Missing Data

Missing data are data points that for some reason have not been recorded and are absent from a data set.

The analyst does not know what value it would have taken if it had been recorded.

The Complexity of Analysing Data With Missing Values

Variables with missing values are multi-type variables: the recorded values are of one type (numerical, ordinal, categorical), while the missing values are a type of their own.

Cannot apply standard statistics to missing data – the missing values in a variable have no mean or distribution

The degree of missingness, and how it is distributed, may greatly affect which methodology is most appropriate

Exploration of Missingness – a Visualization Challenge

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Exploration of Missingness – a Visualization Challenge

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Exploration of Missingness – a Visualization Challenge

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.

Visualization may greatly support the investigation of missingness patterns and visual attributes aid by indicating the existence of missing values [2]. Wong and Varga [8] identified representation of missing data as a particularly important visual analytics issue. This was also emphasized by Kirk [3]. However, only a small number of publications [4, 5, 6, 9] describe methods for visualizing missing values.