CLOSED FORM AND GEOMETRIC ALGORITHMS FOR REAL TIME CONTROL OF AN AVATAR

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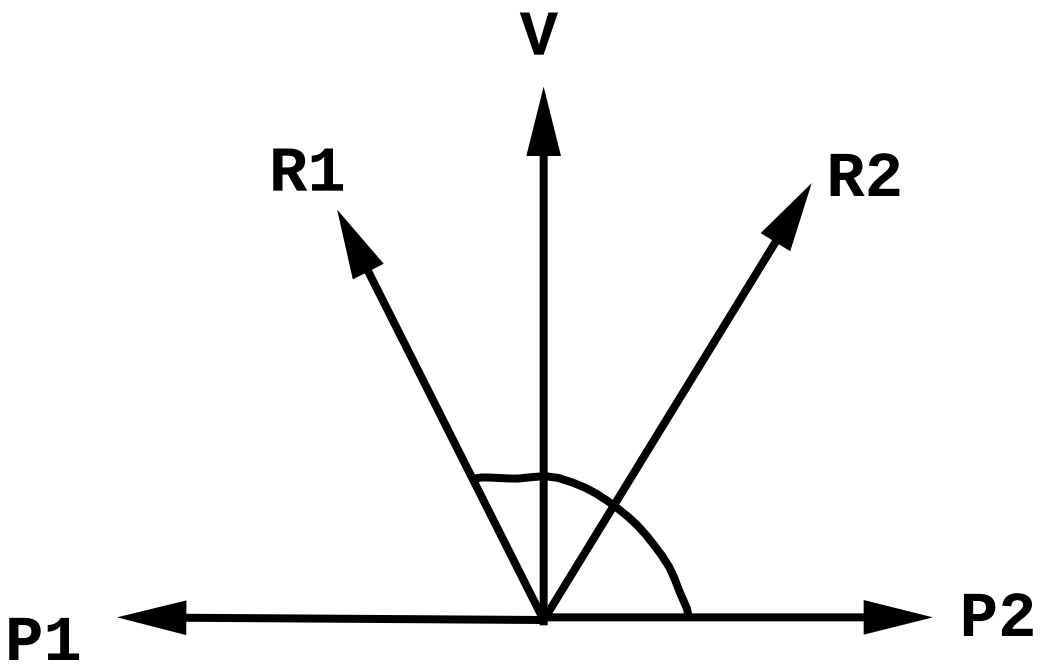

$$P1 = (V \times R1) \times V$$

$$P2 = (V \times R2) \times V$$

Human form can be:

a) specified by specifying the joint orientations, use the given limb dimensions

b) satisfy the end-effectors by possibly stretching the limbs as necessary

Given measurements of participant's limbs

- style of the participant extracted (a and b)
- Deformation algorithms needed to allow stretching (b)
- Size of the avatar same all the time (a), or vary (b)

Remarks

- Skeleton is only an approximation of the human body
- trackers are placed on the skin, not at the joints
- tracking errors, and non–linearity when multiple transmitters are present

Results:

- **limited number of sensors could be used**
- **several smaller kinematic chains are easier to handle**
- **variety of complex poses can be obtained**
- **relationship between frames of the joints could be utilized**

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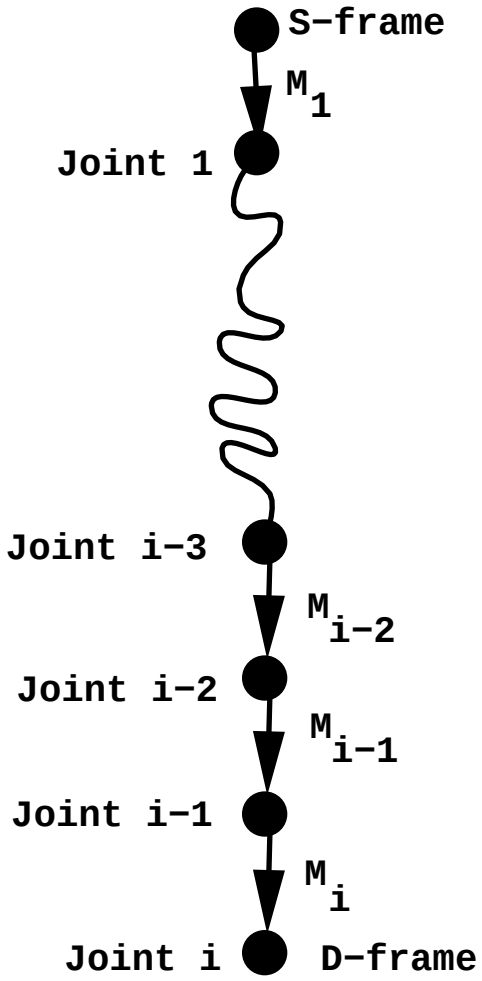
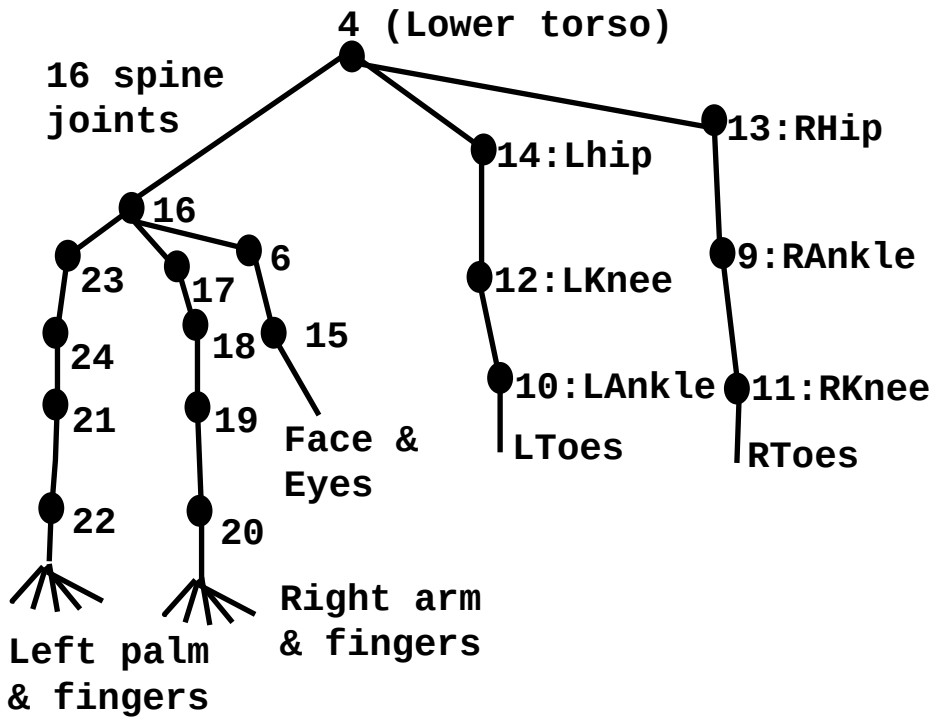


Animate Transform M_i =

$$\left[\text{S–frame} * M_1 \bullet\bullet\bullet M_{i-2} * M_{i-1} \right]^{-1} * \text{D–frame}$$

* => concatenate


4 (Lower torso)
16 spine joints
13:RHip
14:Lhip
16
9:RAnkle
6
12:LKnee
23
17
24
18
15
10:LAnkle
11:RKnee
21
19
Face & Eyes
LToes
RToes
22
20
Right arm & fingers
Left palm & fingers