# Report week 4

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## 1 Fitting to model

My goal this week was to finish this, but I'm still tearing my hair out over it. Mostly, this is due to some rendering issues in rviz. The program runs fast – at approx. 7.5 - 8 fps. However, the skeleton seems to lag as it updates, and not everything is drawn at once. I shall look into this further.

A couple of things were implemented this week:

- Accessor functions for the limbs and their attributes.
- `'set-'` functions for changing a `Person` object's keypoints post initialization.
- Repositioning of keypoints according to fitting the model[1].

I also tried to develop a function so only the "best" limbs would contribute to scaling the model, but I ended up using a weighted average of all the limbs, as I then didn't need to sort them. The result from this weighted sum was a lot more stable.

In addition, the keypoint positions start to get unpredictable when the subject is too close, <500mm, or too far away >3000mm. However, the point cloud seems to be fine at these distances, so I'm wondering what's going on.

Next week I want to continue implementing some ideas for refining the 3D position of the keypoints, but I feel I should also try some different approaches I've read about that might yield better results:

- Using depth points between the two keypoints to estimate a unit vector. (Then place the keypoint along this to the scaled length.) This might be dropped in favor of bulletpoint 3.
- Improve tracker so I can use previous frames to estimate new position of limbs not observed in the current frame.
- Compare the accuracy of this manual keypoint allocation with machine learning techniques.

[1] There are still some challenges with this. The results I get seem to compensate too much, and I'm not sure the positions stay updated.

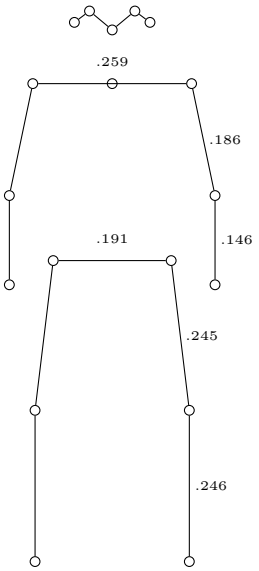


Figure 1: The constrained lengths, where we multiply by *scale* to get how the lengths should be proportioned. Based on Drillis R, Contini R. *Body Segment Parameters* New York, New York: Office of Vocational Rehabilitation; 1966