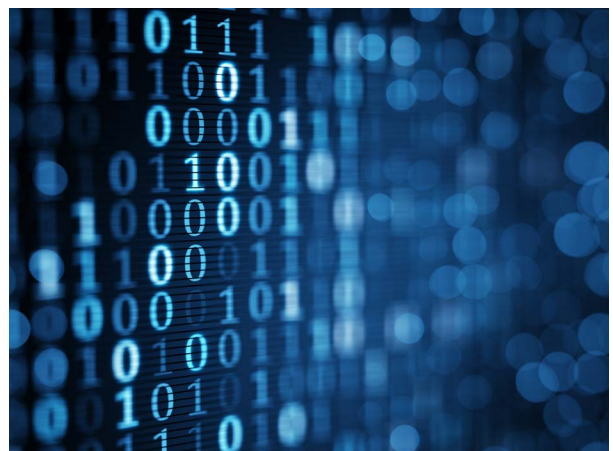
In the storm of this new era of risk, one source of light on the horizon is the emergence of new technological applications, specifically artificial intelligence (AI). Insurance has been and always will be a data-driven industry; as such, it is poised to benefit from advances in a data-driven technology field like AI. At its core, AI is advanced data analytics. Often being overlooked in policy discussions as an integral part of the solution to the challenges insurers are facing today, advancements in the field of AI can help in various ways, like increased precision in risk classification and mitigation of claims and perils in the new era of risk.

Notwithstanding the challenges of the new era of risk, the insurance industry also faces a changing consumer mindset. As technology evolves, so, too, do consumer expectations. Today's consumers already interact with AI in a myriad of ways – from the robot vacuum in their homes, digital assistants like Alexa or Siri, and customer service chatbots, to the purchase suggestions on their Amazon accounts. Immediacy, convenience, and personalization are at the core of modern consumer expectation in our world of evolving technology. The insurance industry, while also using AI to address the challenges of the new era of risk, can rise to the occasion and meet consumers' changing expectations by leaning into those AI use cases that will provide benefits to the industry and policyholders.

## BACKGROUND – AI TYPES AND CURRENT USE CASES

### WHAT IS ARTIFICIAL INTELLIGENCE?

Artificial intelligence has been one of the hottest topics in the media and the policymaking sphere since the release and rapid rise of OpenAI's large language model ChatGPT in late 2022. The field of AI has been around for much longer than its recent mainstream explosion, and ChatGPT is only one application. In the current policymaking world where references to AI can mean a whole host of things, one can easily find themselves confused over what AI actually is and what it means. Is AI a sentient machine, a product of science fiction? Not quite. In the simplest sense, AI is math – a field of advanced data analytics and computer science, to be exact.



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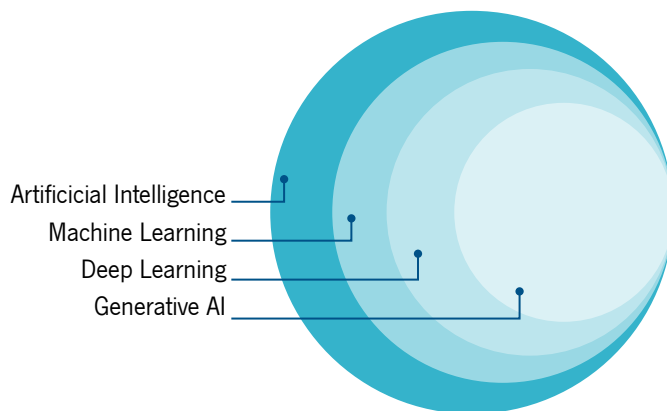
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According to the National Institute of Standards and Technology, artificial intelligence is a “branch of computer science devoted to developing data processing systems that performs functions normally associated with human intelligence, such as reasoning, learning, and self-improvement.”<sup>1</sup> The field of AI creates systems and models that provide insights into data, as well as provide or generate new content based on those insights and learnings from large data sets. Within the field of AI, there are distinct applications and subsets, depending on the type of insight or output one is looking for.

No matter which type of model or application, however, the general process of how AI models work is the same. Once a model is developed, it operates by receiving large data inputs, getting trained on the data input, and then generating a data output.

One of the simpler AI models are machine learning models. In machine learning models, the model is trained on the set of data and can then make predictions on data it has not yet seen – those predictions are the output. By way of a very simple example, one could train such a model using data on sales of ice cream cones in the summer. The model, once trained, can then output predictions on data points it has not seen, such as sales of ice cream cones in the fall, winter, or spring.

Deep learning is a type of machine learning that imitates the way human brains process information. These brain-like “artificial neural networks” in these models assess large amounts of data to make accurate predictions and adapt accordingly. Imagine, for example, one is driving down the road and a pedestrian unexpectedly runs in front of the car. That driver’s brain processes the information and results in the driver slamming on the brakes to avoid a collision. An automated vehicle running on deep learning models, for example, would respond in the same way, once trained on the relevant data sets.



