IAA AI TASK FORCE: GITHUB REPOSITORIES ON CASE STUDIES AND TOOLS

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The International Actuarial Association's (IAA) AI Task Force has developed a rich and growing set of resources for actuaries interested in artificial intelligence. One of the most valuable hubs for these materials is the Task Force's GitHub account – a central place where actuaries find practical case studies, how-to guides, and tools that help actuaries apply AI in their work.

THE IAA AI TASK FORCE

The IAA is the worldwide association of professional actuarial organisations, with a mission to advance scientific knowledge and the skills of actuaries globally. Launched in 2024, the AI Task Force brings together about 100 volunteers from all over the world. In its 2025/2026 phase, the AI Task Force is organised into four workstreams: 'Engagement and Foundations', 'Research and Advancement', 'Case Studies and Tools', and 'Adoption Framework'. This article offers a closer look at the work of the 'Case Studies and Tools' workstream. More information on the AI Task Force – its workstreams, overall deliverables, and general background – is available on the IAA AI Task Force website.

If you have visited the AIforActuaries platform, you've already encountered one of the AI Task Force's flagship initiatives – a space for learning, discussion, and exchange of AI-related content tailored for actuaries.

To share resources on case studies and tools more broadly, the AI Task Force also maintains a dedicated presence on GitHub, a widely used platform for hosting and collaborating on code, documentation, and project materials. >

The GitHub account features two primary repositories:

- *Actuarial AI Case Studies:* a curated collection of real-world AI examples – including machine learning, generative AI (GenAI), and agentic AI – designed to help actuaries apply these techniques to practical problems.

- *AI Tools for Actuaries:* a comprehensive hub of tutorials and how-to guides on AI tools, ranging from document-to-Markdown conversion to using large language models (LLMs) via API, aimed at enabling actuaries to integrate AI technologies into their workflows.

In the following, we take a closer look at each repository, explaining their purposes and showcasing sample content.

REPOSITORY SPOTLIGHT: 'ACTUARIAL AI CASE STUDIES'

This repository compiles a wide range of actuarial case studies involving AI, covering all skill levels from introductory to expert. Each case study is listed with metadata (e.g., date, topic, complexity level, models used, abstract/summary) and includes links to supporting materials such as articles, websites, and code. The collection primarily compiles existing case studies from the actuarial field; however, for topics where no suitable examples were found, the AI Task Force developed original case studies – complete with implemented code and explanatory documentation.

The repository's purpose is twofold:

1. Demonstrate concrete AI applications to actuarial tasks.

2. Enable actuaries to adapt these solutions for their own work by providing code and practical implementation steps.

To illustrate the repository's value, we highlight two original case studies showing how GenAI streamlines actuarial tasks with complex visual and unstructured data. Both are fully implemented as Jupyter notebooks.

Case Study 1: Car Damage Classification and Localisation with Fine-Tuned Vision-Enabled LLMs

This case study explores how multimodal LLMs, such as OpenAI's GPT-4o, can classify different types of car damage from images. It compares three models: a traditional convolutional neural network (CNN), an off-the-shelf GPT-4o, and a fine-tuned version of GPT-4o trained on a labelled subset of the car damage images. For the given task, the off-the-shelf GPT-4o performed nearly as well as the CNN straight out of the box – benefiting from pre-training and without requiring specialised CNN expertise – while fine-tuning the LLM further raised its accuracy and F1 score above those of the non-fine-tuned GPT-4o.

Notably, GPT-4o can go beyond simple classification by extracting contextual insights, such as the damage location (e.g., 'rear bumper') and additional details like weather conditions or number plates. These capabilities are particularly valuable for automating claims processing and risk assessment.

Case Study 2: GenAI-Driven Market Comparison

This case study applies GenAI to extract and compare key financial and insurance data from insurers' annual reports – documents that are long, unstructured, and highly variable. Using a three-stage pipeline based on retrieval-augmented generation (RAG), the model extracts three specific aspects from the 2025 annual reports of three major European insurers (AXA, Generali, and Zurich): regulatory capital ratios under Solvency II or the Swiss Solvency Test, EUR discount rates for insurance contract liabilities, and insurer financial strength ratings. >

The pipeline first processes and embeds the documents for semantic search, then retrieves relevant text chunks based on the user's query, and finally uses Structured Outputs to ensure the results conform to predefined JSON schemas. Five widely used LLMs are benchmarked on this shared retrieval pipeline, yielding stable, near-deterministic outputs across repeated runs. The approach enables actuaries to efficiently produce standardised comparisons across companies without manually reviewing entire reports – and can be readily adapted to analyse and compare other documents, such as risk reports or insurance tariff details.

REPOSITORY SPOTLIGHT: 'AI TOOLS FOR ACTUARIES'

This repository offers practical tutorials and how-to guides on AI tools designed to support actuaries in their daily tasks. Content is delivered in formats best suited to each tool – whether short instructional videos, interactive notebooks for code-based applications, or other appropriate media. Current examples include a document-to-Markdown conversion toolkit for actuarial workflows, with OCR and office-document support; and a guide to using large language models via API, covering basic prompting alongside more advanced techniques such as Structured Outputs, Function Calling, fine-tuning, and RAG.

The repository's purpose is to raise awareness of relevant AI tools, demonstrate their practical use with best practices, and highlight how these technologies can improve the efficiency and/or quality of actuarial work.

GET INVOLVED: A EUROPEAN INVITATION

We invite you to explore the **IAA AI Task Force GitHub repositories** and discover practical ideas you can adapt to your own work. European actuarial practice is already represented, and we particularly welcome further European contributions – for instance case studies built on EU and EEA data sources, analyses framed against EIOPA guidance and the EU AI Act, GDPR-aware data treatments, or tools developed within European actuarial workflows. If you know of, or have developed, relevant case studies or tools, please share them using the submission guidelines in the repositories or by contacting us directly.

New content is added regularly – stay connected and check back often to discover the latest updates. <

IAA AI Task Force: **https://actuaries.org/council/executive/artificial-intelligence/**
GitHub Repositories: **https://github.com/IAA-AITF/**
AIforActuaries: **www.aiforactuaries.org/**

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