SOLUTION BRIEF

Virtual Reality
Immersion Analytics

ADDING DIMENSION TO DATA ANALYTICS THROUGH IMMERSIVE VISUALIZATION

Immersion Analytics
a Virtual Cove company

Immersion Analytics Visualizer™ taps the greater potential of the human mind by allowing users to view data in multiple dimensions.

In today's global environment, the sea of data is overwhelming in sheer volume, scope and complexity. Our ability to process that data depends on how much of it can be visualized and understood at any given moment. An informational bottleneck is created when we are forced to break apart multidimensional data so that it can be viewed in a 2D format, as on paper or a computer screen. A world of insight is limited or lost entirely due to the resulting data blindness.

Immersion Analytics Visualizer solves this by leveraging the immersive properties unique to virtual, mixed, and augmented reality. Visualizer taps into the intuitive, multidimensional thinking human minds have honed over a lifetime of experience interacting with the physical world. We do this naturally every time we walk, drive a car or catch a ball. By leveraging this innate human ability, the mind is able to process more data and uncover hidden insights in a fraction of the time.

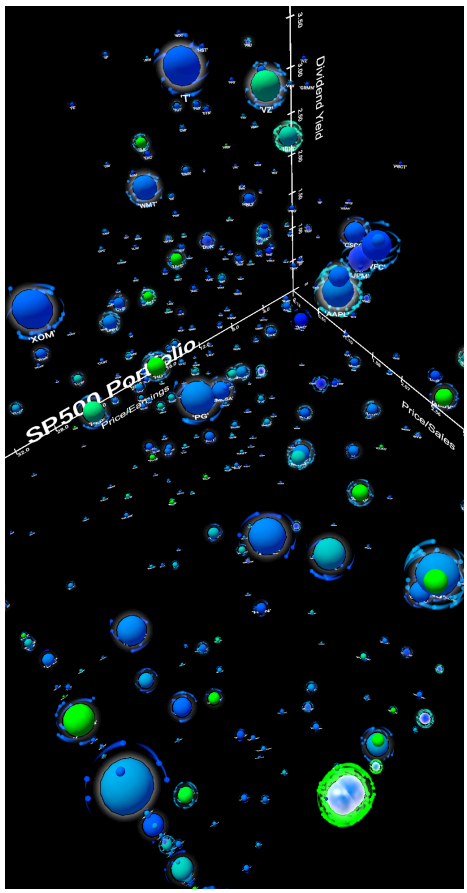
Immersion Analytics' products enable you to:

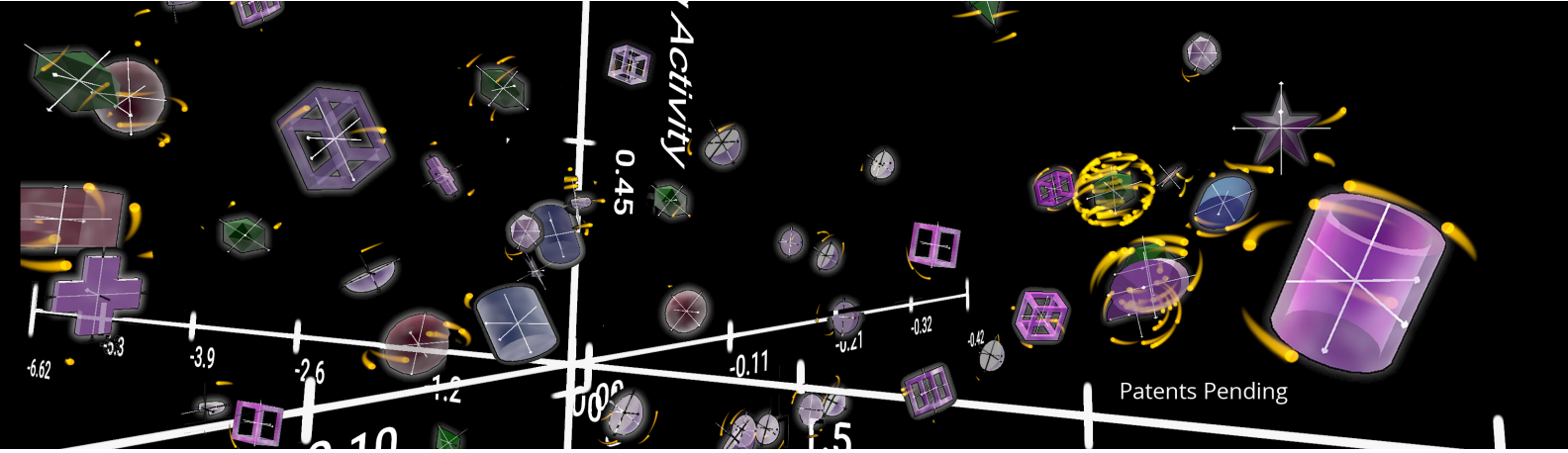
- Distill 1,820 unique plots, across vast data sets, into a single visualization
- Understand interrelationships across complex data structures
- Create trust and AI Governance™ for black-box AI models
- Interactively filter and pivot data
- Uncover the unknown unknowns to discover new risk and opportunity

For data-driven companies, this new approach to experiencing data can increase exploratory data visualization productivity up to 400-fold, revealing insights not otherwise possible and dramatically decreasing time-to-insight. Immersion Analytics Visualizer is designed to leverage the high clock speeds in Intel® Core™ i7, i9 and Intel® Xeon® CPUs, where tens of thousands of data points and dynamic visualizations are smoothly rendered by the GPU using Immersion Analytics' proprietary rendering technology.