Generative AI is the type of model that has garnered much attention in the wake of the release of Chat GPT in November 2022. Using deep learning, generative AI learns patterns in large data sets and can then generate new content based on those learnings. One of the most common generative AI applications is using a generative AI model to summarize a topic or generating responses to questions. Generative AI models like Chat GPT are trained on vast amounts of data available on the internet and can be asked to summarize topics in response to prompts like “Write me a paper on the history of AI” or “Write me a poem and read it in the voice and style of Mickey Mouse.”

Given the different subsets and applications of AI and the very different functions they can serve, one begins to see how clarity and specificity on the type of AI model at issue are of the utmost importance. In terms of policy advocacy, different policymaking groups often have different AI applications in mind. Specificity and clarity are important especially in the policy space in terms of scope of applicability, uniformity where possible, and creating a level of regulatory oversight commensurate with risk, so that innovation and the benefit to be derived from AI advancements is not stifled.

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<sup>1</sup> “Artificial Intelligence,” Computer Security Resource Center, NIST, accessed April 30, 2024, <https://csrc.nist.gov/topics/technologies/artificial-intelligence>.

# NAMIC ISSUE ANALYSIS

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## OPPORTUNITIES FOR THE INSURANCE INDUSTRY

The insurance industry is a data-driven industry, and the foundation of AI is data. These facts, combined with the differing types and levels of AI application, position the industry well to benefit from AI use. The insurance industry has leveraged traditional algorithms for quite some time, and the Society of Actuaries has recognized how advancements in AI and resulting machine learning models hold great promise in insurance risk rating and claim modeling, for example.<sup>2</sup>

Yet, many of the policy discussions in all levels of government have focused on the need for new legal frameworks for this (not so) new field of AI and its various applications. For some policymakers, this instinct to restrict likely stems from their experiences during the rise of social media platforms and big tech companies, where the regulatory approach was more hands off, allowing for unfettered proliferation that many have argued came at the expense of consumer protection. Although such concerns are unrelated to the use of AI models in insurance, the insurance industry has not been immune to these AI policy discussions. In fact, throughout 2023 and into 2024, the insurance industry has seen new laws, implementation of new regulations, and issuance of regulatory bulletins that in many ways add layers of regulation where an appropriate and applicable framework already exists. This activity has resulted in overly burdensome requirements that can stifle innovation. As policymakers continue to express caution or skepticism, or view AI development as a potential threat, it is important for the insurance industry to embrace and highlight some of the positive aspects of AI.

## INCREASED COMPETITIVENESS AND COST REDUCTION FOR CONSUMERS

### GREATER ACCESS FOR CONSUMERS

Arguably one of the most impactful benefits stemming from AI use in the insurance industry is cost reduction for the insurer, which can translate into cost reduction for consumers, and therefore greater access for consumers. For instance, incorporating AI into operational processes can automate repetitive knowledge tasks (e.g., data extraction, data entry, report generation) and free up the human worker for highly skilled activities. Smaller insurers can especially benefit from such cost reductions, as incorporating AI into operational processes can allow for business expansion at scale, while abating the need for a drastic increase in headcount. When insurers reduce internal costs, this results in cost reduction and greater access for consumers.

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<sup>2</sup> Society of Actuaries, "Machine-Learning Methods for Insurance Applications," 2019, <https://www.soa.org/493479/globalassets/assets/files/resources/research-report/2019/machine-learning-methods.pdf>.

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## AI CAN ENHANCE PRECISION IN MATCHING RATE TO RISK

The foundational practice in the business of insurance is accurately matching the rate (or the amount an insured pays in premium) to the risk of insured loss that a policyholder presents. Not only does such practice result in overall fairness for the consumer in that lower risks pay less in premium, but the practice is essential to the health and functioning of the insurance business. An insurer must be able to accurately price risks to pay valid claims when they are submitted while remaining solvent for future claims that come from other insureds on the books. If an insurer grossly underestimates the amount of risk that a particular insured represents, the insurer could find itself in a situation where claims can set off a cascade of financial challenges that, in extreme cases, could even lead to insolvency. If inaccurate risk rating occurs on a grand scale, the financial health of the insurer crumbles, and, with it, the protection it provides to consumers.

To accurately match rate to risk, insurance actuaries rely on statistical methods to model and assess risk and to assign requisite pricing. Traditionally, actuaries have used standard statistical models such as generalized linear models (GLMs) in assessing claims risk. While more accurate than most statistical methods, GLMs do have limitations that can be addressed through the use of machine learning models.<sup>3</sup> For instance, the level of predictability in machine learning models is generally believed to be superior to GLMs, and machine learning models require far fewer assumptions, as it learns from the data it is trained upon.<sup>4</sup> Machine learning models can analyze higher volumes of consumer data to generate more accurate insights of risk, often detecting risk patterns that have gone unnoticed by simpler statistical models and actuaries alone.

