

1067-62-719

Ali A Al-Sharadqah* (alsha1aa@gmail.com), 411 Hickory Knolls, Birmingham, AL 35226. *A novel Algorithm for ellipse fitting*. Preliminary report.

Fitting simple contours to observed points is a basic task in pattern recognition and computer vision. The most important contours are circles and ellipses. Many practical algorithms have been developed for such curves to scattered data, but their statistical analysis is difficult when both coordinates of observed points are measured with errors. In modern statistics, the corresponding assumptions are known as Errors-In-Variables (EIV) model. Al-sharadqah and Chernov developed a new approach to study the statistical properties for curve fitting. This allows them to investigate the most popular circle fits (geometric fit and other algebraic fits such as Kasa, Taubin and Pratt) and show exactly why and by how much circle fits differ from each other. Also, they constructed a new algebraic (non-iterative) circle fitting algorithm that outperforms all the existing methods, including the geometric fit by removing the significant part of the second order bias. Inspired by their work, we study the statistical properties of ellipse fits (Algebraic, GRAF), which are much harder than circle fits, and developed new ellipse fits by eliminating the second order bias completely. These fits again outperform the existing fits (Received September 14, 2010)