

# Animating a Bicycle - Animation

CS475M: Computer Graphics - Assignment 2, Part 3

Due Date: 30/10/2016

## 1 The Assignment

This assignment is aimed at producing an animated (very) short film by the end of the course. There are many steps to making an animation that involve a combination of aesthetic and technical skills. In this course we will learn many of these basic technical aspects. The aesthetic quality of the final result is, however, dependent on how much thought/effort you put into it.

This is the final part of this assignment and it deals with animating the bicycle that you modelled and rendered in the previous parts.

### TO DO:

1. Create a file called *keyframes.txt*.
2. Your program will have a animation record mode, that gets enabled when you press 'R.'
3. In the record mode, whenever you press the 'S' key, you will save a keyframe to the file *keyframes.txt*.
4. A keyframe is just a line of text containing all the parameters - like root translation and rotation, angle of rotation for back wheel, front wheel and handle bar, each separated by a single space. It can also contain parameters for other things that can change in your scene like camera parameters, light switch toggles and so on.
5. Pressing 'S' should add a line to the file. Pressing 'C' should clear (or erase) all existing keyframes from the file.
6. Pressing 'P' should enable animation playback mode, where it should load all the keyframes from *keyframes.txt* into a vector and play back the animation.
7. Learn how to use the `glutIdleFunc` or a `glutTimerFunc` to post `glutPostRedisplay` events to playback the animation. Do not use

a loop in the display function to playback all the frames - it will not work.

8. Interpolate between successive keyframes for the animation. You can assume a constant number of keyframes between each keyframe to begin with, then store this number in the keyframes.txt file and modify it manually to make your animation go faster or slower, as desired.
9. Create a animation of atleast 30 seconds. Try to tell a story through your animation if you can - get creative!
10. Your animation must at least have the bicycle move, use the first and third person cameras, toggle the headlight and the light in the room.
11. Submit the keyframes.txt file with your assignment submission.
12. Bonus: Use glReadPixels to read the current framebuffer and store whatever you render to an image. Save each frame of your animation to an image and join them to form a movie. This will slow down rendering, so make sure this is optionally turned on using a key or command line option. Add sound to your movie if you want. Upload the movie to Youtube! In Linux, you can use mencoder, ffmpeg or avconv to join images into a movie file and add a soundtrack to the movie stream. Submit the link to you youtube film if you complete the bonus.

#### **DO NOT:**

1. Compile and produce an *a.out*. Learn how to use a Makefile, as used in assignment 1.
2. Write code for non-inlined functions in header files.
3. Code that does not compile will not be evaluated.

#### **MARKING:**

- Record Mode and keyframe saving: 20 marks
- Keyframe playback: 50 marks
- Submitted animation in keyframes.txt: 50 marks
- Report: 10 marks
- Bonus: 20 marks
- Total: 130+20 marks

- Deduction - I am expecting everybody to write properly formatted, indented and structured code from now on. Untidy code will be penalized.
- Late submission will follow a policy of graceful degradation with a 25% penalty for each day's delay (i.e., you get zero marks if the assignment is more than three days late after the due date.)

**TO SUBMIT:**

1. A Tar-Gzipped archive of the complete source code (and only source code). It should compile using the given Makefile on any Ubuntu system.
2. A link to a html report page on the assignment that should contain some details about what you implemented and images of some the results that you generated. Put the link in a README file in the archive you submit.
3. The submission will be through the submission portal.