From an underwriting perspective, today's underwriting processes often depend on legacy records. In the current new era of risk, especially with astonishing increased frequency and severity of natural catastrophes, losses are outpacing new business premiums. By way of example, the global property/casualty insurance combined ratio in 2022 was 103 percent, marking the third year of losses since 2018.<sup>5</sup> When an insurer cannot accurately price risks, and losses outpace premiums, an insurer might not renew a policy or leave a particular market. This results in a compounding issue of insurance availability and affordability, resulting in underinsurance concerns.<sup>6</sup> The rapidly evolving risk landscape "reveals the limitations of outdated models and suggests that carriers can't compete only with base rate increases but also require more sophisticated risk analysis."<sup>7</sup>

Insurance underwriters agree that leveraging third-party data insights and advanced predictive models like machine learning models are essential to accurately assess and price risk and to combat the limitations of legacy systems and data.<sup>8</sup> By leveraging AI models insurers can enter a new world of superior pricing through more accurate prediction of loss. Machine learning can unlock insights into unstructured data to refine risk selection and to derive granular insights allowing insurers to pinpoint insurable risks in traditionally uninsurable geographic areas or asset classes.<sup>9</sup> With superior actuarial methodology comes superior risk rating ability, and therefore, more accurate pricing. With more accurate pricing, competition is generated among insurers, resulting in more options and access for consumers.

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<sup>3</sup> Society of Actuaries, "Machine-Learning Methods for Insurance Applications," 2019, <https://www.soa.org/493479/globalassets/assets/files/resources/research-report/2019/machine-learning-methods.pdf>.

<sup>4</sup> John (Jun) Zhou and Debbie (Quianxin) Deng, "GLM vs. Machine Learning - with Case Studies in Pricing, November 10, 2019, slide 10, [https://www.casact.org/sites/default/files/presentation/annual\\_2019\\_presentations\\_c-22\\_zhou.pdf](https://www.casact.org/sites/default/files/presentation/annual_2019_presentations_c-22_zhou.pdf).

<sup>5</sup> "World Report Series 2024: Property and Casualty Insurance," Capgemini, April 2024, p. 5, [https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR\\_2024\\_web.pdf](https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR_2024_web.pdf).

<sup>6</sup> "World Report Series 2024: Property and Casualty Insurance," Capgemini, April 2024, p. 8, [https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR\\_2024\\_web.pdf](https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR_2024_web.pdf).

<sup>7</sup> "World Report Series 2024: Property and Casualty Insurance," Capgemini, April 2024, p. 5, [https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR\\_2024\\_web.pdf](https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR_2024_web.pdf).

<sup>8</sup> "World Report Series 2024: Property and Casualty Insurance," Capgemini, April 2024, p. 5, [https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR\\_2024\\_web.pdf](https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR_2024_web.pdf).

<sup>9</sup> "World Report Series 2024: Property and Casualty Insurance," Capgemini, April 2024, p. 16, [https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR\\_2024\\_web.pdf](https://www.capgemini.com/wp-content/uploads/2024/04/WPCIR_2024_web.pdf).

## FRAUD PREVENTION AND DETECTION

### DATA ON INSURANCE FRAUD

Adding to the challenges of the new era of risk are the staggering costs of insurance fraud, an expensive problem for insurers and consumers. The most recent study by the Coalition Against Insurance Fraud indicates that this cost is more than \$308 billion each year, and the FBI estimates such fraudulent claims cost families \$400 to \$700 yearly in increased premiums.<sup>10</sup> When fraudulent activity increases, premiums for consumers also increase, as insurers are forced to counteract those losses. By leveraging AI models in fraud prevention and detection, insurers can address these losses proactively and lessen the monetary effect such losses are having on the industry and consumers.

### USING AI MODELS TO DETECT FRAUDULENT ACTIVITY

As technology advances, fraudsters leverage the new technology to their benefit, resulting in higher volume and complex types of fraudulent activity, compounding an already expensive problem for insurers. For example, “shallowfakes,” manually manipulated images using photo editing software, have been used by fraudsters for some time in insurance claims; with the advancement of AI technology, AI models are now being used to generate “deepfakes,” also fake images, but more difficult to detect, and these are beginning to turn up in insurance claims.<sup>11</sup> As fraudsters increasingly use new technology, so, too, must insurers to counteract that activity.

Access to data and leveraging AI models for the specific purpose of fraud detection and deterrence can protect insurers and policyholders from the related monetary losses, as the technology can alert an insurer to fraudulent activity before monetary damage occurs. By way of example, the technology can monitor claim processing and policy data in real time and identify inconsistencies with claims and policy information more accurately and efficiently than manual human analysis. In another use case, machine learning can be used to predict and label whether activity is potentially or likely fraudulent. The machine learning model in this instance could be trained on historical claims or application data, wherein it would analyze the data to find patterns and anomalies indicative of fraudulent activity. The trained model would then make useful predictions about new data (new claims or application data, for instance) to flag potential fraud.

