NII International Internship program
Segmented Fusion

Warping, Refinement
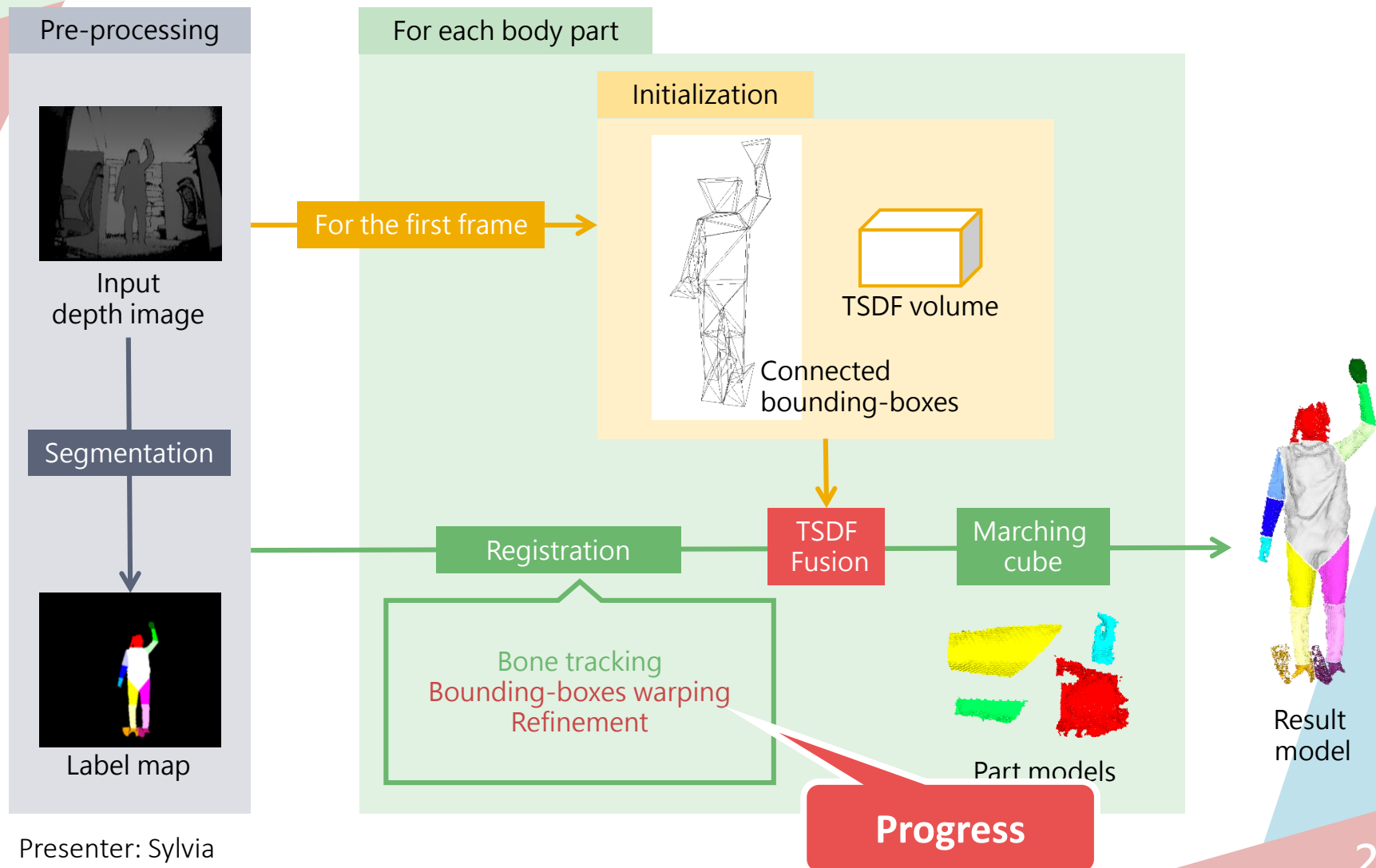
20180110

Sylvia

Advisors: Prof. A.Sugimoto

Ass.Prof. D.Thomas

Summary

Pre-processing

Input depth image

Segmentation

Label map

For each body part

Initialization

For the first frame

Connected bounding-boxes

TSDF volume

Registration

Bone tracking
Bounding-boxes warping
Refinement

TSDF Fusion

Marching cube

Part models

Result model

Progress

