What is claimed is:

1. A method for generating a mesh deformation of a facial model, the method comprising:

generating a plurality of coarse deformation maps by applying a first plurality of trained neural networks to rig-parameters of the facial model, wherein one deformation map is generated for each of one or more first segments of a polygonal mesh of the facial model;

selecting regions of the polygonal mesh, where the selected regions are fewer than all regions of the polygonal mesh;

generating a plurality of refined deformation maps by applying a second plurality of trained neural networks to rig-parameters of the facial model, wherein one deformation map is generated for each of a plurality of second segments of selected regions of the polygonal mesh, the plurality of refined deformation maps having a spatial resolution greater than the plurality of coarse deformation maps;

extracting a first plurality of vertex offsets based on the plurality of coarse deformation maps;

extracting a second plurality of vertex offsets based on the plurality of refined deformation maps; and

applying the first plurality of vertex offsets and the second plurality of vertex offsets to a neutral mesh of the facial model to generate the mesh deformation of the facial model.

2. The method of claim 1, wherein extracting the first plurality of vertex offsets comprises performing an interpolation of at least one of the plurality of coarse deformation maps at a plurality of vertex positions.

3. The method of claim 2, wherein the interpolation comprises a bilinear interpolation or a cubic interpolation.

4. The method of claim 1, wherein applying the first plurality of vertex offsets to the neutral mesh of the facial model comprises adding the first plurality of vertex offsets to values of a plurality of vertices of the neutral mesh.

5. The method of claim 1, wherein each of the first plurality of trained neural networks comprises a convolutional neural network (CNN) model.

6. The method of claim 1, wherein:

applying the first plurality of vertex offsets to the neutral mesh comprises applying the first plurality of vertex offsets to values of all vertices of the neutral mesh; and

applying the second plurality of vertex offsets to the neutral mesh comprises applying the second plurality of vertex offsets to values of at most a subset of the vertices of the neutral mesh to generate the mesh deformation.

7. The method of claim 6, wherein the subset of the vertices of the neutral mesh corresponds to one or more regions of the neutral mesh exhibiting a level of approximation error that is above a particular threshold.

8. The method of claim 1, wherein:

applying the first plurality of vertex offsets to the neutral mesh of the facial model comprises

adding the first plurality of vertex offsets to values of a plurality of vertices of the neutral mesh to generate a plurality of intermediary vertex values; and

applying the second plurality of vertex offsets to the neutral mesh comprises adding the second plurality of vertex offsets to at most a subset of the plurality of intermediary vertex values to generate the mesh deformation.

9. The method of claim 1, further comprising:

based on the plurality of coarse deformation maps and the plurality of refined deformation maps, identifying one or more rigid mesh segments of the facial model that move rigidly during deformation; and

performing a separate approximation of each of the one or more rigid mesh segments.

10. The method of claim 9, wherein performing the separate approximation of each of the one or more rigid mesh segments comprises performing a rigid rotation and translation for vertices of the rigid mesh segment.

11. A system for generating a mesh deformation of a facial model, the system comprising one or more processors configured to:

generate a plurality of coarse deformation maps by applying a first plurality of trained neural networks to rig-parameters of the facial model, wherein one deformation map is generated for each of one or more first segments of a polygonal mesh of the facial model;

select regions of the polygonal mesh, where the selected regions are fewer than all regions of the polygonal mesh:

generate a plurality of refined deformation maps by applying a second plurality of trained neural networks to the rig-parameters of the facial model, wherein one deformation map is generated for each of a plurality of second segments of selected regions of the polygonal mesh,

the plurality of refined deformation maps having a spatial resolution greater than the plurality of coarse deformation maps;

extract a first plurality of vertex offsets based on the plurality of coarse deformation maps;

extract a second plurality of vertex offsets based on the plurality of refined deformation maps; and

apply the first plurality of vertex offsets and the second plurality of vertex offsets to a neutral mesh of the facial model to generate the mesh deformation of the facial model.

12. The system of claim 11, wherein the one or more processors are further configured to extract the first plurality of vertex offsets by performing an interpolation of at least one of the plurality of coarse deformation maps at a plurality of vertex positions.

13. The system of claim 12, wherein the interpolation comprises a bilinear interpolation or a cubic interpolation.

14. The system of claim 11, wherein

the one or more processors are further configured to apply the first plurality of vertex offsets to the neutral mesh by applying the first plurality of vertex offsets to values of all vertices of the neutral mesh; and

the one or more processors are further configured to apply the second plurality of vertex offsets to the neutral mesh by applying the second plurality of vertex offsets to values of at most a subset of the vertices of the neutral mesh to generate the mesh deformation.

15. The system of claim 11, wherein each of the first plurality of trained neural networks comprises a convolutional neural network (CNN) model.

16. The system of claim 11, wherein:

the one or more processors are further configured to apply the first plurality of vertex offsets to the neutral mesh by

applying the first plurality of vertex offsets to values of all vertices of the neutral mesh; and

the one or more processors are further configured to apply the second plurality of vertex offsets to the neutral mesh by applying the second plurality of vertex offsets to values of at most a subset of the vertices of the neutral mesh to generate the mesh deformation.

17. The system of claim 16, wherein the subset of the vertices of the neutral mesh corresponds to one or more regions of the neutral mesh exhibiting a level of approximation error that is above a particular threshold.

18. A machine-readable non-transitory medium having stored thereon machine-executable instructions for generating a mesh deformation of a facial model, the instructions comprising:

generating a plurality of coarse deformation maps by applying a first plurality of trained neural networks to rig-parameters of the facial model, wherein one deformation map is generated for each of one or more first segments of a polygonal mesh of the facial model;

selecting regions of the polygonal mesh, where the selected regions are fewer than all regions of the polygonal mesh;

generating a plurality of refined deformation maps by applying a second plurality of trained neural networks to the rig-parameters of the facial model, wherein one deformation map is generated for each of a plurality of second segments of selected regions of the polygonal mesh, the plurality of refined deformation maps having a spatial resolution greater than the plurality of coarse deformation maps;

extracting a first plurality of vertex offsets based on the plurality of coarse deformation maps;

extracting a second plurality of vertex offsets based on the plurality of refined deformation maps; and

applying the first plurality of vertex offsets and the second plurality of vertex offsets to a neutral mesh of the facial model to generate the mesh deformation of the facial model.