The machine learning models applied in fraud detection context have found three times more fraud than manual review or traditional rules-based tools.<sup>12</sup> Generative AI can add further benefit to insurance fraud teams to help fraud investigation units with review and summary of lengthy documents to free up a fraud investigation unit’s time for more complex cases and review of cases in general.<sup>13</sup>

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<sup>10</sup> Robb Bhatt, “3 ways insurers are using predictive analytics to grow their business,” Digital Insurance, February 6, 2024, [https://www.dig-in.com/opinion/predictive-analytics-helps-insurers-increase-business?utm\\_source=newsletter&utm\\_medium=email&utm\\_campaign=V3\\_DIG\\_Daily\\_Briefing\\_2023%2B%27-%27%2B02072024&bt\\_ee=Uli7uMLjNMekueJaz3SqSOD2TZ%2BzQHVCq6dPV8NQKnDyO2o7tZlMeJyngeVJ6MFX&bt\\_ts=1707314759283](https://www.dig-in.com/opinion/predictive-analytics-helps-insurers-increase-business?utm_source=newsletter&utm_medium=email&utm_campaign=V3_DIG_Daily_Briefing_2023%2B%27-%27%2B02072024&bt_ee=Uli7uMLjNMekueJaz3SqSOD2TZ%2BzQHVCq6dPV8NQKnDyO2o7tZlMeJyngeVJ6MFX&bt_ts=1707314759283).

<sup>11</sup> Amanda Paule, “Insurance companies are betting on AI and mass data analytics in a battle against fraud that costs billions,” Business Insider, October 24, 2023, <https://www.businessinsider.com/insurance-fraud-artificial-intelligence-detection-2023-10>.

<sup>12</sup> Amanda Paule, “Insurance companies are betting on AI and mass data analytics in a battle against fraud that costs billions,” Business Insider, October 24, 2023, <https://www.businessinsider.com/insurance-fraud-artificial-intelligence-detection-2023-10>.

<sup>13</sup> Amanda Paule, “Insurance companies are betting on AI and mass data analytics in a battle against fraud that costs billions,” Business Insider, October 24, 2023, <https://www.businessinsider.com/insurance-fraud-artificial-intelligence-detection-2023-10>.



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## DATA BREACH RESPONSE AND CYBER DETECTION

### ACCURACY AND SPEED IN DETECTION

Cyberattacks are also an expensive problem for insurers, with the average cost of a corporate data breach being \$4.35 million.<sup>14</sup> For insurers, this is another preventable expense to help abate the costs of the new era of risk, but it is also an area where bad actors are using AI models themselves for more frequent and complex attacks. As such, insurers must leverage the opportunity that new technology like AI models can provide.

AI models can be incorporated into a company's cybersecurity processes, namely through replacing costly, time-consuming, and less effective human detection and identification of data breaches. The benefits of AI model incorporation are speed and accuracy; speed in detection and response of a data breach is paramount in limiting the ultimate cost or damage the breach can impart on insurers and consumers. With speed in detection comes speed in subsequent response or containment of breaches and, therefore, cost and reputational savings.

Currently, some insurers are leveraging the data they have on their normal network patterns and user activities to train machine learning models to detect anomalies within their networks.<sup>15</sup> Further, insurers are also using AI models to reconstruct real cyberattacker behavior to help proactively search for vulnerabilities in their systems.<sup>16</sup> One of the limitations in the evolving world of cyber defense is the lack of sufficient data from which to train models, without pooling data or having access to third-party data.<sup>17</sup> To solve this, generative AI models can be used to generate synthetic data that resembles real-world cyber threats that can then be used to train machine learning models for use in cyber programs to detect threats.<sup>18</sup>



<sup>14</sup> Rahul Nawab, "How generative AI could help insurers with cybercrime," Digital Insurance, September 29, 2023, <https://www.dig-in.com/opinion/how-generative-ai-could-help-insurers-with-cybercrime>.

<sup>15</sup> Rahul Nawab, "How generative AI could help insurers with cybercrime," Digital Insurance, September 29, 2023, <https://www.dig-in.com/opinion/how-generative-ai-could-help-insurers-with-cybercrime>.

<sup>16</sup> Rahul Nawab, "How generative AI could help insurers with cybercrime," Digital Insurance, September 29, 2023, <https://www.dig-in.com/opinion/how-generative-ai-could-help-insurers-with-cybercrime>.

<sup>17</sup> Rahul Nawab, "How generative AI could help insurers with cybercrime," Digital Insurance, September 29, 2023, <https://www.dig-in.com/opinion/how-generative-ai-could-help-insurers-with-cybercrime>.

<sup>18</sup> Rahul Nawab, "How generative AI could help insurers with cybercrime," Digital Insurance, September 29, 2023, <https://www.dig-in.com/opinion/how-generative-ai-could-help-insurers-with-cybercrime>.