Presenter: Sylvia
Advisors: Prof. A.Sugimoto, Ass.Prof. D.Thomas

Summary

♣ Previously

   ♣ Warp meshes by irregular extrapolation

♣ Progress

   ♣ Modify the warping in spine part which has more than 8 corners

   ♣ Implement the new warping method in Fusion and Refinement
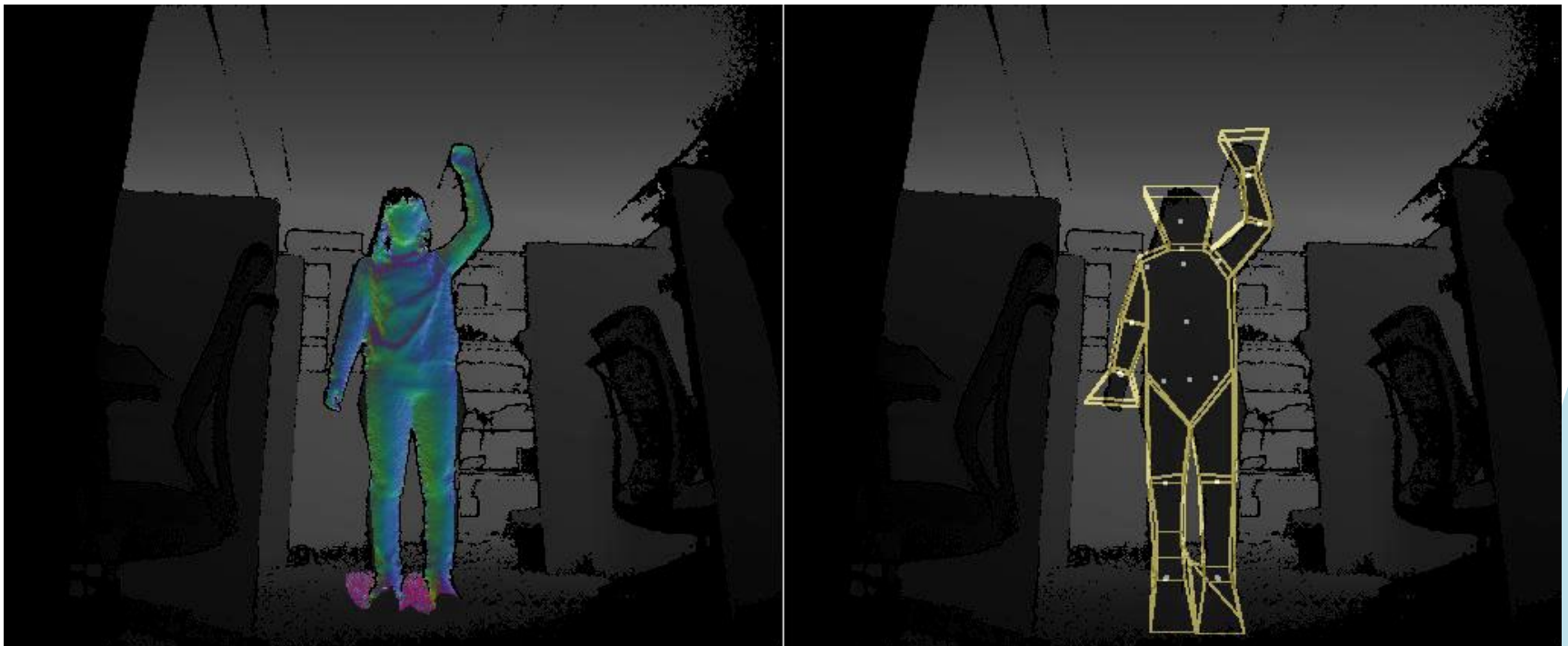
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Warping in spine

♣ In 1D, if there are more than two points, the interpolation cannot be linear.

