

Py-shiny for Reinsurance:

ready or not, here we come

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June 16, 2023

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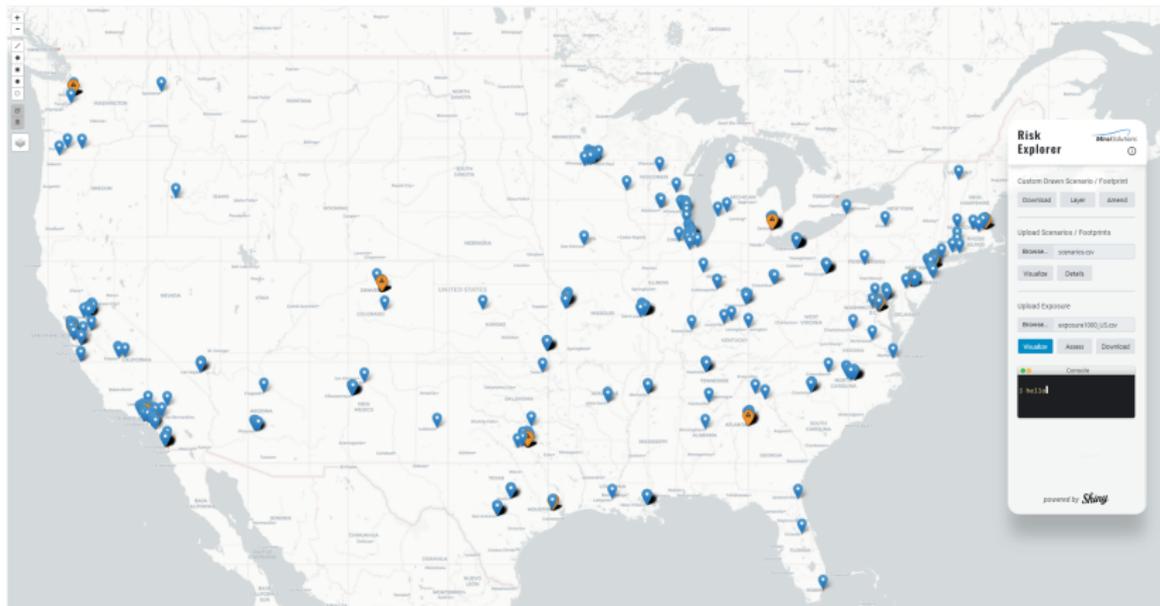
Purpose of Risk Explorer

- **Context:** Corporate reinsurance clients interested in extending and modernizing solutions to explore, accumulate and manage risks in interactive and responsive ways.

The core functionality of our initial Risk Explorer app / service helps to visualize, assess, communicate and understand risks and exposure.

- **Features / Usages:** Map visualization allowing to interactively create and modify custom (ad-hoc) hazard footprints and download footprint data. Upload existing scenario and exposure data and visualize. Validate and analyze exposure against scenarios.
-> Offers GIS and basic analytic capabilities and shall allow users to define and assess many different scenarios in an interactive way, with direct feedback and potential data export.

Use Case: US Terrorism Scenarios for ORSA



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The screenshot displays a web application interface for ORSA (Operational Risk and Scenario Analysis). The main component is a map of Boston, showing various neighborhoods like East Cambridge, West End, North End, Back Bay, South End, Fenway-Kenmore, and Bay Village. Several location markers are visible: blue pins in Fenway-Kenmore, Back Bay, and West End; and a red circular footprint in the West End area, which is being interacted with by a hand cursor. To the right of the map, there are two main control panels. The top panel, titled "Upload Scenarios / Footprints", includes a "Browse..." button followed by a text input containing "scenarios.csv", and "Visualize" and "Details" buttons. The bottom panel, titled "Upload Exposure", includes a "Browse..." button followed by a text input containing "exposure1000_US.csv", and "Visualize", "Assess", and "Download" buttons. Below these panels is a "Console" window with a dark background and yellow text, displaying the output: "\$ [42.3582, -71.05798]: - Aggregate 18,066,117.0 CHF".

Additional Features

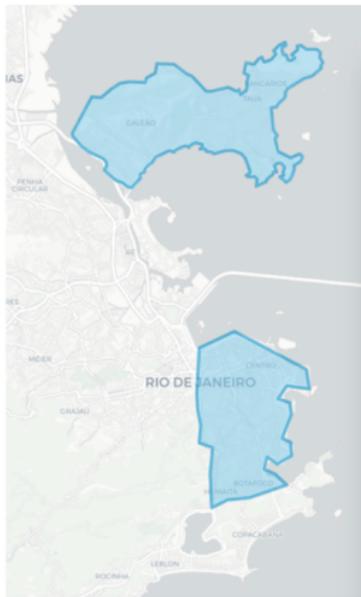
Zoom Control

Scenario Drawing Control

Make your own scenarios, with custom shapes and editing tools. Add to new layers

Layers Control

Layer visualization. On and Off feature



Risk Explorer

Mirai Solutions

Custom Drawn Scenario / Footprint

Download Layer Amend

Upload Scenarios / Footprints

Browse... Choose CSV File

Visualize Details

Upload Exposure

Browse... Choose CSV File

Visualize Assess Download

Console

```
$ amended details successfully!
```

powered by *Shiny*

Custom Drawn Scenario Controls

Create a new layer, download scenario for future use. Amend Scenario

Scenarios Upload

Exposure Upload

Event Console

Quickly check relevant information

- **Rapid Prototyping:**

Easy to get set up and running with PyCharm and Conda environment.

PyShiny smooth and efficient from the beginning with Uvicorn and localhost.

Improved out-of-the-box info logging.

Reactive features flexible and intuitive with decorators in Python.

- **Data:**

Fast creation of various sample data through new AI tools such as ChatGPT.

- **GIS:**

Despite Python being the preferred language not straight-forward to use existing libraries and achieve things that can be described rather simply.

`shinywidgets` and `ipyleaflet` with some limitations.

- **Styling:**

Difficulty in styling the application and understanding the UI syntax.

Challenging to assign classes and IDs for styling purposes.

CSS stylesheet not automatically updating after saving, requiring renaming and manual replacement in Python code.

- **Dynamic UI, Interactivity:**

Complications in integrating JavaScript with the framework.

Missing essential features compared to R Shiny and extensions, such as certain handlers.

- **Development:**

PyShiny's reactive nature and lack of error warnings toughens debugging.

Cluttered error log window in PyCharm hampers the debugging process.

Get involved / further reading:

- Mirai Solutions GitHub:
<https://github.com/miraisolutions>
- Mirai Solutions website:
<https://mirai-solutions.ch/>



We would like to hear your thoughts and ideas!