HW2 - Forward Kinematics

2022 Computer Animation and Special Effects

Outline

- Overview
- Objective
- Report
- Scoring
- Submission

Overview

- Before time warping - https://youtu.be/Lask1cUmgn8
- After time warping - https://youtu.be/UKY9JfML-OY

Objective

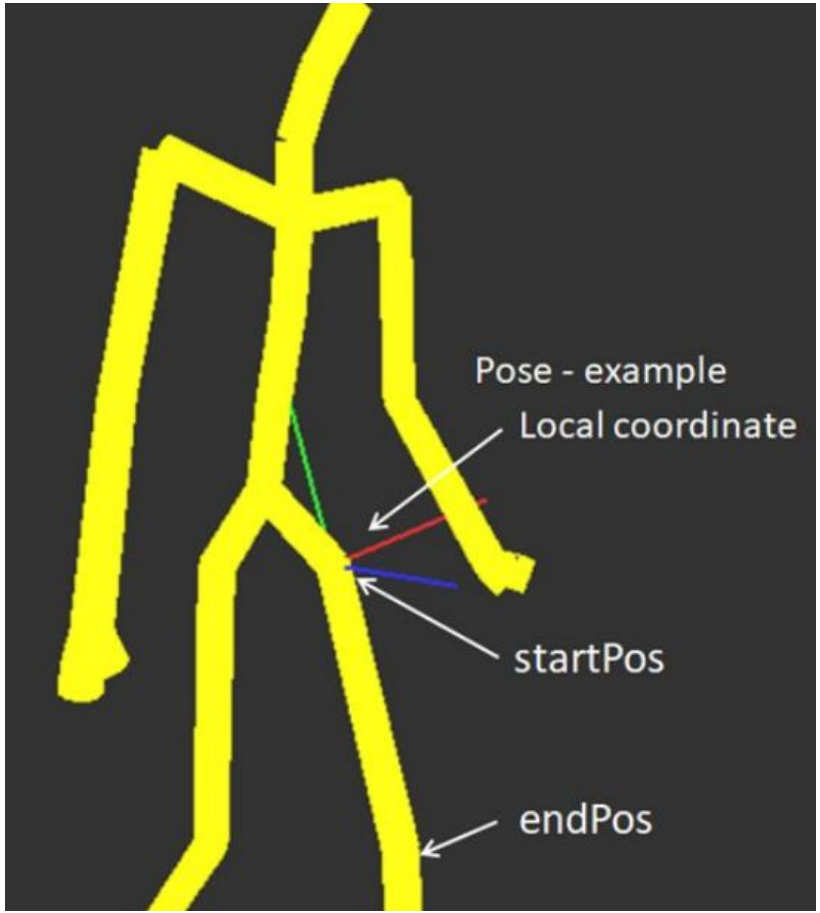
- Everything you need to implement is in kinematics.cpp (in src folder)
- There are two functions you need to implement in this homework
  - void forwardKinematics(...)
  - Motion motionWarp(...)
- Bonus
  - Motion motionBlend(...)

Objective (cont.)

- void forwardKinematics(...)
  - Goal
    - Convert motion data from joint space to the Cartesian space
      - Set each bone's global start and end position and rotation
  - Hint
    - Review "kinematics.pptx" from p.1 - p.19
    - Review "acclaim_FK_IKnote.pdf" from p.1 - p.4
    - You should read local coordinate data from posture first
    - Maybe you can use DFS or BFS to traverse all bones
    - You can check
      - struct Posture in posture.h (in include folder)
      - struct Bone in bone.h (in include folder)

Objective (cont.)

- Pose example
- Each bone has
  - local coordinate
  - start position
  - end position



Objective (cont.)

- Motion motionWarp(...)
  - Goal
    - Implement time warping
    - You should perform interpolation then update motion’s translations and rotations
  - Hint
    - Perform linear interpolation on translation
    - Perform spherical linear interpolation on rotation
      - You can use slerp() which is a member function in Eigen::Quaternionf

Report

- Suggested outline
  - Introduction/Motivation
  - Fundamentals
    - Describe local and global coordinates in your words
  - Implementation
  - Result and Discussion
  - Bonus (Optional)
  - Conclusion

Scoring

- Forward kinematics - 50%
- Time warping - 30%
- Report - 20%
- Bonus - up to 15%

Submission

- Please upload only two files
  - kinematics.cpp
  - report_< your student ID >.pdf
- Late policies
  - Penalty of 10 points on each day after deadline
- Cheating policies
  - 0 points for any cheating on assignments
- Deadline
  - Monday, 2022/04/25, 23:59