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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2019/062717	22.11.2019	26.11.2018

International Patent Classification (IPC) or both national classification and IPC
INV. G06F3/01 G06F3/0481

Applicant
FACEBOOK TECHNOLOGIES, LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2019/062717

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed:

      ☐ in the form of an Annex C/ST.25 text file.

      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **State of the Art**

Reference is made to the following documents:

D1 US 2018/005429 A1 (OSMAN STEVEN [US] ET AL) 4 January 2018 (2018-01-04)

D2 US 2017/326457 A1 (TILTON ROBBIE [US] ET AL) 16 November 2017 (2017-11-16)

D3 US 2011/225519 A1 (GOLDMAN DANIEL M [US] ET AL) 15 September 2011 (2011-09-15)

D4 US 2018/329604 A1 (NAKABO TAKASHI [JP] ET AL) 15 November 2018 (2018-11-15)

Re Item VIII

Certain observations on the international application (clarity)

2 **Clarity (Art. 6 PCT)**

2.1 The application does not meet the requirements of Article 6 PCT, because independent **claims 1, 11 and 15** and dependent **claims 6 and 8** are not clear. Actually, the current set of claims is very unclear as it is full of major clarity issues. This opinion comprises a detailed list of several clarity issues concerning the current set of claims. Only once the applicant has overcome all clarity issues, may novelty and inventive step discussed in detail.

2.2 In particular, the following passages involve clarity deficiencies:

2.3 **Claims 1, 11 and 15:**

2.3.1 `"connecting to a virtual session".`

Although it is clear what `"a virtual session"` is, the connection to such a session can only be performed if:

- the virtual session is running somewhere,

- a display (e.g. an HMD) is present to display the virtual session to the users, and

- there is a wired or wireless communication module at each user's device enabling a connection to the device running the session.

The presence of these aspects is therefore essential and should be made explicit in the independent claims.

2.3.2 "environment comprises a screen".

This passage leaves the reader confused as to whether the screen corresponds to a real one in the real world or it is merely a virtual screen. In the light of the description, it seems that "a screen" must be understood as being "a virtual screen".

2.3.3 "receiving relative-position information [...] between the first user and the one or more other users"

This receiving of information can only be performed if:

- there is a communication module enabling the reception of this info, and

- the information has means to be generated, i.e. if there is a sensor or a measurement device determining the absolute user positions, or at least a sensor or measurement device determining the relative positions of every user with respect to the others.

The presence of these aspects is therefore essential and should be made explicit in the independent claims.

2.3.4 "based on a first position", "based on a second position"

For the rendering to be based on said first and second positions,

- said positions might be actually determined at the rendering device via a sensor or received from a different device.

The presence of these aspects is therefore essential and should be made explicit in the independent claims.

2.3.5 "the screen rendered by the second computing device and the first avatar representing the first user have a different spatial relationship in the virtual reality environment than the predefined spatial relationship"

This passage seems to be key to the invention but is however unclear. In principle, it seems that the change of the spatial relationship serves the purpose of keeping a consistent understanding on what is happening in the scene.

However this is not merely achieved by claiming merely a different spatial relationship.

Let's go into detail: first and second users, with different locations within the VR, scene are however watching the content from an identical perspective, i.e. the virtual screen is rendered with different virtual orientations for each of them but with the same relative perspective, i.e. with the same spatial relationship to the individual users.

However, the posture of the first (second) user avatar gets modified in the rendering of the second (first) device, so that consistent information gets presented, e.g. if the first (second) user is looking at the content, his/her avatar posture must adapted to make it sure that it also appears looking at the content as rendered for the second (first) user (see claim 8).

Not any different spatial relationship achieves this purpose. The way the claim is phrased it would also cover the case in which the first user is watching the content but his/her avatar is presented to the second user as it were looking away from the content.

It is therefore necessary, in order for the invention to actually achieve the expected effect, that the different spatial relationship is not just any relationship, but rather the specific relationship disclosed by **claim 8.**

For the sake of this opinion therefore, it would be assumed that **claim 8**'s subject-matter is incorporated into **claim 1.**

2.4 **Claims 6-7:** `"facing direction", "faces forward"`

No means have been mentioned that determine a facing direction. Said means would be **essential.**

The term "forward" is also confusing. Does it actually mean that the virtual screen will follow the facing direction of the user, i.e. if the user turns his face right, will the virtual screen move its virtual position to actually follow the user's line of sight?

