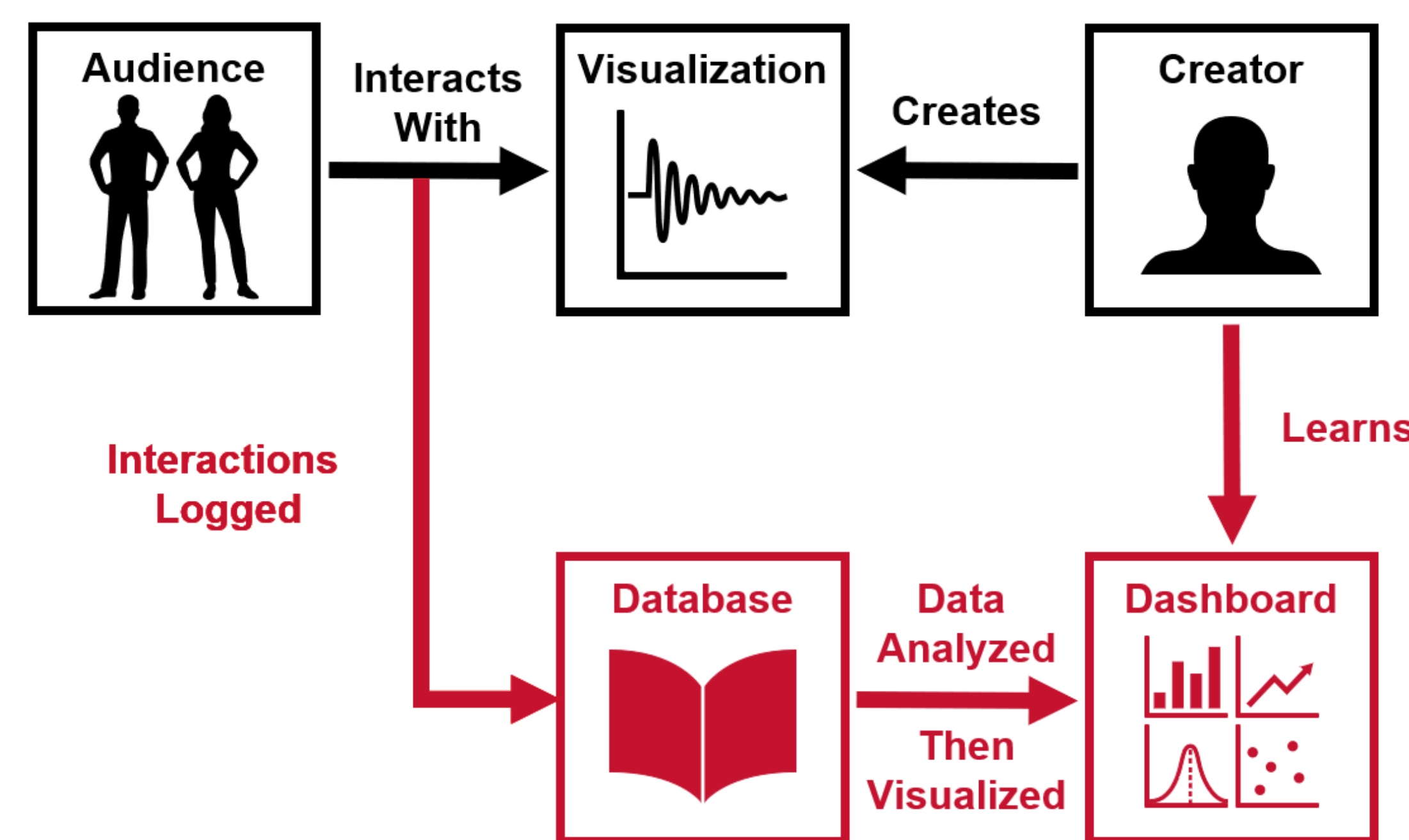


### Problem Statement

Creators of interactive visualizations have few ways of understanding how their audience reacts to their work. Once their visualization is published to the web, there exists no widely accepted mechanisms for the creator to see how users interact with that visualization.

### Current Cycle of Visualization Creation



### Informed Iterative Development with ReVisit

ReVisit would close the gap between the visualization creator and audience by collecting user interaction data, analyzing it, and presenting it in a dashboard.

