

NII International Internship program

Segmented Fusion

Registration

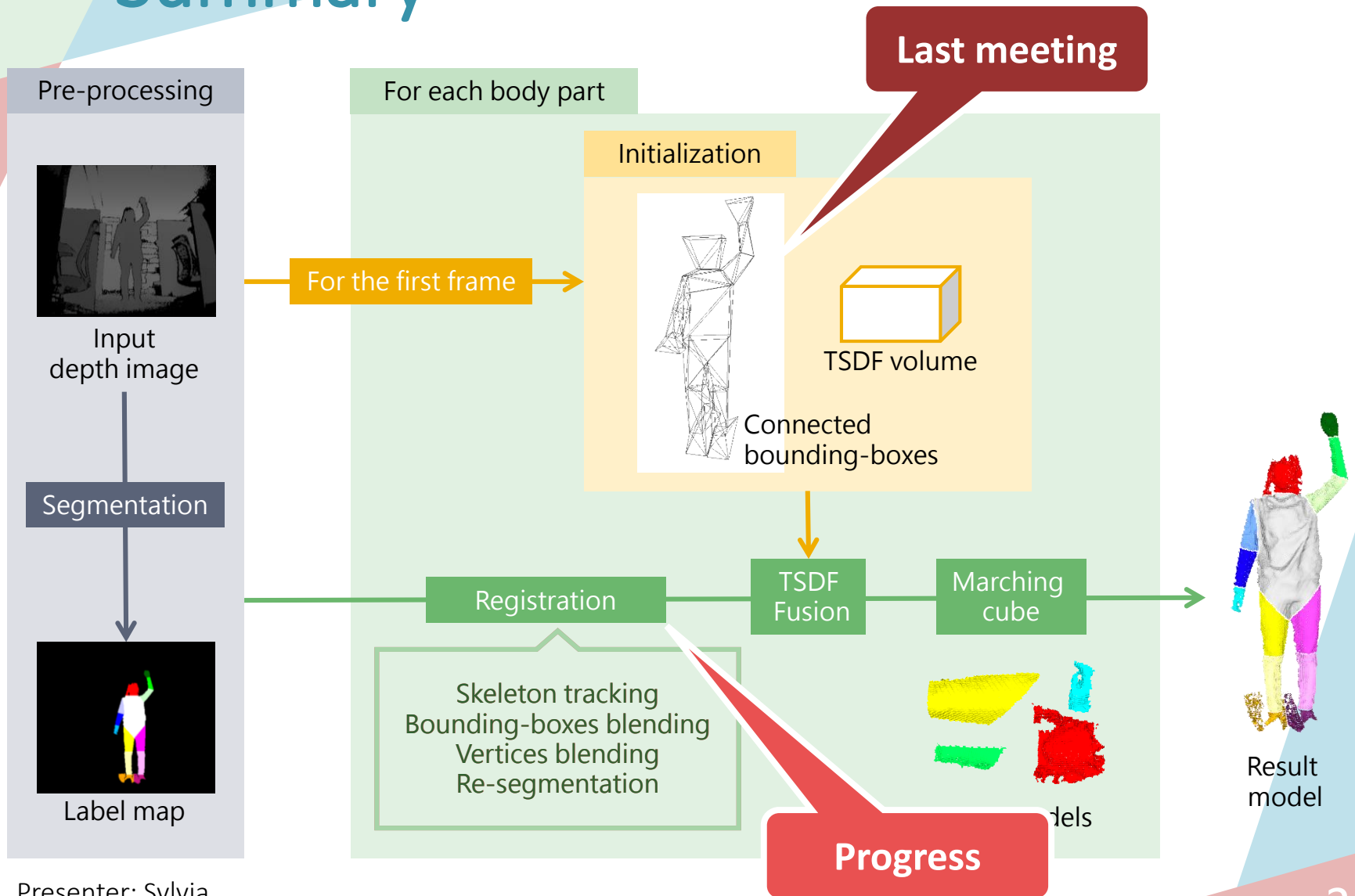
20171201

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Summary



Presenter: Sylvia

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

Summary

♣ Previously

- ♣ Bounding-boxes: reshape the bounding-boxes

♣ Progress

- ♣ Bounding-boxes: complete reshaping all bounding-boxes
- ♣ Registration: get new bounding-boxes by skeleton motion, blend vertices, and re-segment
- ♣ BodyFusion

[1] Rünz, Martin, and Lourdes Agapito. "Co-fusion: Real-time segmentation, tracking and fusion of multiple objects." *Robotics and Automation (ICRA), 2017 IEEE International Conference on*. IEEE, 2017.

