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**Ponto et al.**

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(54) **SYSTEMS, METHODS, AND MEDIA FOR HIERARCHICAL PROGRESSIVE POINT CLOUD RENDERING**

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(51) **Int. Cl.**

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|---|---|
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| ***G06T 15/04*** | (2011.01) |
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(52) **U.S. Cl.**

CPC ..... ***G06T 5/007*** (2013.01); ***G06T 15/00*** (2013.01); ***G06T 15/005*** (2013.01); ***G06T 15/04*** (2013.01); ***G06T 17/005*** (2013.01); *G06T 2207/10028* (2013.01); *G06T 2210/56* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

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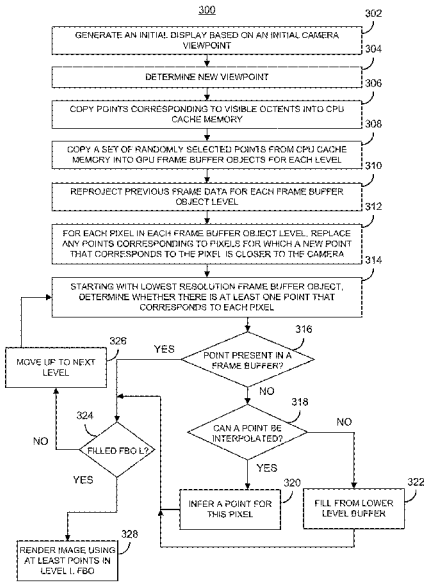
(57) **ABSTRACT**

In accordance with some aspects, systems, methods and media for hierarchical progressive point cloud rendering are provided. In some aspects, a method for point cloud rendering is provided, the method comprising: rendering a first image based on point cloud data; requesting point cloud points, first synthetic point cloud points, and an octant of a second synthetic point cloud that intersects a new viewing frustum; reprojecting points used during rendering of the first image into frame buffer objects (FBOs) of different resolutions; replacing reprojected points if a received point corresponding to the same pixel is closer to the camera; determining that a pixel in the highest resolution FBO is unfilled; copying a point that originated in a lower resolution FBO to the gap in the highest resolution FBO; and when the highest resolution FBO is filled, rendering a second image based on the contents.

**21 Claims, 18 Drawing Sheets**