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Resource: 031_warping.avi
4
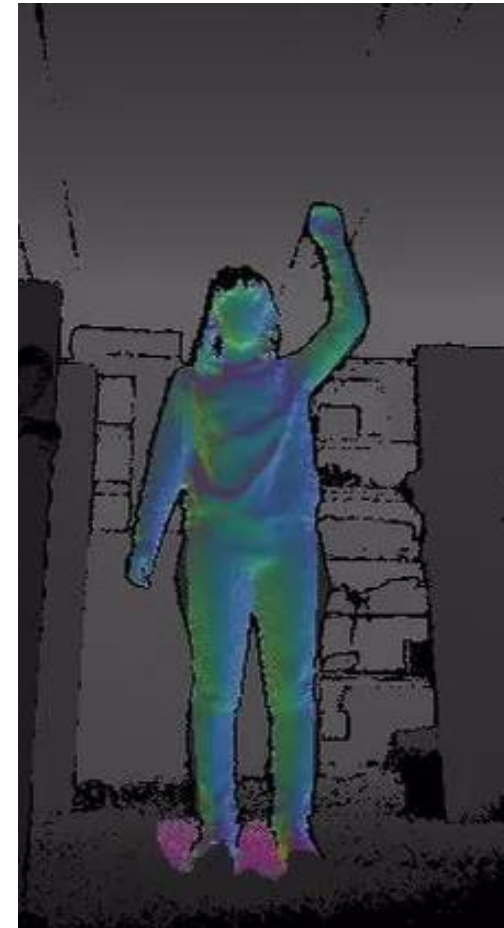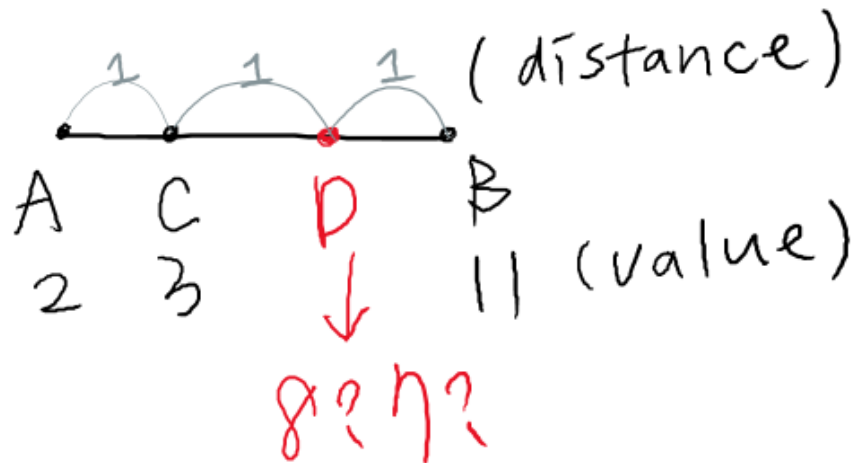
Lie Algebra Warping

♣ $\mathbf{T}_1 = \mathrm{e}^{\mathbf{x}_1} \in \mathbb{SE}(3), \mathbf{T}_2 = \mathrm{e}^{\mathbf{x}_2} \in \mathbb{SE}(3)$

♣ $\mathbf{x}_1, \mathbf{x}_2 \in \mathfrak{se}(3)$

♣ $\mathbf{T} = \mathrm{e}^{w\mathbf{x}_1 + (1-w)\mathbf{x}_2}, where\ 0 \leq w \leq 1$

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Fusion

♣ I implemented the same warping in Fusion.

