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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MATTHEW BELL, DAVID GAUSEBECK, and MICHAEL BEEBE

Appeal 2019-001984
Application 14/070,430
Technology Center 2400

Before MICHAEL J. STRAUSS, IRVIN E. BRANCH, and PHILLIP A. BENNETT, *Administrative Patent Judges.*

BENNETT, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 2–5, 7–25, and 27–30. Claims 1, 6, and 26 have been cancelled. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Matterport, Inc. Appeal Br. 3.

RELATED DECISIONS

Appellant identifies three patent applications under appeal relating to the subject matter of this appeal. Each appeal has been since resolved in Board decisions issued July 2, 2019. The related applications are: (1) App. No. 14/070,427 (Appeal No. 2018-007317), (2) App. No. 14/070,428 (Appeal No. 2018-007323), and (3) App. No. 14/070,429 (Appeal No. 2018-007640).

CLAIMED SUBJECT MATTER

The claims are directed to a capturing and aligning three-dimensional scenes. Claim 2, reproduced below with a disputed limitation emphasized, is illustrative of the claimed subject matter:

> 2. A method comprising:
>
> *determining*, by a system comprising a processor, *a global alignment, relative to a three-dimensional coordinate space, between three or more sets of three-dimensional data captured from an object or an environment at different capture positions or orientations*, wherein the three or more sets of three-dimensional data respectively correspond to volumes of the object or the environment and wherein at least some of the volumes overlap;
>
> identifying, by the system, a first set of a second set of three-dimensional data from the three or more sets of three-dimensional data that correspond to non-overlapping volumes of the object or the environment;
>
> determining, by the system, a first set of visual features included in a first two-dimensional image associated with the first set of three-dimensional data;
>
> determining, by the system, a second set of visual features included in a second two-dimensional image associated with the second set of three-dimensional data; and

> determining, by the system, an alignment score representative of a quality of a pair-wise alignment between the first set of three-dimensional data and the second set of three-dimensional data based on a comparison of the first set of visual features and the second set of visual features.

Appeal Br. 65 (Claims Appendix).

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Ninan	US 2012/0162366 A1	June 28, 2012
Rosenstein	US 2012/0185094 A1	July 19, 2012

REJECTIONS

Claims 2–5, 7–25, and 27–30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ninan and Rosenstein. Final Act. 2–41.

ISSUE

Has the Examiner erred in finding the cited references teach or suggest "determining . . . a global alignment, relative to a three-dimensional coordinate space, between three or more sets of three-dimensional data captured from an object or an environment at difference capture positions or orientations, wherein the three or more sets of three-dimensional data respectively correspond to volumes of the object or the environment," as recited in claim 2?

ANALYSIS

The Examiner finds the disputed limitation taught by Ninan. Final Act. 3–4 (citing Ninan Fig. 9, ¶¶ 57, 115–116). More specifically, the

Examiner finds that Ninan teaches the use of hardware/software components which compute the depth of pixels in input scanlines from pixel disparity. Ans. 39–40. The Examiner explains that Ninan's image processing system "may determine the depth based on the disparity and geometric configuration of the camera elements 102-1 and 102-2 (i.e., the camera elements have 'different capture positions or orientations')." Ans. 40.

Appellant argues "Ninan discloses a system in which left and right input frames (i.e., 2D images) are captured and used to generate stereoscopic HDR images." Appeal Br. 22. Appellant asserts the cited disclosure of Ninan "merely discloses using information regarding the geometric portion of the left camera . . . relative to the right camera . . ., to determine a geometric disparity between corresponding pixels." Appeal Br. 24. Appellant further argues Ninan fails to teach or suggest "*sets of three-dimensional data* captured from an object or an environment," because "[c]aptured depth data requires usage of a depth capturing instrument (e.g., a depth sensor or LIDAR)" and that the data captured by Ninan's stereoscopic camera is two dimensional in nature, and that any depth information associated with a 3D image is derived and not captured. Reply Br. 22–23. Appellant further argues that Ninan merely describes "a conventional passive stereo technique for deriving depth information," and that even if the stereoscopic images pairs are considered captured sets of three dimensional data, Ninan does not teach or suggest "determining an alignment" between sets of depth information. Appeal Br. 24−25.

We are persuaded of Examiner error. Ninan "relates to image processing systems that process three-dimensional (3D) images from a standard stereoscopic camera to generate 2D or 3D High Dynamic Range

(HDR) images." Ninan ¶ 2. Thus, Ninan describes using non-HDR capable cameras to capture images that are subsequently processed so that they can be displayed in 3D on a HDR display. Ninan achieves this goal through the use of a stereoscopic camera in which the left lens is "set to a first exposure setting for capturing relatively bright portions of a scene, while a right view camera element . . . may be set to a second exposure setting for capturing relatively dim portions of the same scene." Ninan ¶ 29.

The Examiner finds that Ninan's computing of pixel depth using disparity of pixels is a "global alignment." However, to the extent pixel depth is a "global alignment," Ninan makes this determination based on two stereoscopic images – i.e., two sets of 2D image data – and not based on multiple sets of 3D image data. As persuasively explained by Appellant, "Ninan merely discloses deriving depth or 3D data from a captured 2D image." Reply Br. 23. We also agree with Appellant that the pair of stereoscopic images captured in Ninan are not "*sets of three-dimensional data* captured from an object or an environment," as the depth information is *derived* from the two dimensional images, and the raw information captured by the stereoscopic camera lacks any depth component. Accordingly, we do not sustain the rejection claim 2 under 35 U.S.C. § 103(a), nor the rejection of independent claims 13 and 23 which recite similar limitations.

Remaining Claims

The remaining claims are each depend from one or independent claims 2, 13, and 23. By virtue of their respective dependencies, they each stand together with their respective independent claims.

CONCLUSION

We reverse Examiner's rejection under 35 U.S.C. § 103(a).

DECISION SUMMARY

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
2–5, 7–25, 27–30	103(a)	Ninan, Rosenstein		2–5, 7–25, 27–30

REVERSED