Directional Statistics with the Spherical Normal Distribution - DTU Orbit (02/11/2018)

Directional Statistics with the Spherical Normal Distribution
A well-known problem in directional statistics - the study of data distributed on the unit sphere - is that current models disregard the curvature of the underlying sample space. This ensures computational efficiency, but can influence results. To investigate this, we develop efficient inference techniques for data distributed by the curvature-aware spherical normal distribution. We derive closed-form expressions for the normalization constant when the distribution is isotropic, and a fast and accurate approximation for the anisotropic case on the two-sphere. We further develop approximate posterior inference techniques for the mean and concentration of the distribution, and propose a fast sampling algorithm for simulating the distribution. Combined, this provides the tools needed for practical inference on the unit sphere in a manner that respects the curvature of the underlying sample space.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Cognitive Systems
Contributors: Hauberg, S.
Pages: 704-711
Publication date: 5 Sep 2018

Host publication information
Title of host publication: Proceedings of 2018 21st International Conference on Information Fusion, FUSION 2018
Publisher: IEEE
ISBN (Print): 97809996452762
DOI: 10.23919/ICIF.2018.8455242
Source: Scopus
Source-ID: 85054082495
Research output: Research - peer-review › Article in proceedings – Annual report year: 2018