For the sake of this opinion it will be assumed that the virtual screen gets a fixed position according to a first facing direction of the user and gets fixed there, without further tracking the facing direction.

2.5 **Claim 8:** the dependency is incorrect. Said claim will be assumed to depend on **claim 7.**

2.6 It must be here noted that the objections which have been raised concerning one claim frequently apply to other claims and even to claims of the other categories as well. It goes without saying that the objections have to be overcome in the entire set of claims and not only in the claim which has been mentioned here.

2.6.1 The ***essential*** features defining the core of the invention (which should be claimed explicitly in the independent claims) appear to be:

2.7 **a)** Multiple users wear/carry immersive displays harnessed with communication modules.

2.8 **b)** Their positions are being tracked with some sensors.

2.9 **c)** They share a common VR scene managed by a certain device running a virtual session.

2.10 **d)** Each user is represented with an avatar to the others which follows the user's position in the real world.

2.11 **e)** All users have viewing access to a certain virtual object displaying digital media content,

2.12 **f)** The virtual object is rendered differently at each user's display to show an identical perspective of the media-content.

2.13 **g)** The avatars postures as rendered in a local device are adapted so that when the user's are watching the content, their avatars seem to be looking at the virtual object as rendered locally.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

3 Inventive Step - Independent claims

3.1 Notwithstanding the above-mentioned lack of clarity, the present application does not meet the requirements of Article 33(1) PCT because the subject-matter of independent **claims 1, 11 and 15** does not involve an inventive step within the meaning of Article 33(3) PCT .

3.2 Regarding claim **1:**

3.2.1 Document **D1** can be considered to be the prior art closest to the subject-matter of independent **claim 1** and discloses:

a) Multiple users wear/carry immersive displays harnessed with communication modules. **c)** They share a common VR scene managed by a certain device running a virtual session.

> See [0008]: *"a system for providing VR scenes to one or more HMDs [...] The computing system also establishes a first communication channel for providing the first perspective of the VR scene to the first HMD as well as w second communication channel for receiving a signal from a second HMD requesting to join the VR scene"*.

b) Their positions are being tracked with some sensors.

> [0008]: *"The system additionally includes a positioning system for tracking real-world position and orientation and changes thereto of the first HMD and the second HMD"*

d) Each user is represented with an avatar to the others which follows the user's position in the real world.

> [0058]: *"Movements of both users are also being tracked by cameras disposed within the virtual reality interactive space such that movements occurring in the real-world can be mapped into virtual movements carried out by avatars 210a and 212b."*
>
> See also fig. 5.

e) All users have viewing access to a certain virtual object displaying digital media content:

> [0084]: *"FIG. 11A shows two co-located HMD users viewing a same VR scene. The VR scene includes a planet 1101 and a spaceship 1103. Host 1102 and guest 1104 are being presented VR scenes 1110 and 1112, respectively. Though scenes 1110 and 1112 appear similar, host 1102 and guest 1104 might have differing POGs (e.g., looking at different things)"*.

f) The virtual object is rendered differently at each user's display to show [a certain] ~~an identical~~ perspective of the media-content.

> [0073] *"For the second user, operation 510 displays the first VR with a modified perspective corresponding to the second user's position and orientation in the real world relative to the first user. Thus, if the two users are facing each other in the real world, they will see completely different fields of view in the VR. But, if for example, the second user turns 180*

degrees to face the same direction as the first user, his change in orientation will be tracked by method 512, via cameras on the HMDs and within the VR interactive space in real-time. The second user will now have a perspective similar to that of the first user, since he is now facing the same direction as the first user"

~~**g)** The avatars postures as rendered in the local devices are adapted so that when a user is watching the content, his/her corresponding avatar seems to be looking at the virtual object as rendered locally.~~

The postures of the avatars of **D1** are not changed in this particular way. Instead, in order to know what the other user is looking at, a certain indicator is shown. See figs. 6, 11A-B.

