USC CSCI 520 Assignment 2 Report

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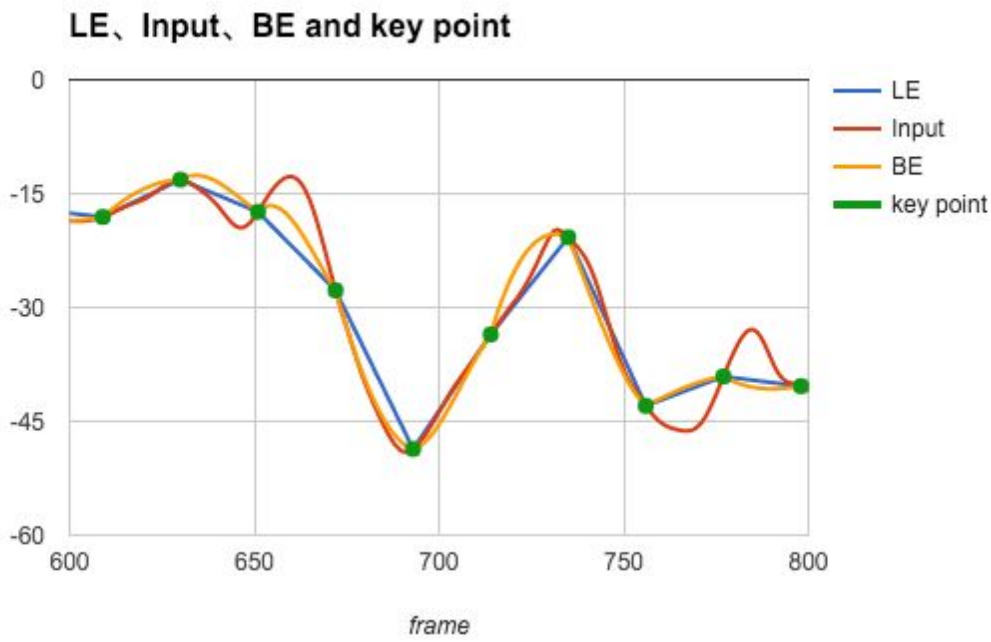
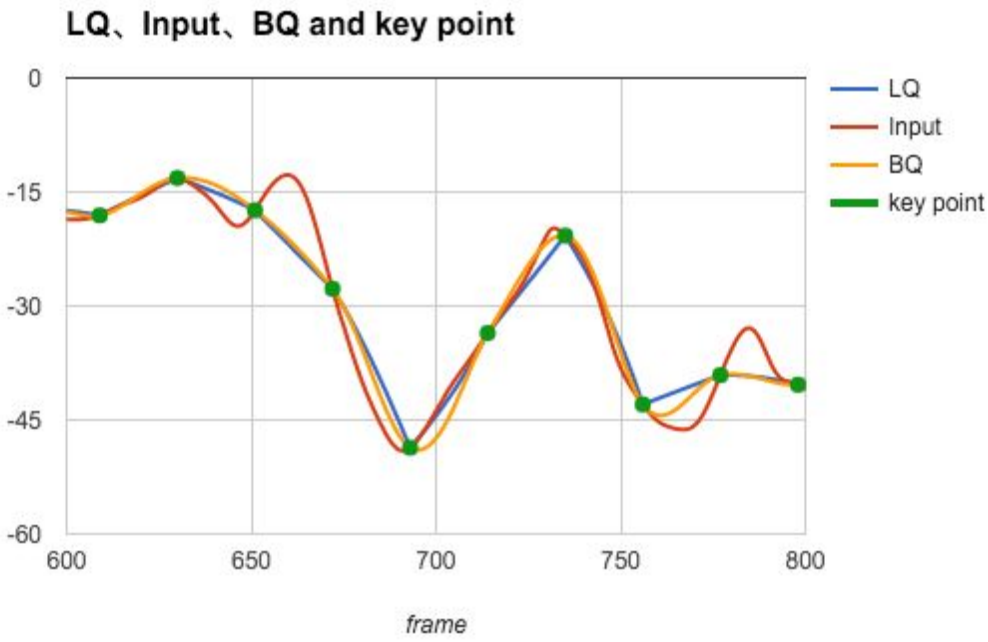
Graph#1 compares linear Euler to Bezier Euler interpulation(and input), lfemur joint, rotation around X axis, frame 600-800, for N=20, input file: 131_04-dance.amc



