$$V = T + I + E + C$$

THE VALUE OF VISUALIZATION

$$\vee = \mathbf{T} + | + \mathsf{E} + \mathsf{C}$$

The ability to minimize the total **time** needed to answer a wide variety of questions about the data (without formal questions, interaction really helps)

The ability to minimize the total **time** needed to answer

- Retrieve Value

- Filter

 Compute derived values
 Find extremes

 Characterize Distribution
 Find Anomalies
 Cluster

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- Sudden grasp of new relationships that are necessary to solve a problem and that were not learned in the past.
- Is knowledge building and model-confirmation, like a substance that people acquire with the aid of systems (not an aha! Moment)

THE VALUE OF VISUALIZATION

 $V = T + I + \mathbf{E} + C$

The ability to convey an overall **essence** or take-away sense of the data.

(the big picture, where the whole is greater that the sum of the parts)

$$\vee = \uparrow + \mid + \mid E + \mid C$$

The ability to generate **confidence** and trust about the data, its domain and context. (beneficial data analysis process side effects)