HAAG Weekly Report Week 5

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Feb 07, 2025

Time-Log

- What did you do this week?
  - Ran example code for PyCPD algorithm
  - Researched on creating Statistical Shape Model using PCA on landmark points.
  - Managed Meeting with Dr. Porto to discuss Project Progress.
  - Read research Document on Bayesian Extensions and Geodesic Kernels on CPD.
- What are you going to do next week
  - Implement Statistical Shape Model in python using PCA.
  - Implement Gaussian Mixture Model using Mean of Moving Point Scans.
- Blockers, things you want to flag, problems, etc.
  - No current blockers.

Abstracts

Hirose, Osamu. (2022). Geodesic-Based Bayesian Coherent Point Drift. IEEE Transactions on Pattern Analysis and Machine Intelligence. 10.1109/TPAMI.2022.3214191.

https://arxiv.org/abs/0905.2635

Coherent point drift is a well-known algorithm for non-rigid registration, i.e., a procedure for deforming a shape to match another shape. Despite its prevalence, the algorithm has a major drawback that remains unsolved: It unnaturally deforms the different parts of a shape, e.g., human legs, when they are neighboring each other. The inappropriate deformations originate from a proximity-based deformation constraint, called motion coherence. This study proposes a non-rigid registration method that addresses the drawback. The key to solving the problem is to redefine the motion coherence using a geodesic, i.e., the shortest route between points on a shape's surface. We also propose the accelerated variant of the registration method. In numerical studies, we demonstrate that the algorithms can circumvent the drawback of coherent point drift. We also show that the accelerated algorithm can be applied to shapes comprising several millions of points

What did you do and prove it

Links to papers read: https://www.researchgate.net/publication/364361740_Geodesic-Based_Bayesian_Coherent_Point_Drift

Repository url: https://github.com/Nikitos1865/pycpd-Porto/tree/master