## IMPROVE CLAIMS PROCESSING EFFICIENCY

### STREAMLINING CLAIMS PROCESSING AND COMBATTING LEGAL SYSTEM ABUSE

Legal system abuse has been a substantial component in the new era of risk, and one area insurers can be proactive is their own claims processing methods. In the wake of legal system abuse, one question for insurance companies to ask is how can the company identify a potential nuclear verdict in a claim when it crosses the claim examiner's desk.<sup>19</sup> Research has shown a pattern in nuclear verdict cases, so there are certain attributes about claims that have the potential to lead to a lawyer's involvement and large jury verdict. Because there are consistent attributes, AI models can be trained on this data and then be applied to incoming claims to spot those claims that are likely to lead to litigation and to address potential concerns before a consumer involves a lawyer.<sup>20</sup>

To further aid in the fight against litigation abuse, AI models can be used to streamline claims processing and automate rote or administrative tasks, thereby freeing up the human worker to devote time to more complex cases. Instead of having claims workers comb through paper files, faxes, and PDFs that may exist across multiple systems, AI models leveraged to automate and digitize the process to make it quicker. Generative AI can be used here to summarize those files, faxes, and PDFs, allowing a claims worker to then learn the overview of a claim and go to the source to get further detail when necessary. AI models can also be applied to images taken from drones to inspect damage in near real-time to determine the damage that occurred and repairs needed more quickly for consumers. Working with speed and efficiency can further help stave off the effects of legal system abuse, if insurers provide consumers with the help they need before the decision is made to seek an attorney.

Modernization in claims processing by leveraging AI models will help bridge the gap and strengthen consumer satisfaction. Such modernization is critical to restoring trust between insurers and consumers and can help as a proactive measure in lessening the impact of abusive litigation in the new era of risk.

## MITIGATION OF CLAIMS AND PERILS

Perhaps one of the most impactful benefits insurers can derive from AI model use prevention and/or mitigation of claims and perils. Today, an insurer's focus is largely on identifying risks, pricing products appropriately according to those risks, and processing claims to repair damage when a policyholder experiences a covered loss. With AI and its advancements, insurers can expand on their ability to predict losses more accurately and reduce the severity of claims by improving consumer awareness and response times. In leveraging AI model insights for claims and perils, insurers can create an interactive feedback loop with consumers that can lead to increased trust for consumers, resulting in consumers looking to insurers as educators and partners in risk prevention and mitigation.

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<sup>19</sup> Denise M. Tyson, "How AI could identify potential nuclear verdicts," Digital Insurance, October 13, 2023, <https://www.dig-in.com/opinion/how-ai-could-identify-potential-nuclear-verdicts#:~:text=Artificial%20intelligence%20now%20makes%20it,the%20risk%20of%20nuclear%20verdicts>.

<sup>20</sup> Denise M. Tyson, "How AI could identify potential nuclear verdicts," Digital Insurance, October 13, 2023, <https://www.dig-in.com/opinion/how-ai-could-identify-potential-nuclear-verdicts#:~:text=Artificial%20intelligence%20now%20makes%20it,the%20risk%20of%20nuclear%20verdicts>.

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## NATURAL CATASTROPHE PREDICTION

In this new era of risk, natural catastrophes are increasing in frequency and intensity. In 2023, U.S. property/casualty insurers “incurred a \$21.2 billion net underwriting loss, only slightly improved from a \$24.9 billion underwriting loss recorded in 2022,” and 2023 natural catastrophe losses totaled roughly \$65 billion.<sup>21</sup> While increased precision in risk rating is surely a tool to use in abating these losses, another tool for insurers to leverage is AI modeling for mitigation of the resulting claims. AI models, combined with geospatial data, can unlock key mitigation strategies for insurers and insureds alike.

Geospatial data, when combined with machine learning models, can play a significant role in building resilience through risk avoidance and mitigation. Satellite imagery provides imaging in real time to better reflect current weather patterns, which can help better measure and predict risks amid natural catastrophes, as well as help make better data-driven decisions about future natural catastrophe events.<sup>22</sup> The granularity of satellite data and speed with which it can be accessed are key – an insurer can then leverage AI models to track changes and patterns with more precision and keep pace with the evolution of natural catastrophes.



If an insured lives in a hurricane-prone area based on the insurer’s model, the insurer can educate the policyholder on how a hurricane can affect property, so he/she can then make any necessary arrangements to better protect assets and avoid a claim.<sup>23</sup> In terms of flooding prediction, researchers have discovered promising potential in the application of quantum machine learning that leads to improved accuracy and effectiveness of predictions.<sup>24</sup> While events like hurricanes, or storms resulting in flooding, aren’t necessarily preventable, the damage and likelihood of large claims can be mitigated through leveraging machine learning models based on geospatial data. The increased accuracy and effectiveness of prediction can help educate consumers about where to live; help areas better adapt to these extreme weather events; and help strengthen the accuracy of the risk assessment of such areas. As the field of AI continues to advance, these models will only improve the insights that insurers can glean from the data.

