

identified neighboring voxels for all the normal vectors that have an assigned direction;  
 determine which direction the majority of the normal vectors associated with the voxel under consideration and its identified neighboring voxels are assigned for all the normal vectors that have an assigned direction;  
 assign said majority direction to the voxel under consideration if it has been previously assigned a contrary direction or if it does not have an assigned direction.

**10.** The process of claim **4**, wherein the process action of extracting a triangular-mesh representation of the surface of the object being modeled, comprises the actions of:

- (a) selecting a previously unselected voxel containing reconstruction points;
- (b) computing the triangle-mesh representation of the portion of the object being modeled having a surface that contains the selected voxel using a marching cubes procedure while keeping track of each voxel processed via the procedure;
- (c) determining whether there are any remaining unprocessed voxels containing reconstruction points;
- (d) selecting one of any remaining unprocessed voxels containing reconstruction points in lieu of the previously selected voxel; and
- (e) repeating process actions (b) through (d) until there are no remaining unprocessed voxels containing reconstruction points.

**11.** A system for modeling an object, comprising:

- a camera for capturing digital images of the object that collectively depict all the object's surfaces which are to be modeled;
- a general purpose computing device;
- a computer program comprising program modules executable by the computing device, wherein the computing device is directed by the program modules of the computer program to,
  - input said digital images of the object,
  - select a plurality of sets of one or more of the digital images,
  - compute a 3D reconstruction of a portion of the object's surfaces from each set of digital images, said 3D reconstructions comprising a plurality of reconstruction points,
  - register each 3D reconstruction to a common coordinate system to produce an overall 3D reconstruction of the object's surfaces,
  - extract a surface representation of the object from the overall 3D reconstruction, and
  - create a texture map for the surface representation of the object using the previously captured images of the object.

**12.** The system of claim **11**, further comprising a program module for eliminating extraneous points from each individual 3D reconstruction prior to performing the program module for registering the 3D reconstructions, said program module for eliminating extraneous points comprising the following sub-modules:

- for each 3D reconstruction,
  - calculating a mean distance of the reconstruction points in each of the three orthogonal directions from the origin of a 3D coordinate system associated with said camera used to capture the images employed in computing the reconstruction, as well as a variance in each direction based on the associated mean,
  - eliminating those reconstruction points existing outside a cuboid region defined by extending the same

distance both ways from each mean in each orthogonal direction for a total distance equal to a prescribed multiple of the variance associated with the mean in that direction,

repeating the calculating and eliminating sub-modules until the mean and variance in each orthogonal direction has not changed more than a prescribed amount.

**13.** The system of claim **12**, wherein the program module for eliminating extraneous points further comprises sub-modules for:

- using an octree approach to divide a 3D space containing all the reconstruction points associated with each of the 3D reconstructions into voxels each of which contains at least one reconstruction point; and

- for each reconstruction point in each of the 3D reconstructions,
  - identifying a voxel neighborhood made up of the voxel containing the reconstruction point and a prescribed number of neighboring voxels,
  - counting the number of reconstruction points contained within the voxels of the voxel neighborhood, and
  - eliminating the reconstruction point whenever the number of points counted in the voxel neighborhood associated with the point does not exceed a prescribed threshold number.

**14.** The system of claim **11**, wherein the program module for extracting a surface representation of the object from the overall 3D reconstruction comprises sub-modules for:

- using an octree approach to divide a 3D space containing all the reconstruction points associated with the overall 3D reconstruction into voxels each of which contains at least one reconstruction point;

- identifying a voxel neighborhood for each voxel made up of the voxel and a prescribed number of neighboring voxels;

- respectively computing a plane for each voxel that best fits the reconstruction points contained within its associated voxel neighborhood; and

- extracting a triangular-mesh representation of the surface of the object being modeled based on the planes defined for each voxel.

**15.** The system of claim **14**, wherein the sub-module for extracting a triangular-mesh representation of the surface of the object being modeled, comprises sub-modules for:

- selecting a voxel;
- employing a marching cubes procedure to compute the triangle-mesh representation of the portion of the object being modeled which has a surface contained within the selected voxel while keeping track of each voxel processed via the procedure;

- selecting one of any remaining unprocessed voxels; and
- repeating the sub-modules for employing the marching cubes procedure and selecting one of any remaining unprocessed voxels until there are no remaining unprocessed voxels.

**16.** A computer-readable memory for modeling an object, comprising:

- a computer-readable storage medium; and
- a computer program comprising program modules stored in the storage medium, wherein the storage medium is so configured by the computer program that it causes a computer to,
  - compute a series of 3D reconstructions from inputted images depicting every surface of the object that is to