Opportunities for Artificial Intelligence Applications in Insurance Regulatory Market Analysis

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The Center for Economic Justice

CEJ is a non-profit consumer advocacy organization dedicated to representing the interests of low-income and minority consumers as a class on economic justice issues. Most of our work is before administrative agencies on insurance, financial services and utility issues.

On the Web: www.cej-online.org
About Birny Birnbaum

Birny Birnbaum is the Director of the Center for Economic Justice, a non-profit organization whose mission is to advocate on behalf of low-income consumers on issues of availability, affordability, accessibility of basic goods and services, such as utilities, credit and insurance.

Birny, an economist and former insurance regulator, has worked on racial justice issues for 30 years. He performed the first insurance redlining studies in Texas in 1991 and since then has conducted numerous studies and analyses of racial bias in insurance for consumer and public organizations. He has served for many years as a designated Consumer Representative at the National Association of Insurance Commissioners and is a member of the U.S. Department of Treasury's Federal Advisory Committee on Insurance, where he co-chairs the subcommittee on insurance availability. Birny is also a member of the U.S. Federal Reserve Board's Insurance Policy Advisory Committee.

Birny served as Associate Commissioner for Policy and Research and the Chief Economist at the Texas Department of Insurance. At the Department, Birny developed and implemented a robust data collection program for market monitoring and surveillance.

Birny was educated at Bowdoin College and the Massachusetts Institute of Technology. He holds Master’s Degrees from MIT in Management and in Urban Planning with concentrations is finance and applied economics. He holds the AMCM certification.
Why CEJ Works on Insurance Issues


CEJ works to ensure *fair access* and *fair treatment* for insurance consumers, particularly for low- and moderate-income consumers.

*Insurance is the Primary Institution to Promote Loss Prevention and Mitigation, Resiliency and Sustainability:*

CEJ works to ensure insurance institutions maximize their role in efforts to reduce loss of life and property from catastrophic events and to *promote resiliency and sustainability* of individuals, businesses and communities.
Artificial Intelligence: Let’s Get More Precise on Terms

Ali vs. Data Mining vs. Machine Learning vs. Deep Learning

How Does AI work?

**Simple** – Automate human-designed rules – convert a manual premium calculation to an automated premium calculation – think of a spreadsheet.

**More Complex** – Implement human-designed rules to amounts of information difficult for humans to deal with – tools to identify quantitative outcomes – data mining and big data analytics.

**Yet More Complex** – Tools to make decisions based on desired outcomes or tools to identify qualitative outcomes – machine learning

**Yet Even More Complex** – Tools that teach themselves how to identify desired or qualitative outcomes – deep learning

**Key distinction** – moving from implementation of human-designed rules to algorithms that learn and change on their own.
Let’s look at potential applications of Al to review of policy forms

Simple – tools to compare policy forms and show changes, tools to search for and identify key specific words.

More Complex – tools that apply human-designed tests to policy forms – Flesch tests / readability, identify specific wording / phrasing of concern.

Yet More Complex – tools that identify potentially misleading or deceptive terms and provisions.

Yet Even More Complex – tools that learn and change to better achieve regulatory goals.
Let’s think about how these tools are possible and potential pitfalls

1. **Granular data and lots of it.** In the case of policy forms, you have thousands of individual words within a single policy form and thousands of policy forms from which to learn. The data you are analyzing – words, combinations or words and location of words – allows for granular analysis. You also have a rich database of accepted and rejected forms – you not only have the raw data, but you have outcome data.

2. **If the training data have errors or biases, the AI application will learn and perpetuate those errors and biases, unless steps are taken to identify and eliminate those biases.** Similarly, if the human-designed rules or defined qualitative and quantitative outcomes reflect human bias, the AI application will reflect and perpetuate those biases. While some bias may be offensive – intentional or unintentional racial bias – don’t consider bias to be sinister – think about confirmation bias – where information and outcomes that support one’s expectations are given great weight while information and outcomes that contradict one’s expectations are given less weight by the analyst. One of the great benefits of data mining and AI is the ability to identify and mitigate biases in data and modelers.
3. **Greater ability to analyze impacts on protected classes.** AI has raised awareness of the potential for proxy discrimination and disparate impact in insurance. For those of you who attended the NAIC screening of *Coded Bias*, you learned how and why facial recognition technologies are biased against African Americans. You may have also read about Google’s attempt to use AI to develop an unbiased hiring algorithm – and the algorithm failed to hire any women because the training data reflected the historical bias in hiring white men. But, AI offers opportunities for improved identification of such biases.

But the other lesson is that you have to evaluate outcomes produced by AI to ensure the AI application is producing the intended results. Auditing an algorithm on the front-end is not sufficient – you must collect and analyze outcomes produced by the AI application.
With that lengthy introduction, let’s look at opportunities for using AI in market analysis. The foundation of our inquiry are the following two points:

1. What outcomes are you trying to achieve?

2. What data are available / what data are needed?
Any AI application requires a clear articulation of the outcomes you are trying to achieve. Referring back to our policy form review example – the outcomes were identifying prohibited words, phrases and provisions and identifying misleading and deceptive provisions – the outcomes that would indicate a violation of statute or regulation.