## NATURAL CATASTROPHE DETECTION AND RESPONSE

Just as important as understanding the likelihood of a natural catastrophe in risk mitigation is the speed for detecting and responding to such natural catastrophes. Insurers know that wildfires, in particular, are natural catastrophes that, if not detected and contained early, can wreak havoc and result in expensive claims and losses for consumers, not to mention potential loss of life. By way of example, the August 2023 Maui wildfires alone caused an estimated \$4 billion to \$6 billion in damages.<sup>25</sup>

<sup>21</sup> Peter L. Miller, “CEO Viewpoint: Predict and Prevent Just Makes Economic Sense,” Carrier Management, March 28, 2024, [https://www.carriermanagement.com/features/2024/03/28/260569.htm?bypass=4893e3eae748cc99f496dd9815d514&rid=2012923&utm\\_campaign=RiskandInsurance](https://www.carriermanagement.com/features/2024/03/28/260569.htm?bypass=4893e3eae748cc99f496dd9815d514&rid=2012923&utm_campaign=RiskandInsurance).  
<sup>22</sup> Gia Snape, “How can satellite technology boost the insurance sector?,” Insurance Business Magazine, February 8, 2024, [https://www.insurancebusinessmag.com/us/news/technology/how-can-satellite-technology-boost-the-insurance-sector-476432.aspx?rid=2012923&utm\\_campaign=RiskandInsurance](https://www.insurancebusinessmag.com/us/news/technology/how-can-satellite-technology-boost-the-insurance-sector-476432.aspx?rid=2012923&utm_campaign=RiskandInsurance).  
<sup>23</sup> Jason Wootton, “What to Know About Geospatial Technology,” Jason April 18, 2024, <https://www.insurancethoughtleadership.com/commercial-lines/what-know-about-geospatial-technology>.  
<sup>24</sup> “Multiverse Computing deploys quantum technology to predict floods,” TNW, October 31, 2023, <https://thenextweb.com/news/quantum-startup-multiverse-computing-predict-floods?rid=695466>.  
<sup>25</sup> Peter L. Miller, “CEO Viewpoint: Predict and Prevent Just Makes Economic Sense,” Carrier Management, March 28, 2024, [https://www.carriermanagement.com/features/2024/03/28/260569.htm?bypass=4893e3eae748cc99f496dd9815d514&rid=2012923&utm\\_campaign=RiskandInsurance](https://www.carriermanagement.com/features/2024/03/28/260569.htm?bypass=4893e3eae748cc99f496dd9815d514&rid=2012923&utm_campaign=RiskandInsurance).

# NAMIC ISSUE ANALYSIS

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Wildfire detection and response are areas in which AI models are currently being piloted. In 2023, the California Department of Forestry and Fire Protection began a pilot program leveraging AI models for wildfire detection.<sup>26</sup> The program leverages 1,039 high-definition cameras positioned throughout the state and uses AI models to constantly monitor the camera feeds for anomalies like smoke.<sup>27</sup> The benefit of the program is that AI can distinguish between smoke, fog, and clouds, and the cameras can catch potential wildfire activities from miles away. This leads to alerting fire protection units well before an individual might notice the blaze.<sup>28</sup>

The system not only works for fire detection, but it has also been helpful for officials to study the first moments of ignition to determine the cause.<sup>29</sup> While the California pilot is focused on detection and human-led response, NASA is funding research into leveraging AI machine learning for natural catastrophe response missions, like the use of unmanned aircraft and drones to help with emergency response. These technological advances not only help improve responses to the start of wildfires, but also increase awareness into the cause of fires, which may lead to other mitigation measures not yet developed.

## HOMEOWNER PERIL PREVENTION

Homeowner perils are another area that insurers can look to for applying AI models for prevention and mitigation. By way of example, “[e]lectrical fires impact nearly 50,000 homes each year ... [and] cause approximately \$1.3 billion in property losses each year.”<sup>30</sup> These hazards are often undetectable to a casual observer and can show no signs of an inherent electrical fire hazard.<sup>31</sup>

To prevent the damage that electrical fires can cause, some insurers are providing policyholders with home electrical monitoring devices. These devices operate by detecting electrical arcing and power quality problems in insureds’ homes.<sup>32</sup> Built with sensors and machine learning models, the devices sample voltages of the home, which leverage digital signal processing that is “capable of digitizing, detecting, and interpreting the medium to high-frequency content in [electrical] pulses.”<sup>33</sup> When sensor-identified conditions that have the potential to cause a fire are detected, the system alerts the homeowner and provides localization of the case along with troubleshooting protocol to mitigate a resulting electrical fire.<sup>34</sup> By way of numbers and a concrete example, one large insurer partnered with such technology and made the devices available to its policyholders for use in their homes; the program detected and mitigated more than 500 potential electrical fires in 2022.<sup>35</sup>

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<sup>26</sup> Hayley Smith, “As California fires worsen, can AI come to the rescue?,” LA Times, August 24, 2023, <https://www.latimes.com/california/story/2023-08-24/can-ai-fight-wildfires-california-is-counting-on-it>.