### Research Questions

**RQ1:** What are the current goals and working contexts of interactive visualization creators?

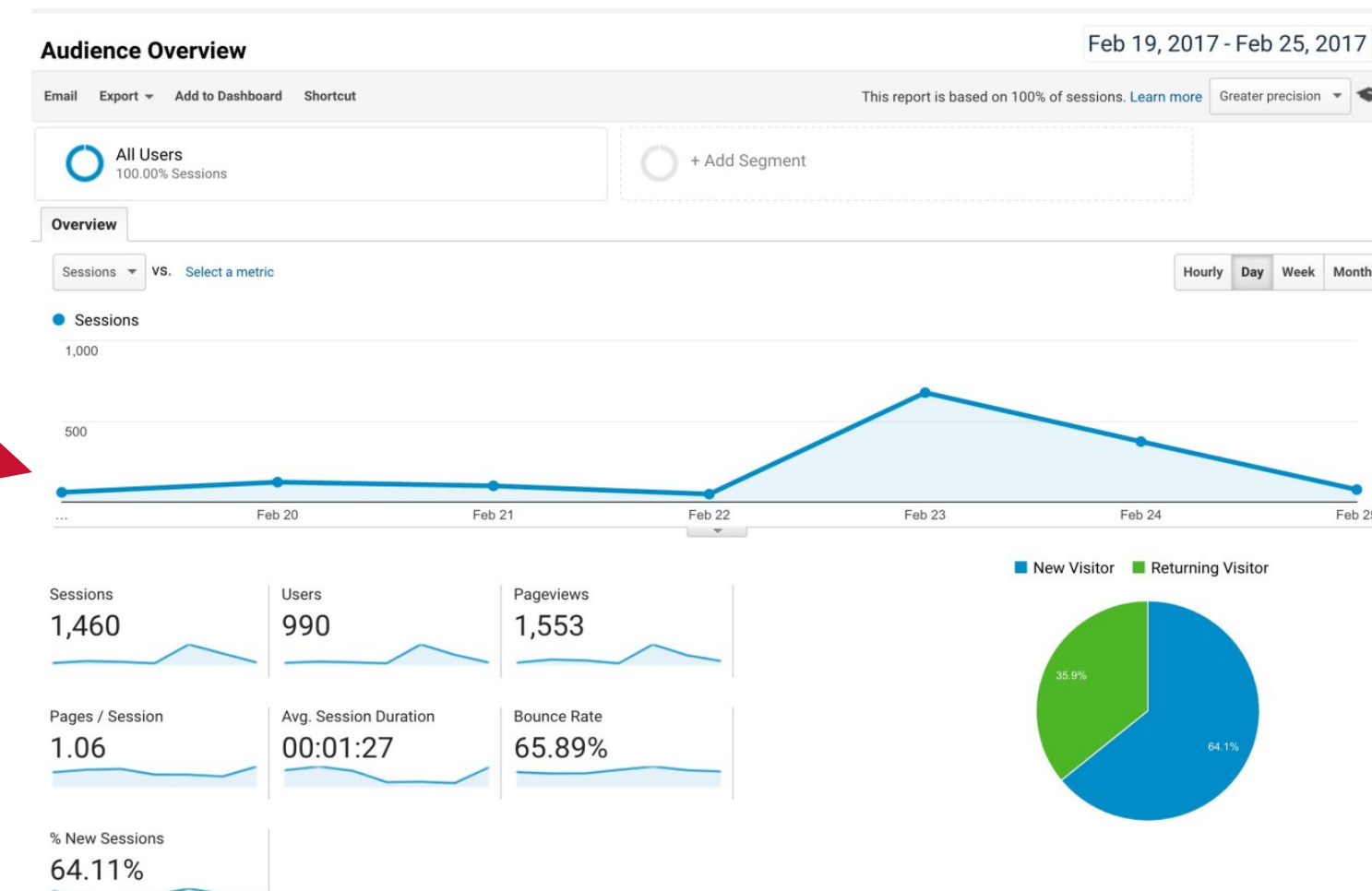
**RQ2:** How can valuable data regarding audience interactions with visualizations be captured efficiently?

**RQ3:** How can tools like ReVisit help interactive visualization creators understand their audience through visualized user interactions?