The data available are not just thousands of policy forms but all the words in those policy forms as well as historical outcome data – accepted and rejected words and phrases. The historical data may go back many years, but recent data are also available.
When insurers utilize AI for, say, customer service, let’s assume the intended outcomes are reduced insurer costs, higher return on investment, improved customer satisfaction.

They might accomplish this with AI to reduce hold times on calls, reducing insurers’ human interaction (by using a chat bot) or using AI to match the most appropriate customer service agent with a particular customer in real time.

The data available to the insurer are thousands of actual historical consumer interactions – which consumer with which service representative, specific issue of concern, time of day, hold time, length of call, success of initial menu selection, use of chat bot, success of chat bot, issue resolved or not, pushed to supervisor, customer satisfaction and more.

With these data, the insurer can use AI to develop tools to analyze the customer and issue in real time and route to the most suitable customer service representative and allow the tools to continue to learn and modify to achieve the intended outcomes.
Clearly-Identified Outcomes and Timely, Granular Data

Insurers’ AI applications for marketing, pricing, claims settlement and anti-fraud rely on access to a variety of data sources accessible in real time to make decisions in real time based on specific customer or claim characteristics. Lots of data, accessed and analyzed in real time.

Let’s turn to AI for Market Analysis – First, what are the outcomes we want to achieve with AI for market analysis?

- Speed up current market analysis processes?
- Eliminate false positives in current market analysis processes?
Or, re-imagine and re-engineer market analysis for more timely ways to:

- Identify individual insurer violations of laws or regulations?
- Identify individual insurer violations of laws and regulations that reflect a business practice?
- Identify industry trends that may violate laws or regulations or that may require new laws and regulations for consumer protection?
- Identify legal consumer outcomes that reflect consumer confusion or legal but unfair or deceptive practices?
- Identify legal or possibly illegal practices that unfairly disadvantage consumers?
- Identify anti-competitive practices, markets or market segments?
• Identify insurers with poor consumer outcomes? Industry segments with poor consumer outcomes?

• Identify producers with poor consumer outcomes?

• Identify opportunities / needs for regulatory engagement with consumers – improve complaint filing opportunities and process, improve consumer education and disclosures, improve DOI websites, target DOI media and social media activities?

• More timely identify problematic practices and poor consumer outcomes?

• What are some others – what do you want AI in market analysis to accomplish?
Data Needs for AI in Market Analysis

Current data available for market analysis:

- Complaints
- MCAS
- Exams and other Continuum Actions
- Financial statements
- Insurer SEC filings
- Insurer investor presentations
- Insurer form and rate filings
- Insurer press releases and news reports
- Lawsuits
Quite a bit of data and information, but two major problems for using these to develop AI for market analysis:

- Difficult to combine data for AI due to different time frames, different types / sources of data and lack of common analytic unit.

- No data for actual, granular consumer outcomes. MCAS woefully inadequate for market analysis, generally, and for implementing an AI tool for market analysis, specifically. Moreover, MCAS requires prior identification of potential problems which the summary data are intended to identify – so confirmation bias has an outsized impact on the selection of data elements and breakouts to be included.

*AI for market analysis requires more timely and granular consumer outcome data – which means monthly or quarterly transaction data reporting.* The single most important action necessary to develop AI for Market Analysis is to re-engineer current statistical agent reporting to a transaction reporting regime. Whatever market analysis outcomes for which you want assistance from an AI tool, you need the raw material of granular and timely data of consumer market outcomes – quote and sales transactions and claims transactions.
Let me offer some examples of the role of granular data in market analysis.

*Mortgage forbearance as a result of the CARES Act – how much assistance was provided to whom and where?*

Urban Institute – pdf

Black Knight -- pdf
Covid-related claims in Worker’s Compensation – timely identification of impacts, ease of revision to data reporting.

CA -- pdf
MN -- pdf

WC stat plan revisions – existing data fields (“pandemic”) or add data field (“Covid-19”) as opposed to redesigning a summary reporting form to create new reporting categories and groupings.
Contrast WC with PPA – What type of market analysis was possible in April, May or June 2020 to

- Determine if insurers were complying with emergency orders?
- Determine if rates had become excessive or unfairly discriminatory?
- Determine if premium relief was sufficient to avoid excessive rates?
- Determine if premium relief was being provided fairly to consumers across insurers?
Unlike WC, PPA market analysts had no tools to perform timely market analysis because the available data didn’t allow analysis of

- How did claim frequencies and claim severities change by week or month?
- How did new claims reported by week starting on March 1 compare with the same period in prior years?
- What was the volume of and who received premium payment grace periods?
- What was the volume of and who received premium relief and when was it delivered?
- What was timing on claim resolution, how did that compare to prior periods and how did the timing change over the course of 2020?
Resources:


I’ll conclude by re-stating the two major tasks necessary to introduce AI into insurance market analysis:

- Identify the outcomes you want the AI application to identify; and

- Get the raw material necessary to implement meaningful AI by developing more timely and granular insurer reporting of consumer market outcomes by re-engineering the current statistical agent data reporting to monthly or quarterly transaction data reporting.