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Bias Correction in Localization Algorithms

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Abstract:

In our work a novel analytical approach to approximate and correct the bias in localization problems in n-dimensional space (n = 2 or 3) with N (N ¸ n) sensors is proposed. This new method mixes Taylor series and Jacobian matrices to determine the bias, and leads to an easily calculated analytical bias expression. The proposed novel method is generic which means it can be applied in many types of localization algorithms with different types of measurements. To illustrate this approach, we analyze the proposed method in three situations. Moreover we compare the proposed approach with a well-cited existing bias-correction method using simulation data. Monte Carlo simulation results verify that when the underlying geometry makes the localization problem reasonable the proposed approach can correct the bias effectively in space of dimension 2 or 3 with an arbitrary number of sensors. In addition, the proposed method is applicable irrespective of the type of measurement (range, bearing, etc). The simulation results also demonstrate that the proposed approach performs better than an existing comparison method.

Biography:

Yiming (Alex) Ji was born in Jiangsu, China. He received the B.Eng degree with ?rst class honors in computer science and engineering from Northwestern Polytechnical University (NWPU), China in 2008. He is now a PhD candidate under the supervision of Prof. Brian Anderson at School of Information Engineering, the Australian National University, adjunct at Canberra Research Laboratory, NICTA Ltd.. His current research interests include: Sensor Network Localization without GPS, Consensus, Complex Network, Bias in localization algorithms.