RSG
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VisionEval Explorer

Visualizing Alternative Futures with a Scalable Planning Dashboard

Case Study

Transportation planning tools such as VisionEval generate powerful insights, but they also generate enormous volumes of data. Each scenario run produces tabular outputs, geographic scale detail, and performance measures that must be interpreted, compared, and communicated clearly. For project teams and stakeholders alike, the challenge is rarely a lack of data. It is making sense of it.

VisionEval Explorer is RSG's answer to that challenge: a unified, web-based dashboard application that transforms complex model inputs and outputs into an interactive, intuitive experience for planners. Instead of rebuilding charts, maps, and summary tables after every model run, teams can explore results dynamically across geographies, performance metrics, and alternative futures. VisionEval Explorer reflects RSG's broader approach to custom tools and visualizations: pairing technical rigor with thoughtful design to make sophisticated analysis clear, interactive, and actionable.

The Challenge

VisionEval is an open-source strategic travel demand modeling tool built to assess complex transportation and land use in a flexible model design. Its inputs and

outputs are structured and highly detailed, optimized for complex scenario planning rather than rapid interpretation. Historically, moving from VisionEval's results to insight required additional manual effort: building spreadsheets, generating custom maps, and modifying hard-coded viewers whenever scenarios were rerun.

As projects expanded to include dozens or even hundreds of scenarios, that effort scaled quickly. Comparing alternatives across years, geographies, and performance measures required careful alignment and repeated formatting. Even small refinements could trigger time-consuming updates to visualizations. Tools created for a single application were often difficult to reuse, increasing the risk of inconsistency and creating ongoing maintenance burdens.

The format of the data itself added complexity. Tabular outputs made it difficult to quickly identify anomalies, understand spatial patterns, or communicate trade-offs clearly. Detecting a single irregular value could mean combing through rows of numbers. Answering new questions often required additional GIS work or custom graphics. At the same time, expectations for transparency and engagement among planners are growing. Teams need a modern,

flexible way to explore, filter, and share results without rebuilding tools for every project.

RSG's Solution

RSG developed VisionEval Explorer as a reusable, multi-project platform designed specifically to streamline the exploration of VisionEval inputs and outputs. Rather than delivering a one-off dashboard, RSG built a powerful, web-based application that can be deployed alongside new VisionEval deployments without rewriting the underlying tool.
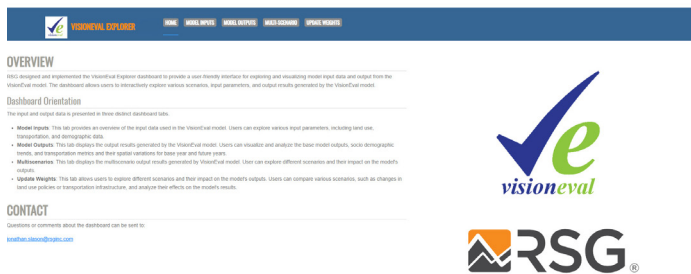
Built in Shiny for Python, VisionEval Explorer brings together multiple complementary views of the same data. Interactive maps reveal spatial variation. Charts and distribution plots surface variability and outliers that averages alone might conceal. Tabular views remain available for detailed inspection, preserving analytical transparency while enhancing clarity. Users can compare scenarios side by side, evaluate differences across time horizons, and examine how changes in inputs influence outcomes.

VisionEval Explorer's architecture emphasizes maintainability and reproducibility. Project-specific elements are separated from the core application code, allowing refreshed model outputs to be integrated through a consistent workflow. Scenario updates no longer require manual dashboard revisions. This approach reduces repetitive effort, supports consistency across projects, and ensures the tool can evolve alongside the modeling platform itself.

Beyond efficiency, VisionEval Explorer strengthens both quality control and communication. Visual interfaces make irregularities easier to detect and validate, supporting faster, more informed review. At the same time, the platform's design enables clearer conversations about trade-offs and performance across alternative futures. Stakeholders can prioritize uncovering actionable insights from the analysis scenarios rather than getting bogged down in details.

Through VisionEval Explorer, RSG united our team's VisionEval domain expertise, data science acumen, and commitment to user-centered design to create a scalable planning tool that turns complex model outputs into defensible, interactive insights.

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