

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Name et al.	)	Examiner: Yuzhen Shen
	)	
Application No.: 19/249,847	)	Art Unit: 2623
	)	
Filed: June 25, 2025	)	Confirmation No.: 4090
	)	
For: DISTRIBUTED IMAGE SIGNAL	)	
PROCESSING	)	
	)	
_____	)	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

In response to the Office Action mailed March 26, 2026, the Examiner is respectfully solicited to enter the following amendments and consider the following remarks.

CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application:

What is claimed is:

1. (Original) A head-mounted device comprising:

an image sensor configured to generate raw image data;

an image processing engine configured to receive the raw image data and perform partial image signal processing on the raw image data to generate processed image data; and

a controller configured to:

determine a power level of a battery of the head-mounted device; and

responsive to the power level of the battery being below a battery threshold, transmitting the processed image data generated by the image processing engine to processing logic of a companion device for further image processing.

2. (Original) The head-mounted device of claim 1, wherein the image processing engine of the head-mounted device is configured to generate YUV image data from the processed image data when the power level is above the battery threshold.

3. (Original) The head-mounted device of claim 1, wherein the controller is further configured to check whether a communication channel is established with the companion device, and wherein the processed image data is transmitted to the

companion device when the communication channel is established and the power level of the battery is below the battery threshold.

4. (Original) The head-mounted device of claim 3, wherein the image processing engine of the head-mounted device is configured to generate YUV image data from the processed image data when the communication channel with the companion device is not established.

5. (Original) The head-mounted device of claim 1, wherein the processed image data is transmitted to the companion device by a wireless communication channel.

6. (Original) The head-mounted device of claim 1, wherein the processed image data is transmitted to the companion device by a wired communication channel.

7. (Original) A method of distributed image signal processing comprising:

- generating raw image data with an image sensor of a head-mounted device;
- performing ultralight image signal processing on the raw image data with an image processing engine of the head-mounted device, wherein performing the ultralight image signal processing generates statistics of the raw image data;
- determining a power level of a battery of the head-mounted device; and
- responsive to the power level of the battery being below a battery threshold, transmitting the raw image data and the statistics of the raw image data generated by the

image processing engine to processing logic of a companion device for further image processing.

8. (Original) The method of claim 7 further comprising:

generating, with the image processing engine of the head-mounted device, YUV image data from the raw image data and the statistics of the raw image data when the power level is above the battery threshold.

9. (Original) The method of claim 7 further comprising:

checking whether a communication channel is established with the companion device, and wherein the raw image data and the statistics of the raw image data is transmitted to the companion device when the communication channel is established and the power level of the battery is below the battery threshold.

10. (Original) The method of claim 9, wherein the image processing engine of the head-mounted device is configured to generate Bayer image data from the raw image data when the communication channel with the companion device is not established.

11. (Original) The method of claim 7, wherein the raw image data is transmitted to the companion device by a wireless communication channel.

12. (Original) The method of claim 7, wherein the raw image data is transmitted to the companion device by a wired communication channel.

13. (Original) The method of claim 7 further comprising:

generating, with the companion device, Bayer image data from the raw image data and the statistics of the raw image data.

14. (Original) The method of claim 13 further comprising:

generating, with the companion device, YUV image data from the Bayer data.

15. (Currently Amended) A head-mounted device comprising:

an image sensor configured to generate raw image data;

an image processing engine configured to receive the raw image data and perform partial image signal processing on the raw image data to generate processed image data; and

a controller configured to:

determine a status of an operating application of the head-mounted device; and

responsive to the status of the operating application including capturing videos, transmitting the processed image data generated by the image processing engine to processing logic of a companion device for further image processing.

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Original) The head-mounted device of claim 15, wherein the processed image data is transmitted to the companion device by a wired communication channel.

20. (Original) The head-mounted device of claim 15, wherein the processed image data is transmitted to the companion device by a wireless communication channel.

21. (New) The head-mounted device of claim 1, wherein the controller is further configured to:

determine a status of an operating application of the head-mounted device, wherein transmitting the processed image data is responsive to the battery being below the battery threshold and responsive to the status of the operating application including capturing video.

22. (New) The method of claim 7 further comprising:

determining a status of an operating application of the head-mounted device, wherein transmitting the raw image data and the statistics of the raw image data is responsive to the battery being below the battery threshold and responsive to the status of the operating application including capturing video.

REMARKS

Claim 15 is amended herein. Claims 16-18 have been cancelled. Claims 21-22 are newly presented. Entry of this amendment and reconsideration of the pending claims are respectfully requested.

Examiner Interview Summary

The Examiner is thanked for conducting an Examiner Interview with Applicant's representative on June 23, 2026. On this date, a telephonic Examiner Interview was conducted between Applicant's representative, Aaron J. Visbeek, Reg. No. 68,372 and Examiner Shen.

During the interview, claim 7 was discussed in view of in the context of 35 USC § 112 rejections. Claim 1, 3, and 16 were discussed in view of in the context of 35 USC § 103 rejections. An agreement was reached to include the subject matter of claim 16 into independent claim 15.

