The Median Absolute Deviation about the Median (MAD)

A measure of spread that has a long tradition is the Median Absolute Deviation about the Median (MAD), also sometimes (humorously) abbreviated the MADAM. The MAD is defined as follows for a data set \( \{X_1, \ldots, X_n\} \):

1. Compute the median,
   \[ \text{Med}_n = \text{median of } \{X_1, \ldots, X_n\}. \]

2. Next compute the absolute deviations about the median,
   \[ \{|X_1 - \text{Med}_n|, \ldots, |X_n - \text{Med}_n|\}. \]

3. Finally, get the median of these absolute deviations,
   \[ \text{MAD}_n = \text{median of } \{|X_1 - \text{Med}_n|, \ldots, |X_n - \text{Med}_n|\}. \]

One appeal of the MAD is its simplicity. Another is its high robustness – like the median, the MAD is unaffected even if 50% of the data are moved to \(+\infty\) (or all to \(-\infty\)). In comparison, the interquartile range (IQR) allows only up to 25% of the observations to be taken to \(\pm\infty\) without “breaking down”. And the standard deviation, like the mean, breaks down if just one observation is taken to \(\pm\infty\).

– RJS, 8/25/09