

HAAG Weekly Report (Simplified) – Omar Moursy – 3D Modeling

Time-Log

What did you do this week?

- Uploaded the Weekly reports and meeting recordings for Week 9.
- Had a progress update meeting with Dr. Porto where we talked about the PCA method results and how the visualization looked better than the landmark testing.
- Read through Dr. Osamu Hirose's Dependent landmark drift paper.
- Shared a visualization of the PCA method performance compared to the original CPD method.
- Found through our discussion with Dr. Porto why the previous tests were not reflective of the PCA implementation results.

What are you going to do next week

- Meet with researchers and discuss how to improve the pca based registration and compare the different registration methods results.
- Meet with Dr. Porto to discuss next steps including starting work on the publication.

Blockers, things you want to flag, problems, etc.

- None for this week

Abstracts:

Dependent landmark drift: robust point set registration with a Gaussian mixture model and a statistical shape model

<https://arxiv.org/abs/1711.06588/>

Abstract

The goal of point set registration is to find point-by-point correspondences between point sets, each of which characterizes the shape of an object. Because local preservation of object geometry is assumed, prevalent algorithms in the area can often elegantly solve the problems without using geometric information specific to the objects. This means that registration performance can be further improved by using prior knowledge of object geometry. In this paper, we propose a novel point set registration method using the Gaussian mixture model with prior shape information encoded as a statistical shape model. Our transformation model is defined as a combination of the similarity transformation, motion coherence, and the statistical shape model. Therefore, the proposed method works effectively if the target point set includes outliers and missing regions, or if it is rotated. The computational cost can be reduced to linear, and therefore the method is scalable to large point sets. The effectiveness of the method will be verified through comparisons with existing algorithms using datasets concerning human body shapes, hands, and faces.

What did you do and prove it

Uploaded the missing [weekly reports](#) and [meeting recordings](#).

We had a team meeting to discuss the results of the pca method and how to accurately compare it to original cpd.