Image-based Modeling on Human Upper Body

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General Description

- Model a human upper body based on 2D imposters.
- A image database is created in the initialization stage by taking a short movie that includes the typical upper body movements.
- Each frame captured from the live camera is compared with the images in the database to find the best fit.
- Error metric is measured by the transformation between the current frame and the best matched frame from the database.

- The new imposter will be updated using the matched image in the database adapted with the error metric.
Two Approaches

- Tracking body components based on body segmentation using computer vision techniques.
- Find best match from the database mainly based on more robust image based technique.
Image-based Approach

- Down sampled input image
- Silhouette of the input image
- Matched database image
Images in the database are down sampled and blurred when loaded. Silhouette for each image is computed.

Each captured frame is down sampled and blurred. Silhouette is also computed.

A brute-force searching runs to find the best match of the current frame, based on the silhouette shape, silhouette area and color. A frame is claimed to be the best match if it has the lowest weighted average of the above three components.
RUN PROGRAM
Problem

- Two images will have large color and silhouette difference with similar posture
Two images will have different posture with small color and silhouette difference.
Computer Vision Based Approach

- Body segmentation on initial friendly posture
- Extract silhouette and contour to detect the joint points and joint segments from the initial image.
- Update the joint points and segments using the knowledge from the previous pose. Edge detection on inner body is needed detect the arm joints.
Problem

- Feature detection is hard and error prone.
- Extra assumption about the initial posture.
- Body parts might not merge well at the joint point.
- Transformation for the body parts is harder to do.
Future work

- Wise matching algorithm
- 2D transformation
- Efficiency