

HAAG Weekly Report Week 7

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Time-Log

- What did you do this week?
 - Work on code update to include statistical shape model for the EM step of the algorithm.
 - Work on testing performance of the algorithms against the standard CPD algorithms.
 - Researched the difference between direct PCA vs Gaussian Kernel replacement and actual EM modifications for weighing the shape modes.
 - Coordinated meetings with Teammates to investigate the different EM step substitutions.
- What are you going to do next week
 - Continue working on EM step Modifications and Testing.
 - Begin to do research on performance interpretations and implications for the different models we have used.
- Blockers, things you want to flag, problems, etc.
 - No current blockers.

Abstracts

Osamu Hirose. "Geodesic-Based Bayesian Coherent Point Drift." IEEE Transactions on Pattern Analysis and Machine Intelligence. (2022).

Link: <https://ieeexplore.ieee.org/document/9918058>

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

Github Repo: <https://github.com/Nikitos1865/pycpd-Porto/>

Link to Paper read: <https://ieeexplore.ieee.org/document/9918058>