

Elevate Your Charts: Make Visualizations Speak with Effective and Engaging Annotations

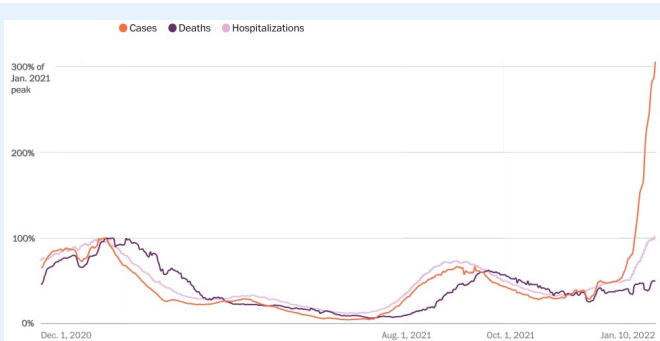
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Annotations are **widely used in visualizations to enhance data communication** by emphasizing key data features, but a **gap in understanding their effective usages and best practices** limits our ability to create effective visualizations and develop automated annotation tools



Our goal is to build a **comprehensive design space of annotations** by **understanding their effective usages and best practices** in visualizations

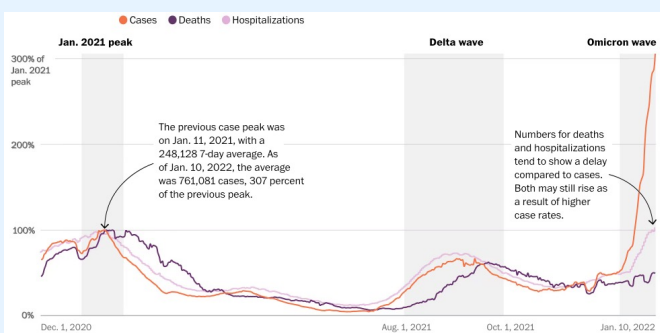


Before: Chart without annotations



hmmm...what's going on here?

added annotations to emphasize key data features



After: Similar chart with annotations



Yesss! Now I know!

Annotations help people **interpret visualizations quickly and efficiently** by **improving visualization comprehension, data retention and retrieval**, and aid in **collaborative data analysis** and **narrative storytelling**



We developed a **design space for chart annotations** derived from **real-world annotation practices** across 14 common chart types

why?

Annotation Type	Common Usages
Envelope	<ul style="list-style-type: none"> Identify a group or an individual point or area of interest Compare a group or an individual point or area of interest
Connector	<ul style="list-style-type: none"> Identify connected visual elements Compare a group or an individual point or area of interest
Text	<ul style="list-style-type: none"> Present: additional context Identify, Summarize, or Compare visual elements
Glyph	<ul style="list-style-type: none"> Identify visual elements Compare visual elements
Color	<ul style="list-style-type: none"> Identify visual elements Compare visual elements
Indicator	<ul style="list-style-type: none"> Identify statistics and threshold values Summarize trends in data Compare trends in data
Geometric	<ul style="list-style-type: none"> Identify a group or an individual point or area of interest

what?

- External Annotations:** Annotations that use data that are external to the dataset.
- Derived Annotations:** Annotations based on calculated data from the dataset.
- Internal Annotations:** Annotations that are directly generated from the dataset.

how?

- N-Annotation Ensemble:** When N distinct annotations are used together, it is an N-annotation (where N = 2, 3, 4, etc.) ensemble.
- One-way:** When one annotation can provide equivalent task support without the other, they have a 1-way dependency relationship.
- Two-way:** When the combination of annotations cannot independently support a task, they have a 2-way dependency relationship.

- Why?** identifies tasks and common annotation usages
- How?** elaborates on diverse chart annotation practices
- What?** categorizes data sources for annotations



We investigated the **common annotation strategies** used by **professional visualization designers**



We studied how **visualization students annotate bar charts** when prompted with **high-level questions about the data**