Inter Partes Review of Patent No. 10,225,479

Apple Inc. v. Corephotonics, LTD., Case No. IPR2020-00905

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Overview of Topics

The specification does not require that Wide perspectiv
be maintained in a wide POV image

It is undisputed that Parulski's image enhancement m
maintains Wide position POV under Petitioner's constr

Parulski teaches using a range map for identifying
extracting objects in the Fig. 14 method

Patent Owner's evidence of secondary considerati
has no nexus with the claims of the '479 patent

Patent Owner's evidence is not credible and no evid
demonstrates commercial success, failure of others, or

Claim Construction in Dispute

- Limitation 1(e)

> e) a camera controller operatively coupled to the first and second AF mechanisms and to the Wide and Tele image sensors and configured to control the AF mechanisms and to process the Wide and Tele images to create a fused image, wherein areas in the Tele image that are not focused are not combined with the Wide image to create the fused image and wherein the camera controller is further operative to output the fused image with a point of view (POV) of the Wide camera by mapping Tele image pixels to matching pixels within the Wide image.

APPL-1001, Claim 1.

- Petitioner's Construction

"fused image in which the positions or shapes of objects reflect those of the Wide camera"

Petitioner Reply at 6 (*same construction as in Petition but using Patent Owner's terminology*).

- Patent Owner's Construction

"fused image in which the position shapes of objects reflect the POV Wide camera"

Patent Owner Resp

POV in a fused image refers to two distinct concept
maintaining object *shape* or maintaining object *posi*

Patent Owner Response at 11-12.

> ***POV*** is defined in the specification quite differently. It refers to how objects are "seen by each sub-camera," i.e., how objects "with be shifted and have different perspective (shape)" for the two cameras. (Ex. 1001 at 5:10–14.) This POV depends on the position and orientation of the camera and cannot be expressed fully by a single numerical angle. Rather, as the '479 patent explains, using a camera with a different POV can both shift an object (change its position in the image) and change the perspective of an object (changes its apparent shape in the image). (Ex. 1001 at 5:10–16.) *See* Hart Decl., ¶ 43.

APPL-1013 (Szeliski at 468) *cited in* Patent Owner Response at 12.

Maintaining object *position* means Wide position P
Maintaining object *shape* means Wide perspective P

In an embodiment, the camera controller configuration to provide video output images with a smooth transition when switching between a lower ZF value and a higher ZF value or vice versa includes

FIG. 2 shows an example of Wide sensor, Tele sensor and their respective FOVs;

FIG. 3 shows a schematically embodiment of CMOS

In a dual-aperture camera image plane, as seen by each sub-camera (and respective image sensor), a given object will be shifted and have different perspective (shape). This is referred to as point-of-view (POV). The system output image can have the shape and position of either sub-camera image or the shape or position of a combination thereof. If the output image retains the Wide image shape then it has the Wide perspective POV. If it retains the Wide camera position then it has the Wide position POV. The same applies for Tele images position and perspective. As used in this description, the perspective POV may be of the Wide or Tele sub-cameras, while the position POV may shift continuously between the Wide and Tele sub-cameras. In fused images, it is possible to register Tele image pixels to a matching pixel set within the Wide image pixels, in which case the output image will retain the Wide POV ("Wide fusion"). Alternatively, it is possible to register Wide image pixels to a matching pixel set within the Tele image pixels, in which case the output image will retain the Tele POV ("Tele fusion"). It is also possible to perform the registration after either sub-camera image is shifted, in which case the output image will retain the respective Wide or Tele perspective POV.

BRIEF DESCR

Non-limiting examples of embodiments disclosed herein are described below with reference to figures attached hereto that are listed following this paragraph. The drawings and descriptions are meant to illuminate and clarify embodiments disclosed herein, and should not be considered limiting in any way.

FIG. 1A shows schematically a block diagram illustrating

capture processing module is applied when the user wishes to shoot still pictures.

FIG. 1B is a schematic mechanical diagram of the dual-aperture zoom imaging system of FIG. 1A. Exemplary dimensions: Wide lens TTL=4.2 mm and EFL=3.5 mm; Tele lens TTL=6 mm and EFL=7 mm; both Wide and Tele sensors ½ inch. External dimensions of Wide and Tele cameras: width (w) and length (l)=8.5 mm and height

Objects in a fused image mainta
and position" *or* "shape or positi
combination" of either sub-came
This is referred to as:
Wide perspective POV (i.e., obje
Wide position POV (i.e., object p

Wide position POV is maintaine
image by matching pixels of the
Tele images (i.e., registration m

Wide perspective POV is mainta
fused image only by "shifting" th
before registration, a separate st
registration mapping.

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