Easier than you may think

At the 2018 LiveWorx conference in Boston, attendees were able to experience PTC's ThingWorx Analytics Industrial IoT predictive model using Immersion Analytics Visualizer. With no prior VR experience, subject-matter experts understood the model in 16-dimensional context.





A Critical Human Supplement to AI

Increasingly, companies look to AI and machine learning to address the avalanche of available data. These machine approaches, however, come with some limitations. Training models to find anomalies, properly consider relevant factors and bring transparency into the "black box" is an ongoing challenge.

Data analysis seeking anomalies of interest can elude these machine approaches. This is especially true with unknown unknowns and dynamic non-linear systems, where the rules keep changing as present in cybersecurity, financial markets, and healthcare. While machines may fail to spot 0-day threat vectors or new financial strategies because the very rules of the game keep changing, human experts intuitively "know it when they see it" so long as they are given a more complete perspective. Immersion Analytics' unique immersive visualizations and architecture makes this an operational reality.

By widening and deepening the data perspective, subject-matter experts are able to apply experience, context, and intuition in common sense ways to find the shortcomings of existing models. Operationally, it becomes feasible to supervise dimensional inputs in context of model-generated output, empowering humans in the loop. Wider adoption of AI and machine learning can be facilitated with an approach that is more inclusive of a wider array of human expertise; stakeholders are able to see models in proper context, fostering trust and AI Governance of formerly "black box" systems.

"Virtual Cove Visualizer is a completely new approach to experiencing data we found visually impressive and mathematically sound. This software enables a new data perspective we've not seen anywhere else."

-Dan DiBartolomeo
President of Northfield Information Services

Accelerating Time-to-Insight with Immersion Analytics Visualizer

To illustrate how the Immersion Analytics system can work in financial applications, exploratory data visualization was performed studying output from two Northfield Information Services proprietary models, U.S. Fundamental Equity and U.S. Macroeconomic Equity.

Adding four additional stock-specific variables of interest, a total of 26 factors were considered. Attempting this task with conventional business intelligence offerings would have required manually studying 14,950 unique x-y-size-color animated scatterplots. Studying for five minutes each, the task would have required at least 35 workweeks. And then, it's unlikely any human analyst would connect the dots between what was seen early vs. later in the process.

Northfield Information Services is a global leader in producing analytical models and applications for financial risk management of financial institutions. Northfield's models yield subtle patterns and relationships, with nonlinear dynamic systems resulting from financial markets where market actors adapt strategies based on evolving information.

With Immersion Analytics Visualizer, it was possible to divide the manual task of visually exploring 14,950 unique plots by distilling 1,820 such combinations as one. The human analyst was able to achieve the same information coverage by studying only nine visualizations, in a single afternoon. Given the rapid pace of trading in global financial markets, such time savings may be uniquely valuable.

This condensed process enables proprietary discoveries, such as formulating new market hypotheses, all while reducing effort and expense. In addition to labor savings, distillation facilitates information retention across visualization sessions to better triangulate insight which may otherwise go unnoticed.

Taking Data Analysis into the Future

Within data-driven industries, including finance, cybersecurity, IoT, project portfolio management, research, defense, and generalized business intelligence, Immersion Analytics Visualizer is designed to:

- Accelerate time-to-insight
- Enable new discoveries
- Distill complexity
- Fit existing systems & workflows

"Consider the benefits of distilling 1,820 unique 2D plots into a single 16D visualization in complete context. This wider perspective draws attention to anomalies and factors you would not have had time to consider before. It also inspires subject-matter experts to formulate unexpected hypotheses which fuel innovation. Immersion Analytics will continue to push the boundaries of high-dimensional immersive visualizations by leveraging Intel's high-performance architectures." – Bob Levy, Founder & CEO, Immersion Analytics

Immersion Analytics Runs on Intel

Immersion Analytics' proprietary rendering engine depends on Intel and optimized CPU pipelines that support more data being processed in parallel, for processing real-time streaming data feeds. Intel's high-performance CPUs enable Immersion Analytics to push the boundaries of data analysis with rich, immersive visualizations.

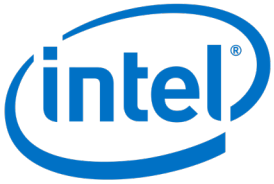
Addressing the AI Challenge

Other attempts to address machine learning limitations use dimensionality reduction techniques such as principal components analysis (PCA) and T-distributed stochastic neighbor embedding (t-SNE). While these abstractions can help analysts see some overall structure, such models distort reality. Visualizer preserves intuitive understanding of the original data.

Learn more

For more information on immersive data visualization, visit:
https://www.immersionanalytics.com/Intel

To learn more about Intel hardware and supported software, go to:
https://software.intel.com/en-us/home



Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.
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