<sup>27</sup> Hayley Smith, “As California fires worsen, can AI come to the rescue?,” LA Times, August 24, 2023, <https://www.latimes.com/california/story/2023-08-24/can-ai-fight-wildfires-california-is-counting-on-it>.

<sup>28</sup> Hayley Smith, “As California fires worsen, can AI come to the rescue?,” LA Times, August 24, 2023, <https://www.latimes.com/california/story/2023-08-24/can-ai-fight-wildfires-california-is-counting-on-it>.

<sup>29</sup> Hayley Smith, “As California fires worsen, can AI come to the rescue?,” LA Times, August 24, 2023, <https://www.latimes.com/california/story/2023-08-24/can-ai-fight-wildfires-california-is-counting-on-it>.

<sup>30</sup> Vyto Babrauskas et al., “New Data: Home Electrical Fire Prevention,” WhiskerLabs, March 1, 2022, <https://www.whiskerlabs.com/ting-performance/>.

<sup>31</sup> Vyto Babrauskas et al., “New Data: Home Electrical Fire Prevention,” WhiskerLabs, March 1, 2022, <https://www.whiskerlabs.com/ting-performance/>.

<sup>32</sup> Vyto Babrauskas et al., “New Data: Home Electrical Fire Prevention,” WhiskerLabs, March 1, 2022, <https://www.whiskerlabs.com/ting-performance/>.

<sup>33</sup> Vyto Babrauskas et al., “New Data: Home Electrical Fire Prevention,” WhiskerLabs, March 1, 2022, <https://www.whiskerlabs.com/ting-performance/>.

<sup>34</sup> Vyto Babrauskas et al., “New Data: Home Electrical Fire Prevention,” WhiskerLabs, March 1, 2022, <https://www.whiskerlabs.com/ting-performance/>.

<sup>35</sup> Ashley Hattle-Cleminshaw, “State Farm’s Ting fire monitor detected and mitigated over 500 fires in 2022,” PropertyCasualty360, April 24, 2024, [https://www.propertycasualty360.com/2024/04/24/state-farms-ting-fire-monitor-detected-and-mitigated-over-500-fires-in-2022/?kw=State%20Farm%27s%20Ting%20fire%20monitor%20detected%20and%20mitigated%20over%20500%20fires%20in%202022&oly\\_enc\\_id=7887J1265456G3L&user\\_id=0b9cfc4320728645bfc7f69334ee80fdbc-cb77f8f42028d49b0b02063b95d58b&utm\\_campaign=weekender&utm\\_content=20240428&utm\\_medium=enl&utm\\_position=2&utm\\_source=email&utm\\_term=pc360](https://www.propertycasualty360.com/2024/04/24/state-farms-ting-fire-monitor-detected-and-mitigated-over-500-fires-in-2022/?kw=State%20Farm%27s%20Ting%20fire%20monitor%20detected%20and%20mitigated%20over%20500%20fires%20in%202022&oly_enc_id=7887J1265456G3L&user_id=0b9cfc4320728645bfc7f69334ee80fdbc-cb77f8f42028d49b0b02063b95d58b&utm_campaign=weekender&utm_content=20240428&utm_medium=enl&utm_position=2&utm_source=email&utm_term=pc360).

# INSURING THE FUTURE: BENEFICIAL AI USE CASES IN THE INSURANCE INDUSTRY

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## MITIGATING DISTRACTED DRIVING AND RESULTING CRASHES

In discussions about mitigating perils, distracted driving and resulting crashes must also be a part of the conversation. Technological advancements like the field of AI and AI model application offer exciting new potential to mitigate driver distraction and resulting crashes.<sup>36</sup> Two applications in particular have been gaining traction in the insurance space: 1) driver-monitoring systems; and 2) crash avoidance systems.

Driver-monitoring systems work by using a camera mounted on a vehicle's dashboard or steering column to track both driver distraction and driver drowsiness, and alert the driver to such activity.<sup>37</sup> These systems work by either inferring driver state using vehicle control measures like steering or throttle inputs or by direct monitoring that relies on camera-based methods and AI systems to identify driver states; more advanced methods use combinations of these methods and other metrics like driver head pose and gaze direction.<sup>38</sup> For mitigation purposes, the systems not only detect and warn a driver, but also can combine the warning with intervention, such as increasing the driver-assistance capabilities of the vehicle when driver inattentiveness is detected.<sup>39</sup> Regardless of the exact method deployed, monitoring-based prevention provides real-time feedback to a driver in an effort to avoid collisions and injuries resulting from distracted driving by stopping distracted driving in the moment. For commercial fleets specifically, these systems can send alerts or video clips to the fleet safety manager for review, who can then meet with drivers experiencing these events and leverage coachable moments, which has been shown to improve the safety of these fleets.<sup>40</sup> Insurers can use these systems in their programs and with their insureds as a way to provide insureds incentive to operate their vehicles with driver-monitoring systems, benefiting both the policyholders and insurers in reducing distracted driving.