[0074]: *"FIG. 6 illustrates a method for allowing HMD users having a shared VR to determine a point of gaze (POG) of the other user (e.g., see where another user is looking or what another user is looking at). For example, in operation 608, gaze information for a guest (second user) and a host (first user) is detected and processed to determine respective points of gaze. Once the POG of the guest and host is determined, operation 610 displays within the shared VR of the guest and indication of the host's POG. Operation 610 also displays within the shared VR of the host an indication of the guest's POG. Gaze indication may take one or more of many forms. For example, the indication may take the form of a reticle. In other embodiments, the indication may appear as a highlighted virtual object or area. In still further embodiments, the indication take the form of a shape's outline.Although not shown, a user's own POG may also be indicated to himself via an indication of POG that differs from that of another user. In some embodiments, if more than two users happen to share a VR, each user's gaze indication may take on a different form to avoid confusion".*

3.2.2 The method disclosed by **D1** differs from the subject-matter of **claim 1** in that the following distinguishing features are missing:

F1: all users see exactly the same perspective for the shared virtual object displaying the media content.

F2: The avatars postures as rendered in the local devices are adapted so that when a user is watching the content, his/her corresponding avatar seems to be looking at the virtual object as rendered locally.

3.2.3 Features **F1** and **F2** solve together the problem of *how to alternatively inform the local user about whether other users are watching a certain content or not.*

3.2.4 However, this problem is already solved in **D1** by presenting a point of gaze indicator (see [0074], figs. 6, 11a-b).

3.2.5 Features **F1** and **F2** represent therefore an alternative way of presenting this information to the local user. In this sense, these distinguishing features **F3** are directed solely towards the presentation of information (Rule 67(v) PCT), in the sense that they do not seem to provide a technical contribution over the prior art. The fact that in the best case they may facilitate the user's understanding so that the user can work more efficiently and notably more quickly, thus lowering his cognitive burden, is in itself not a technical effect.

3.2.6 As said features only contribute towards easing the process of human perception, they do not support the presence of an inventive activity.

3.2.7 The skilled person in the art of human-computer interaction is not concerned with deciding on non-technical matters - he would receive the requirements specifications from an artist, client, manager, user or some other concerned non-technical person. The skilled person's role would then merely consist in implementing the required non-technical functionality without the need of any inventive skill within the meaning of Article 33(3) PCT.

3.3 For the sake of completeness is also worth noting that the core of the invention as disclosed by the essential features of point 2.6.1 is also disclosed by **D2-D4** (see passages cited in the International Search Report) **.**

3.4 The same reasoning applies, *mutatis mutandis*, to the corresponding independent **claims 11 and 15**, the subject-matter of which is therefore also not inventive (Article 33(3) PCT).

4 Inventive Step - Dependent claims

4.1 Notwithstanding the above-mentioned lack of clarity, dependent **claims 2-10 and 12-14** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to inventive step in the sense of Article 33(3) PCT.

4.2 Note however that due to the above mentioned notable clarity deficiencies, the elaboration of a detailed analysis would entail serious difficulties and would not be efficient in procedural terms. The analysis regarding the dependent claims

would be therefore limited to a few references and comments on what is regarded as being common general knowledge of the skilled person, with the hope it can still useful to the applicant.

Claim(s)	Objection	Arguments and references
2, 5, 12	Inventive Step (IS)	**D1** discloses that a third host HMD might send an invitation to first and second HMDs ([0038].
3, 13	IS	It is implicit that the device hosting the virtual session will receive information about the positions and id's of the different devices (D1 [0072]). It is also typical that information of the corresponding avatars would be send with the reply to said invitation. See also **D2** [0077].
4, 14	IS	**D2** discloses a server keeping track of the virtual session, the locations and the identities of all users ([0037]).
6-8	IS	These are presentation aspects which do not further contribute to an inventive step. D1 already discloses a presentation way of providing this type of information to the user based on point of gaze indicators (see [0074], figs. 6, 11a-b).
9-10	IS	This is the typical behavior for VR collaborative spaces.

Re Item VII

Certain defects in the international application

5 The application lacks to meet the following requirements:

5.1 To meet the provisions of Rule 5.1(a)(ii) PCT, the relevant prior art, i.e. the documents **D1** to **D4**, should be acknowledged by reference and briefly discussed in the introductory part of the description.

5.2 The independent claims should be drafted in the proper two-part "characterised" form recommended by Rule 6.3(b).

5.3 The claims do not include reference signs in parentheses where features shown in the drawings are referred to (Rule 6.2(b) PCT).