An Atmospheric Visibility Measurement System Using Smartphone

Lin, Jianing

A lightweight atmospheric visibility measurement system, the mobile visual range measurement(M-Vsi), is established on the smartphone platform. The smartphone's camera is used to take the photo of the sky, while the smartphone' attitude angles are determined by its internal sensors. The photo taken is analyzed and compared to those taken before with known atmospheric visual ranges issued by the authorized meteorological stations, and the current visual range is obtained through mathematical models. Two key technologies are used in the system: one is to keep the proper position of the smartphone, which depends on the applications of the internal sensors; the other is to establish the reliable mathematical models, which is available for the popular smartphones nowadays. Two mathematical methods are used in this study, the multivariable quadratic fitting method and the nearest neighbor method, together with the machine learning to revise the visual range data issued by the authorized stations referred. The visual range data measured by the M-Vsi are close to those issued by the authorized meteorological stations according to our real-time field measurements. The M-Vsi can be widely used by anyone who holds a smartphone, and make the plot of visual range distribution all over the world possible.

Awards Won:

Third Award of $1,000