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<sup>36</sup> National Distracted Driving Coalition, "How Technology Can Help Reduce Driver Distraction," March 2023, p. 2 <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

<sup>37</sup> Prina Gershon et al., "How Technology Can Help Reduce Driver Distraction," National Distracted Driving Coalition, March 2023, p. 3, <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

<sup>38</sup> Prina Gershon et al., "How Technology Can Help Reduce Driver Distraction," National Distracted Driving Coalition, March 2023, p. 3, <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

<sup>39</sup> Prina Gershon et al., "How Technology Can Help Reduce Driver Distraction," National Distracted Driving Coalition, March 2023, p. 3, <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

<sup>40</sup> Prina Gershon et al., "How Technology Can Help Reduce Driver Distraction," National Distracted Driving Coalition, March 2023, p. 5, <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

# NAMIC ISSUE ANALYSIS

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## IIHS Research On ADAS <sup>41</sup>

The Insurance Institute for Highway Safety conducts research on advanced driver assistance systems and other vehicle technology features. The studies are conducted by comparing rates of police-reported crashes and insurance claims of vehicles with the technologies against vehicles without the technologies. The results below are current as of July 2023.

### Automatic Emergency Braking

- 50% reduction in front-to-rear collisions
- 14% reduction in claims rates for damage to other vehicles
- 24% reduction in claim rates for injuries to people in other vehicles

### Lane Departure Warning and Prevention

- 11% reduction in single-vehicle, sideswipe, and head-on collisions

### Rear Automatic Braking

- 78% reduction in backing collisions (when combined with rearview camera and parking sensors)
- 29% reduction in claim rates for damage to other vehicles
- 9% reduction in claims rates for damage to insured vehicle

Collision avoidance systems are another beneficial application of AI models that insurers can use to educate policyholders, in the hopes that more insureds choose to purchase vehicles with those safety features and keep them enabled. Collision avoidance systems use AI models as their foundation, combined with radar, laser, camera sensors, and GPS to warn or assist drivers in avoiding imminent collisions.<sup>42</sup> These systems, which are a subset of advanced driver assistance systems (ADAS) available on most modern passenger vehicles, can alert distracted drivers to various risks of crashing and also intervene through braking or steering to avoid crashes when drivers don't respond to the system alerts.<sup>43</sup> Example features of the systems include lane departure warnings, brake warnings, and adaptive cruise control. Passenger vehicles equipped with such features have been shown to be involved in fewer front-to-rear crashes – up to a 27 percent reduction, and these crashes were cut in half when combined with automatic braking.<sup>44</sup> Through partnering with and educating insureds on the benefits of such vehicles, insurers can work toward becoming trusted partners to their policyholders in mitigating crash risk resulting from distracted driving.

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<sup>41</sup> Footnote for Highlight Box: Insurance Institute for Highway Safety, "Advanced driver assistance," July 2023, <https://www.iihs.org/topics/advanced-driver-assistance#overview>.

<sup>42</sup> "What is a Collision Avoidance System," Nauto, accessed April 30, 2024, <https://www.nauto.com/glossary/what-is-a-collision-avoidance-system#:~:text=A%20collision%20avoidance%20system%20is,%2C%20GPS%2C%20and%20artificial%20intelligence>

<sup>43</sup> Prina Gershon et al., "How Technology Can Help Reduce Driver Distraction," National Distracted Driving Coalition, March 2023, p. 9, <https://usnddc.org/wp-content/uploads/2023/03/NDDC-How-Technology-can-Help-Reduce-Driver-Distraction-11-1.pdf>.

<sup>44</sup> Insurance Institute for Highway Safety, "Real world benefits of crash avoidance technologies," July 2023, <https://www.iihs.org/media/290e24fd-a8ab-4f07-9d92-737b909a4b5e/oOlxAw/Topics/ADVANCED%20DRIVER%20ASSISTANCE/IIHS-HLDI-CA-benefits.pdf>.

# INSURING THE FUTURE: BENEFICIAL AI USE CASES IN THE INSURANCE INDUSTRY

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## CONCLUSION AND FUTURE OUTLOOK

While the industry is experiencing unprecedented times, the outlook is not all bleak. Particularly relative to the extreme weather, inflation, and litigation abuse aspects of the new era of risk, insurers can leverage the ever-advancing field of AI in various ways, including increasing precision in risk rating, increasing consumer satisfaction, streamlining claims practices, and empowering a risk mitigation mindset. In so doing, insurers can start to lessen the effect that the new era of risk has been having on the industry and consumers.

As the field of AI and its applications continue to evolve, and as consumers and the industry evolve with it, there are likely to be new beneficial use cases that emerge that aren't yet contemplated today. Society and the industry are viewing the very beginnings of rapid AI advancement and potential for incorporation and use. Much like the advent of the computer, and then the internet, AI is the newest application in the evolving world of tech to help insurers better do what they've always done, and in turn, better meet the needs and expectations of consumers.

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