

Trend and Bend in Data on Heights

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Abstract

The average height reflects the standard of living and quality of life. Nutrition and health over generations influences the height of descendents to varying degrees. Hence, in this paper we try to detect if there is some trend in the data on the heights and estimate the slope (trend), if any. We also explore some interesting aspects like sex ratio, non-normality of data and reasons behind Galton's bend. It is observed that the data collected does not come from Normal population. Hence we use Mann-Kendall nonparametric test for detecting trend using R. We further estimate the slope using Sen's method to forecast the average height of Indian male/female. It is seen that the rate of yearly growth of an average Indian female is twice that of an average Indian male. The sex ratio is 989 per thousand.

We also observe nonlinearity in the plot of heights of sons/daughters against the average height of their parents. This bend is called "Galton's Bend". It was first observed in Galton's family stature data which was actually used to propose theory of linear regression. He had assumed the distribution of parent population to be Bivariate Normal which was actually not so. We use nonparametric regression to fit an equation using data on heights and try to find possible reasons for the existence of bend.

Keywords: Mann Kendall Test, Sen's Test, Nonparametric Regression, Galton's Bend.
