TPA 8: Avataring a Face; Dynamics (Animation) and Rendering with Opengl

Objective:
Simulate the face of person using the frontal 2D image and 3D model of a face mesh. Since the depth information is not available we will actually approximate the 3D model of the 2D image, using the texture mapping, which is provided in OpenGL after finding a appropriate function, for mapping the pixels of image on the vertices of the face. Three points each on the wireframe and the image are used for mapping. Lighting and shading is used to create a more realistic look. Animations of facial expressions like talking, gestures, smiling etc. should be modeled appropriately.

Input:
 .wrl/blend file for 3D wireframe of face and 2D images (.jpeg/.bmp) of faces (frontal poses).

Output:
Face at different tilt, yaw and roll angles; also change light position and observe the effect.

Your implementation should be capable of the following:

1. Reading .wrl/.ply/.blend file and rendering them in OpenGL.
2. Face image (.jpeg or .bmp) must be mapped on a 3D model.
3. Mapping function must be developed.
4. Lighting and shading should be applied using openGL.
5. Several GUI options should be provided to change the light position etc and for saving the bitmap.
6. Basic animations like realistic movement of eye, eyebrows will deserve extra credit.

References

1. Rick Parent. Computer Animation :Algorithm & Techniques, Second Edition ,Morgan Kaufman Publishers,2008.
2. Donald Hearn, M. Pauline Baker. Computer Graphics C Version ,Second Edition. Prentice Hall,2008
3. http://nehe.gamedev.net
4. VRML tutorial http://www.edcenter.sdsu.edu/vrml.
5. http://www.winprog.org
6. http://en.wikipedia.org/wiki/PLY_(file_format)