Resource: 031_fusion.avi
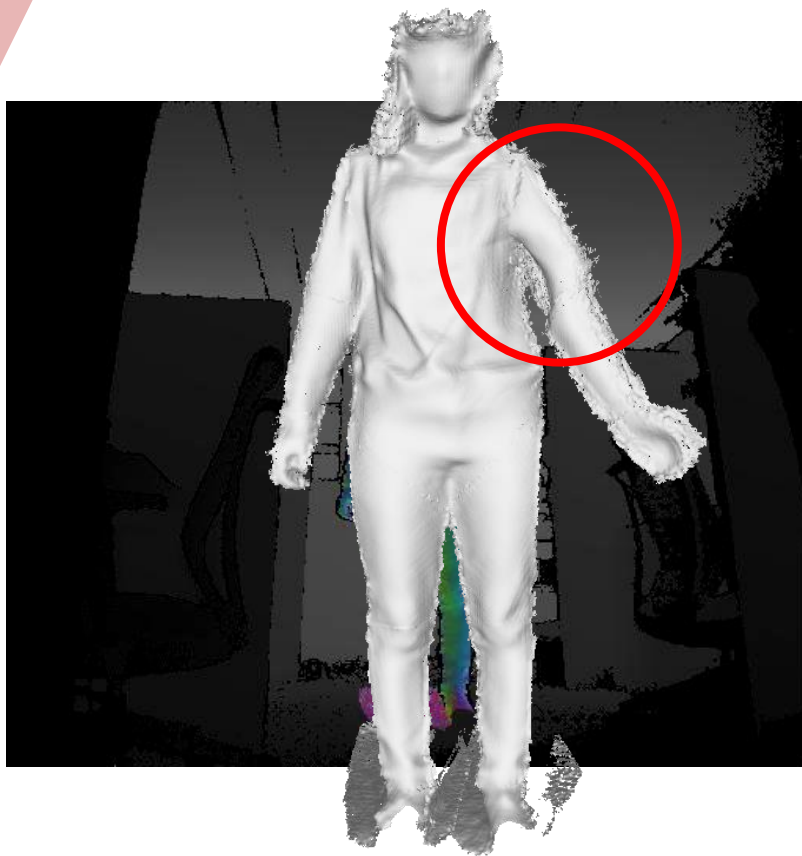
Fusion mesh   Original mesh
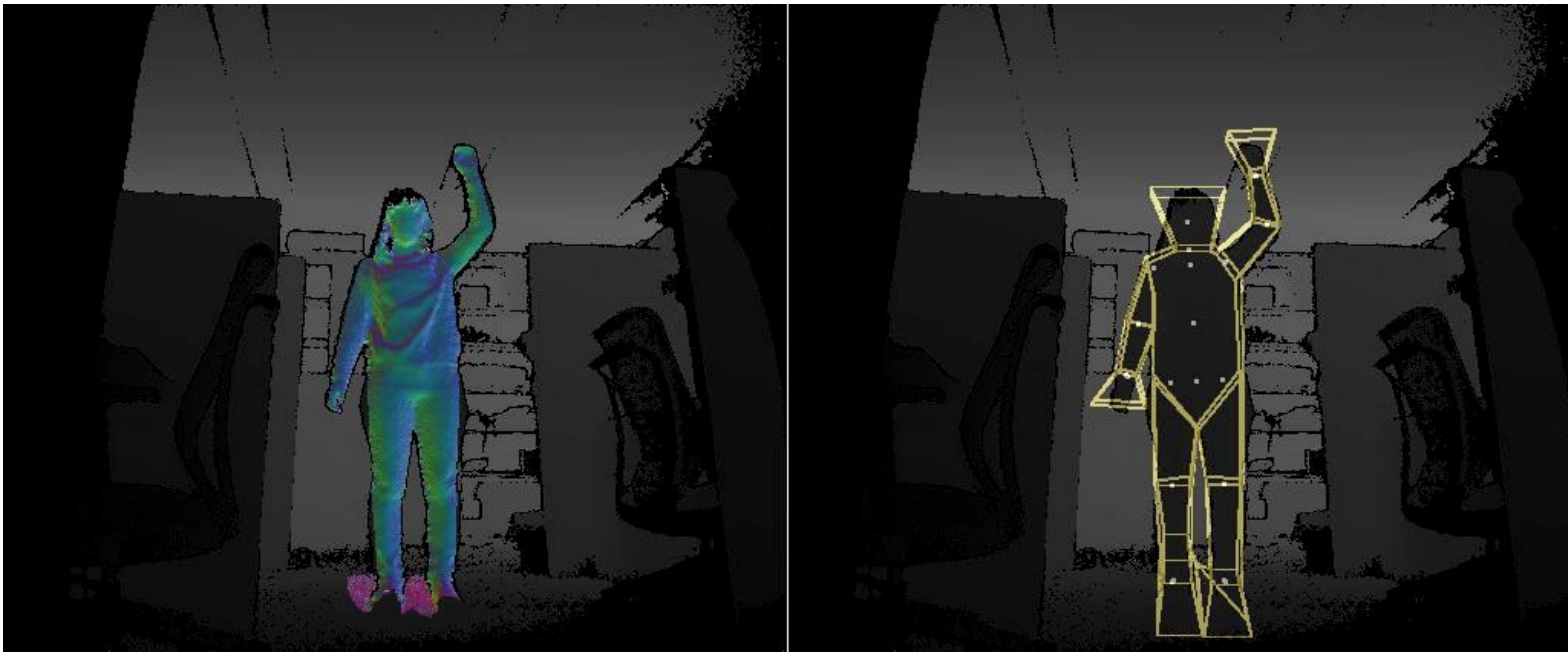
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Refinement

♣ I use least square to optimize the distance between vertex and depth image, and find one transform matrix for each bounding-box.

Resource: 031_refinement.avi

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Next step

♣ Refinement

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