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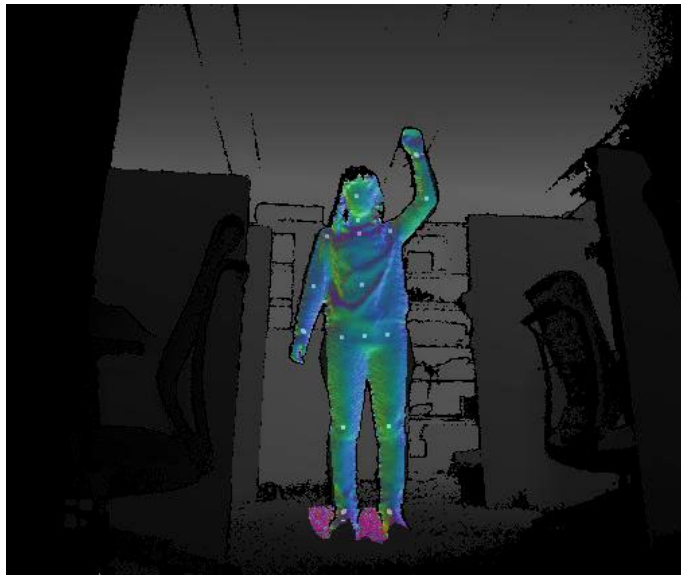
New Bounding-boxes

- ♣ System tracks skeleton motion and gets new corners by interpolated translation. However, this way loses rotation information and gets bad results.

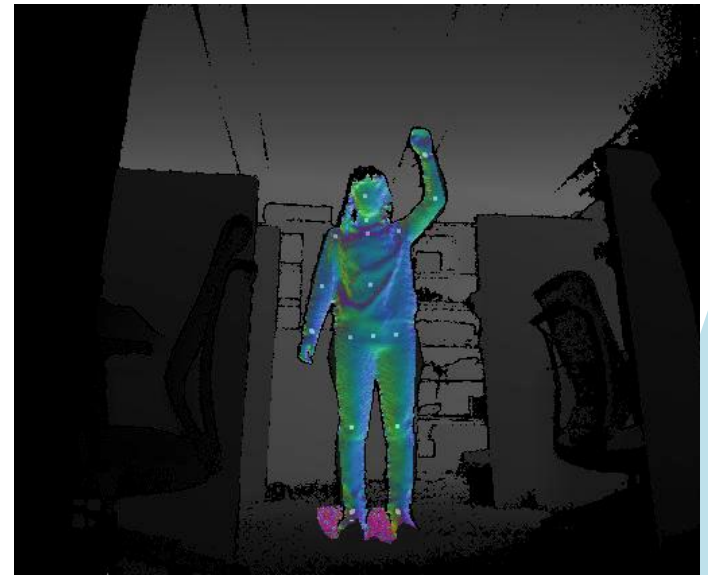


Vertices blending

- ♣ In order to fuse, we need to get the relation of new frame and model. There are two way to deform the model vertices: find transform matrix, and use blending method.



Linear interpolation



Transform matrix

Re-segmentation

- ♣ Re-segment depth image by using new corners of bounding-boxes.



BodyFusion

- ♣ BodyFusion is a novel real-time geometry fusion method which can track and reconstruct non-rigid surface motion of a human by using single depth camera.
- ♣ It contributes to a skeleton-embedded surface fusion method which solves two **deformations** based on information of **attachments**.

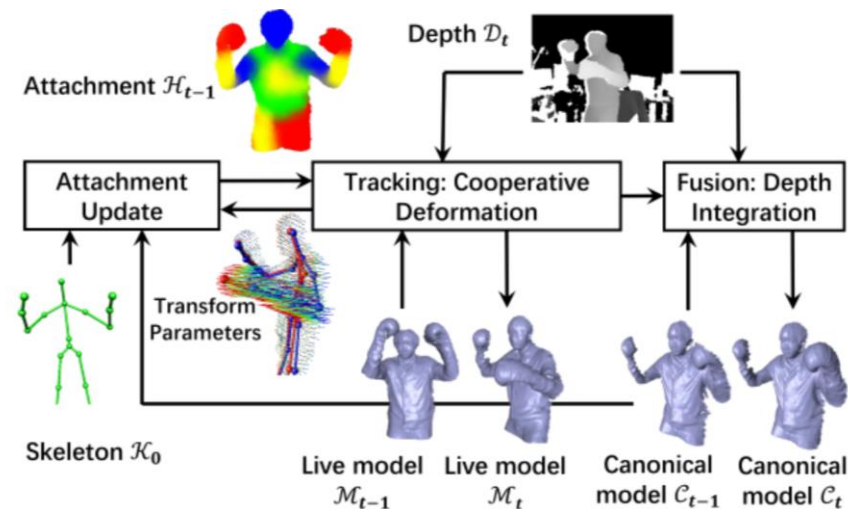
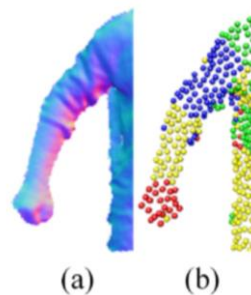


Figure 2: The pipeline of our system.

BodyFusion

- ♣ In initial step, the system gets skeleton, gets model and samples deformation nodes on surface.
- ♣ Attachments are the weights of vertex-to-bone and have three criteria: distance, normal and motion.
- ♣ BodyFusion uses a optimization to get parameters of two deformation, which function has three terms: data term, smoothness term, and binding term. Data term is the error of data fitting. Smoothness term is based on attachments. Binding term enforces consistency between two deformation.



Attachment calculation

Next step

- ♣ Try another blending
- ♣ Fuse the model with new depth information