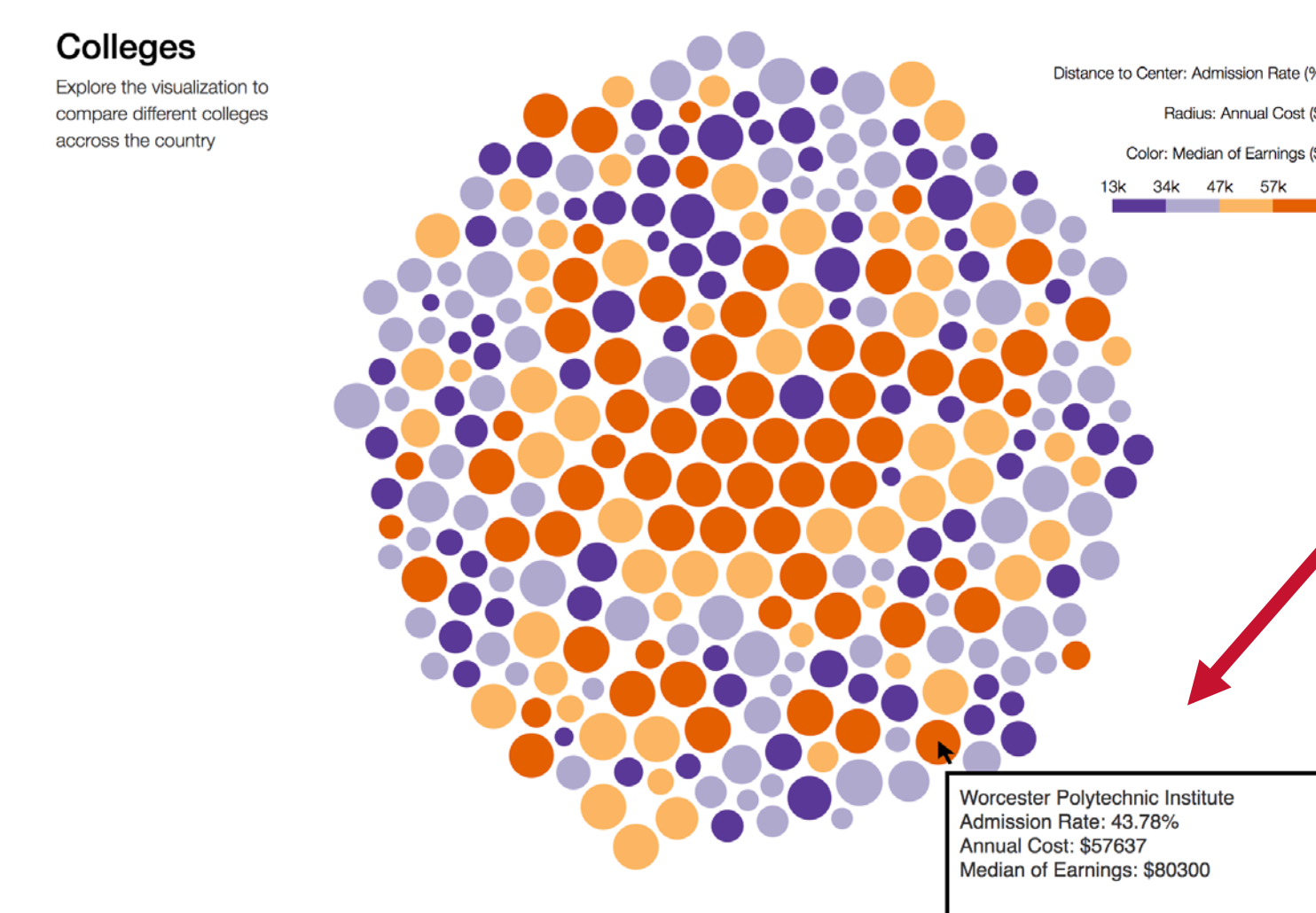
### Contemporary Evaluation Systems

Currently, creators use tools like Google Analytics to get data on the work they publish to the web [1]. Google Analytics only gives them a surface level look.

Google Analytics gives how many people visited the page, but how did those users interact with the items on the page?