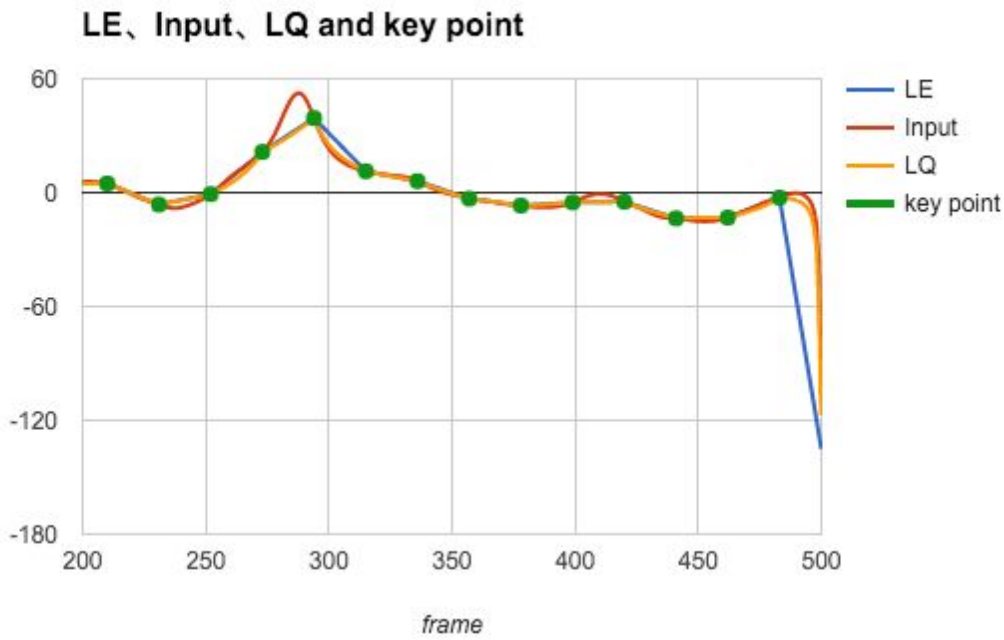
In this chart, we can see that the LE is simply a straight line from one key point to another, it will lose many details in between. The BE seems better, it has some curves between key point, gives it more details, but it may interpolate in a wrong way. Most of the time, the BE is better than LE, but sometimes, it comes to the opposite way.

Graph#2 compares SLERP quaternion to Bezier SLERP quaternion interpulation(and input), lfemur joint, rotation around X axis, frame 600-800, for N=20, input file: 131_04-dance.amc



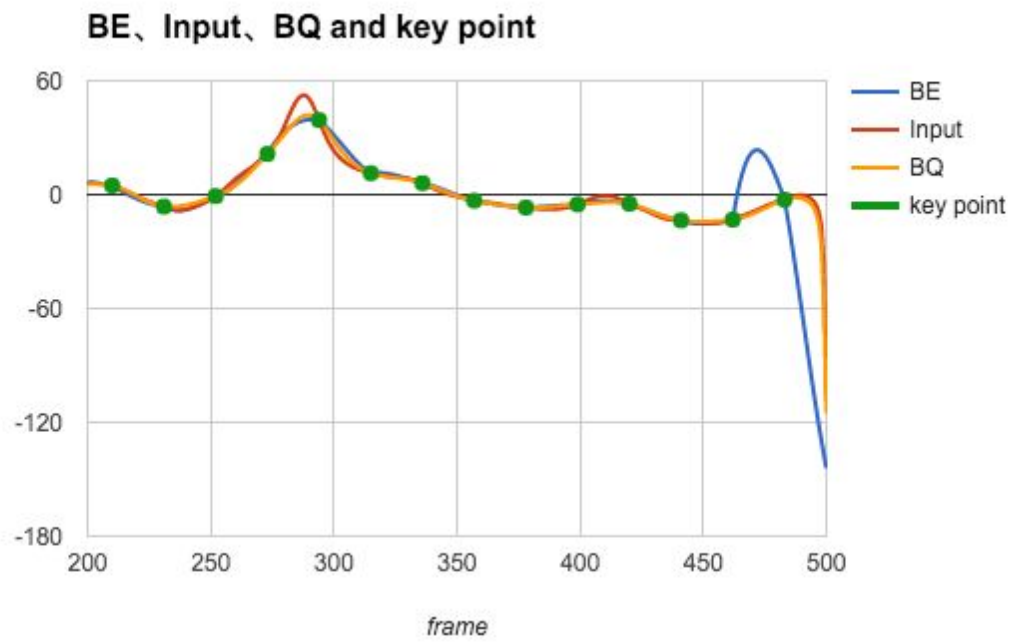
In this chart, we can see that the LQ has a little change along curves, but sill looks like a straight line. The BQ seems more smooth and curvy, but it may interpolate in a wrong way. However, BQ is better than LQ in total.

Graph#3 compares linear Euler to SLERP quaternion interpulation(and input), root joint, rotation around Z axis, frame 200-500, for N=20, input file: 131_04-dance.amc



In this chart, we can see that Quaternion deal better than Euler in big changes between key point, the curve of LQ stick to the input more likely than the LE. The LE looks rigid cause we use Linear interpolation.

Graph#4 compares Bezier Euler to Bezier SLERP quaternion interpulation(and input), root joint, rotation around Z axis, frame 200-500, for N=20, input file: 131_04-dance.amc



In this chart, both Euler and Quaternion are Interpolated in Bezier. Both of BE and BQ looks curvier than Graph#3. But still, the fallback of Euler follows to this char. The Euler can't deal with a big change of key point, as you can see in the chart, the last point and the point after the last point(not shown in the chart) has a very big value change, BQ looks very like the input, which means it interpolate very well. but the BE has a very strange peek between last point and the point before the last point, and then it fall down very quick.

summary:

Bezier is better than Linear when dealing with curves between key points. but sometimes, the Bezier may interpolate in the wrong direction. Bezier is curvier and linear is more rigid.

Quaternion is better than Euler when dealing with big changes between key points. It sticks to the input line closer. Which makes it a better candidate for interpolating the in-between points of key points.