HAAG Weekly Report Week 8

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Time-Log

- What did you do this week?
  - Worked on more modifications to the EM substitutions for Uc Transformation method.
  - Begin to do research on performance interpretations and implications for the different models we have used.
  - Coordinated meetings with Teammates to investigate the different ways to test the new algorithm against existing CPD algorithm.
- What are you going to do next week
  - Continue working on EM step Modifications and Testing.
  - Implement inferences on performance comparisons for the different models we have used.
- Blockers, things you want to flag, problems, etc.
  - No current blockers.

Abstracts

Myronenko A, Song X, and Carreira-Perpinan M, ". Non-rigid point set registration: Coherent Point Drift." OGI School of Science and Engineering. (2006).

Link: https://proceedings.neurips.cc/paper_files/paper/2006/file/3b2d8f129ae2f408f2153cd9ce663043-Paper.pdf

We introduce Coherent Point Drift (CPD), a novel probabilistic method for nonrigid registration of point sets. The registration is treated as a Maximum Likelihood (ML) estimation problem with motion coherence constraint over the velocity field such that one point set moves coherently to align with the second set. We formulate the motion coherence constraint and derive a solution of regularized ML estimation through the variational approach, which leads to an elegant kernel form. We also derive the EM algorithm for the penalized ML optimization with deterministic annealing. The CPD method simultaneously finds both the non-rigid transformation and the correspondence between two point sets without making any prior assumption of the transformation model except that of motion coherence. This method can estimate complex non-

linear non-rigid transformations, and is shown to be accurate on 2D and 3D examples and robust in the presence of outliers and missing points.

What did you do and prove it

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

Link to Paper read:
https://proceedings.neurips.cc/paper_files/paper/2006/file/3b2d8f129ae2f408f2153cd9ce663043-Paper.pdf