### Interactive Visualization Use Case

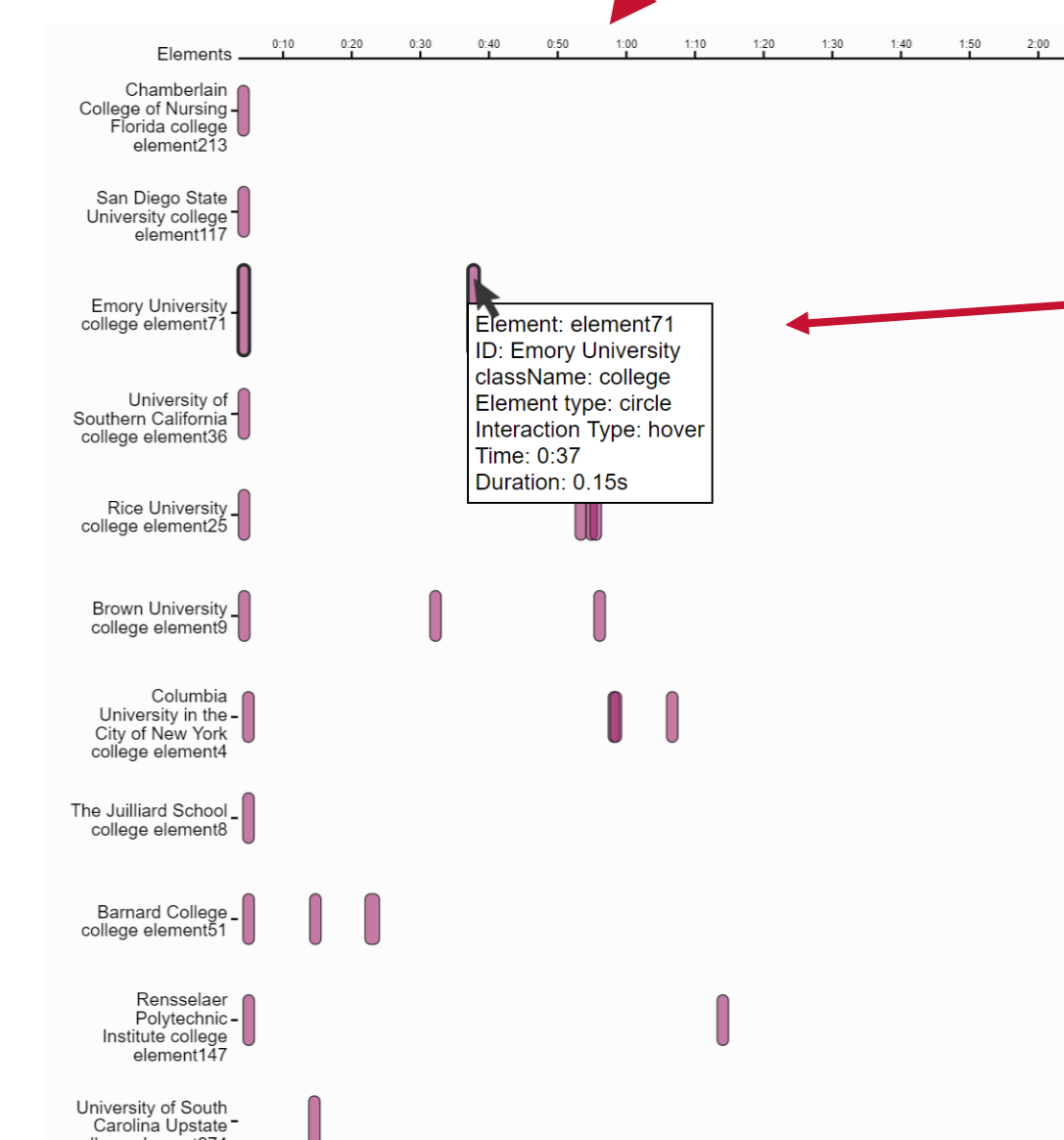


An interactive visualization that ReVisit could be applied to is shown to the left. Hovering over a circle reveals a tooltip with information about the corresponding data point. This visualization could be published to the web and the actions that these audience members take regarding the visualization can be tracked and recorded by the ReVisit logger.

### Data Processing and Analytics

Logged interaction data is processed on the server. For each user session a uniqueness score is calculated [2]. A high uniqueness score indicates that the user's interactions were distinct from the typical user. Uniqueness scores allow visualization creators to determine which users are average and which are outliers.