Claim Rejections – 35 U.S.C. § 112

Claims 7-12 stand rejected under pre-AIA 35 U.S.C. § 112(a), as failing to comply with the written description requirement. In particular, the Office Action asserts “nowhere in the specification and drawing discloses “transmitting the **raw image data** and the **statistics** of the raw image data generated by the image processing engine to processing logic of a companion device for further processing.” *Office Action mailed 03/26/2026, page 3.*

FIG. 1D and [0034] support “**statistics for raw data**” being transmitted to companion device 126.

Applicant's FIG. 1D illustrates an “**Ultralight** ISP Pipeline 188.” In FIG. 1D, head-mounted device ISP 124 includes “light Bayer statistics processing 196 to *generate **statistics for the raw data***.” *Specification*, [0034]. And the arrow in FIG. 1D shows the *generated output* (“statistics for the raw data”) of “light Bayer statistics processing

196” being provided to “companion device 126.” Therefore, FIG. 1D does show that “statistics for the raw data” are being transmitted to companion device 126.

FIG. 1D and [0029] support “raw data” being transmitted to companion device 126.

Now we turn to the question of whether the Application supports “raw data” being transmitted to the companion device. [0029] of the Specification recites, “In an **ultra-lightweight** distributed ISP operation...head-mounted device 124 provides raw image data 156 to companion device ISP 126 for Bayer processing....” Hence, [0029] recites that raw image data is transmitted to companion device 126 in an “**ultra-lightweight** distributed ISP operation.” Notably, FIG. 1D illustrates “**ultralight** ISP pipeline 188.” Furthermore, when [0029] recites raw image data being provided to companion device ISP 126 “for Bayer Processing, RGB Processing, and YUV processing.” This matches up with “Full ISP Bayer Proc. 190,” “Full ISP RGB Proc. 192” and YUV processing 194A/B shown in FIG. 1D. Therefore, there is no doubt that [0029] and FIG. 1D support raw image data being provided from head-mounted device 124 to companion device 126 in an **ultralight** ISP pipeline as recited as “performing **ultralight** image signal processing” in claim 7.

For the reasons recited above, the combination of at least FIG. 1D, [0029], and [0034] support the claim language of claim 7. Therefore, Applicant respectfully requests the withdrawal of all §112 rejections.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 2, 5, and 6 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Lerner et al.* (US 2021/0174123) in view of *Lee et al.* (US 2018/0025478). Claims 3 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Lerner et al.* in view of *Lee et al.* and further in view of *Nambiar et al.* (US 9,305,227). Claims 7, 8, 11, and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Chang et al.* (US 2013/0004071) in view of *Lerner et al.* and further in view of *Lee et al.* Claims 9 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Chang et al.* in view of

Lerner et al. and further in view of *Lee et al* and further in view of *Nambiar et al.*
Claims 15-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Lerner et al.* in view of *Wang et al.* (US 2024/0171701).

“All words in a claim must be considered in judging the patentability of that claim against the prior art.” M.P.E.P. § 2143.03.

Independent claim 15

In accordance with the agreement in the Examiner Interview of June 23, Applicant has amended claim 15 to include the features of claim 16. Accordingly, Applicant requests that the instant §103(a) rejection of claim 15 be withdrawn.

Independent claim 1

Independent claim 1 recites in pertinent part,

1. A head-mounted device comprising:
 - an image sensor configured to generate raw image data;
 - an image processing engine configured to receive the raw image data and perform partial image signal processing on the raw image data to generate processed image data; and
 - a controller configured to:
 - determine a power level of a battery of the head-mounted device; and
 - responsive to the power level of the battery being below a battery threshold, transmitting the processed image data generated by the image processing engine to processing logic of a companion device for further image processing.

Applicant respectfully submits that the cited references fail to disclose transmitting **processed** image data responsive to the power level of the battery.

The Office Action acknowledges that “*Lerner* does not disclose...transmitting the processed image data to the companion device for further image processing in

responsive to the power level of the battery being below a battery threshold.” *Office Action mailed 03/26/2026, page 5*. To attempt to supplement the deficiency in *Lerner*, the Office cites *Lee*. However, *Lee* doesn’t disclose transmitting processed image data. Rather, *Lee* discloses a processor 170 that may perform processing on a part of an image (e.g. a central region) and transmit a part of an image (e.g. a peripheral region) to a second electronic device 200 such that device 200 process the part needing relatively much computation for processing. *Lee*, [0065]. Therefore, *Lee* discloses transmitting a part of an image, but that “part” is unprocessed (e.g. peripheral of an image) rather than “processed image data,” as claimed. To confirm further, [0069] of *Lee* describes transmitting raw image data when the battery is low.

Consequently, the combination of *Lerner* and *Lee* fails to teach or suggest all elements of claim 1, as required under M.P.E.P. § 2143. Independent claim 7 includes similar nonobvious elements as independent claim 1. Accordingly, Applicant requests that the instant §103(a) rejections of claims 1 and 7 be withdrawn.

Dependent Claims

The dependent claims are allowable over the prior art of record for at least the same reasons as discussed above in connection with their respective independent claims, in addition to adding further limitations of their own. Accordingly, Applicant respectfully requests that the instant rejections of the dependent claims be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, it is believed that the applicable rejections have been overcome and all claims remaining in the application are presently in condition for allowance. Accordingly, favorable consideration and a Notice of Allowance are earnestly solicited. The Examiner is invited to telephone the undersigned representative at (206) 607-2700 if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,
FREESTONE IP LAW PLLC

Date: June 24, 2026

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