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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/176,464	02/10/2014	Hua SHENG	2017P00449 US02	9397

14868 7590 07/08/2020

Patent Docketing
200 Bellevue Parkway, Suite 300
Attention: Docketing
Wilmington, DE 19809

EXAMINER	
MARINI, MATTHEW G	

ART UNIT	PAPER NUMBER
2853	

NOTIFICATION DATE	DELIVERY MODE
07/08/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte HUA SHENG, BRYAN C. COOK,
and MATTHEW G. LIBERTY

Appeal 2019-004862
Application 14/176,464
Technology Center 2800

Before DEBRA L. DENNETT, LILAN REN, and JANE E. INGLESE, *Administrative Patent Judges.*

REN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant appeals from the Examiner's Final decision to reject claims 1 and 3–20.[1] *See* Final Act. 7, 11, and 14. 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. Appellant identifies the real party in interest as "lnterDigital Patent Holding, Inc." Appeal Br. 2.

CLAIMED SUBJECT MATTER

"The present invention describes bias tracking techniques, systems, software and devices, which can be used in 3D pointing devices, as well as in other types of devices." Spec. ¶ 2. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A method for filtering an output of a sensor to compensate for a bias error comprising:
>
> sensing rotation of a device about at least one axis to generate at least one output associated therewith, the output comprising at least one of an angular velocity, an angular rate, and an angular position; and
>
> utilizing a zero-rate output (ZRO) tracking filter configured to receive said at least one output to compensate said at least one output for zero-rate offset error,
>
> wherein said ZRO filter is implemented as a combination of a Kalman filter having at least one constraint enforced on at least one parameter associated therewith and a moving average filter.

Appeal Br. 37 (Claims App).

REFERENCES

The prior art references relied upon by the Examiner are:

Name	Reference	Date
Wang	US 7,424,392 B1	Sept. 9, 2008
Hsiung	US 2009/0234587 A1	Sept. 17, 2009
Joseph	US 2010/0174506 A1	July 8, 2010
Best	*The identifying extended Kalman filter: parametric system identification of a vehicle handling model*, Special Issue Paper, Proc. IMechE, Vol. 221, Part K: J., Multi-body Dynamics	2007

REJECTIONS[2]

Claims 1, 3–7, 9–14, and 19 are rejected under 35 U.S.C. § 103(a) based on Joseph and Best. Final Act. 7.[3]

Claims 16–18 and 20 are rejected under 35 U.S.C. § 103(a) based on Joseph, Best, and Wang. Final Act. 11.

Claims 8 and 15 are rejected under 35 U.S.C. § 103(a) based on Joseph, Best, and Hsiung. Final Act. 14.

[2] A rejection under section 101 has been withdrawn (Ans. 3) and is not before us.

[3] The Examiner rejects "[c]laims 1–7, 9–14, and 19" which is believed to be a typographical error. *See* Final Act. 7, 8–11 (analyzing only claims 1, 3–7, 9–14, and 19).

OPINION

Claim 1

In rejecting claim 1 over Joseph and Best, the Examiner finds that Joseph teaches "filter 403" which "calibrates and corrects signals from the sensors such the signals are assumed to have zero error" corresponding to the recited ZRO tracking filter "utilize[ed] . . . to compensate said at least one output for zero-rate offset error." Ans. 3; *see also* Final Act. 7. The Examiner finds that "once the filter 403 compensates for the error, a Kalman filter is applied" which reads on the recited "implemented." Ans. 3. The Examiner finds that "said ZRO filter (403) is implemented as combination of a Kalman filter." Final Act. 7 (citing Joseph ¶ 60).

Recognizing that Joseph is "silent regarding the Kalman filter having at least one constraint enforced on at least one parameter associated therewith and a moving average filter," the Examiner cites Best for the teaching. *Id.* (citing Best 88–89 and formulas 12–24).

Appellant, on the other hand, argues that Joseph does not teach using a Kalman filter as a ZRO tracking filter. Appeal Br. 35. More specifically, Appellant argues that Joseph paragraph 60, cited by the Examiner, only shows that the Kalman filter is used "to compute the altitude of the device after the sensors[] are already calibrated." *Id.* (emphasis removed). Appellant also argues that Best does not teach a ZRO tracking filter. *Id.* at 34.

Joseph paragraph 60 provides, in part:

> In some embodiments, the sensors 401 are calibrated and corrected 403. For example, the sensors 401 may be calibrated and corrected so that a Kalman filter that is used to compute the attitude of a multi-dimensional pointing device (e.g., the multi-

> dimensional pointing device 102 in FIG. 1, etc.) is initialized with a zero assumed error. The Kalman filter states are then determined 404.

We are persuaded that the record supports Appellant's argument with regard to Joseph's teaching. The Examiner does not disagree that Joseph teaches that the Kalman filter is used subsequent to the sensors 401 being calibrated. *Compare* Ans. 3, *with* Appeal Br. 34; *see also* Joseph ¶ 60 (describing Fig. 4 which illustrates "Calibrate/Correct 403" followed by "Compute Kalman Filter States 404."). The Examiner only states that the fact that "once the filter 403 compensates for the error, a Kalman filter is applied" meets the recited "implemented." Ans. 3. The claim language, however, requires more than "implemented" — the claim requires that that "ZRO filter is implemented as a combination of a Kalman filter . . . and a moving average filter."

The Examiner's finding that "said ZRO filter (403) is implemented as combination of a Kalman filter" (Final Act. 7) does not sufficiently support a teaching of the claim language which requires "a combination" of two filters — Kalman and moving average. The Examiner does not sufficiently explain that Best's teaching about "an extended Kalman filter" with "tuning parameters α and λ, using a moving average" combined with Joseph would result in a combination of two filters being implemented as a ZRO filter. Ans. 4. We accordingly do not sustain the rejection based on the current record.

CONCLUSION

The Examiner's rejections are reversed.

More specifically,

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–7, 9–14, 19	103(a)	Joseph, Best		1, 3–7, 9–14, 19
16–18, 20	103(a)	Joseph, Best, Wang		16–18, 20
8, 15	103(a)	Joseph, Best, Hsiung		8, 15
Overall Outcome:				1, 3–20

REVERSED