### ReVisit Interface

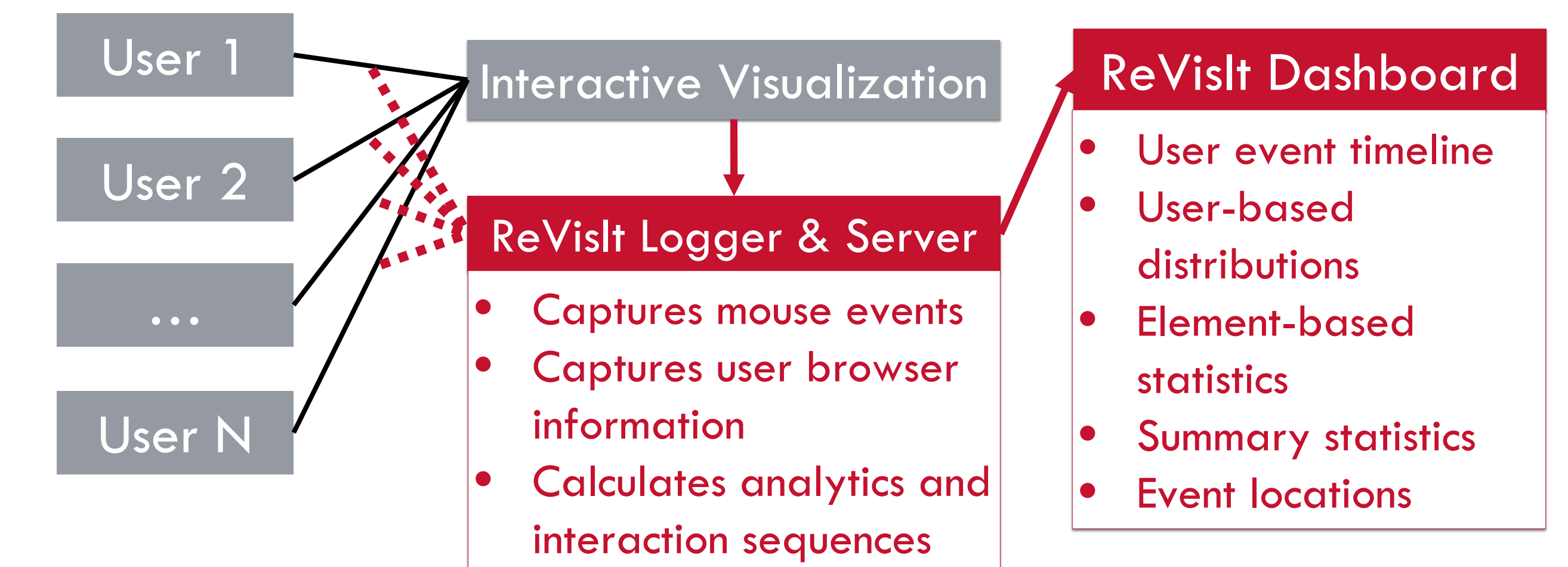


Events of a user session are presented on a timeline. More information about individual events is shown when hovered over.

The location of the highlighted event is shown on the analyzed visualization.

The ReVisit dashboard allows visualization creators to visualize user interaction sequences. They can see what elements those users have interacted with, for how long, and in what order.

### System Features



### Evaluation

To answer our third research question and evaluate ReVisit's potential to be a passive evaluation tool for interactive visualizations, we conducted 4 interviews with visualization creators.

Question	Consensus
How do you currently measure user interactions?	Creators currently have little to no access to information about user interactions.
Would the data presented in ReVisit be valuable to your work?	Being able to see how the users interacted with visualizations would be helpful. "I would buy this product" said one interviewee.
What features of ReVisit require improvement?	The current UX has a steep learning curve and is not intuitive without explanation.

The interview study also revealed that creators mainly focused on the event timeline rather than looking at the visualizations on the side. We concluded that this may be due to the UX design. Overall, the interviewees were excited for the potential of a tool like ReVisit.

### Future Work

While ReVisit received positive feedback from visualization creators, there are still improvements to be made. For future iterations we suggest the following additions:

- Improved location visualization
- Research into key performance indicators
- Research into more useful statistics
- Improved user experience
- Research and development of scalability
- Database storage

### References

- [1] Google analytics. <https://marketingplatform.google.com/about/analytics/>
- [2] M. Feng, E. Peck, and L. Harrison. Patterns and pace: Quantifying diverse exploration behavior with visualizations on the web. *IEEE Transactions on Visualization and Computer Graphics*, 25(1):501–511, Jan 2019.

Thank you to Professor Lane Harrison and Mia Feng for all their help.