



(51) International Patent Classification:

A63F 13/355 (2014.01) A63F 13/53 (2014.01)

A63F 13/86 (2014.01) G11B 27/10 (2006.01)

A63F 13/47 (2014.01) G06F 3/048 (2013.01)

(21) International Application Number:

PCT/US2022/041596

(22) International Filing Date:

25 August 2022 (25.08.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

17/459,474 27 August 2021 (27.08.2021) US

(71) Applicant: META PLATFORMS, INC. [US/US]: 1601 Willow Rd., Menlo Park, California 94025 (US).

(72) Inventors: RUBIN, Jason Pehr; 1601 Willow Road, Menlo Park, California 94025 (US). CHEN, Kun; 1601 Willow Road, Menlo Park, California 94025 (US).

(74) Agent: KAUFMAN, Marc et al.; Rimon Law, 420 West Main Street, Suite 101B, Boise, Idaho 83702 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: VIDEO INTERACTION PLATFORM

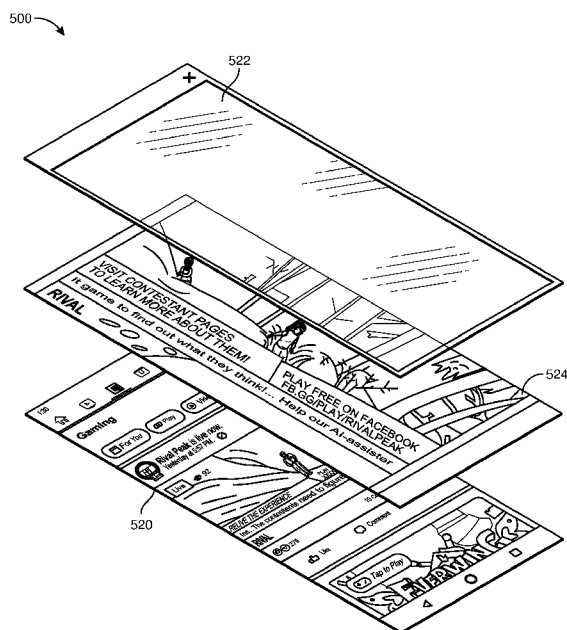


FIG. 5A

(57) Abstract: The disclosed computer-implemented method may include initiating a translucent layer, that includes a user interface element, for displaying over a content layer on a computing device, and receiving, from a content source, video content for the content layer. The method may also include receiving input via the user interface element and sending the input to the content source to direct the content source to modify the video content. The method may further include receiving modified video content from the content source and displaying the modified video content on the content layer. Various other methods, systems, and computer-readable media are also disclosed.

## VIDEO INTERACTION PLATFORM

### FIELD OF THE INVENTION

**[0001]** This disclosure relates to a system for and a method for operating a live interaction platform and methods, systems, and computer-readable media for displaying video content, without being limited thereto.

### BACKGROUND OF THE INVENTION

**[0002]** Playing games on computing devices is a popular activity. As games become more popular, watching people playing games is becoming an increasingly popular form of entertainment. Various live streaming platforms allow spectators to stream live gameplay. Such live streaming platforms allow game players to broadcast their gameplay. However, these live streaming platforms may limit spectators to passive viewing.

**[0003]** Certain other live streaming platforms may provide spectators with limited interactive aspects. For example, some live streaming platforms may allow viewers to chat with a content creator. However, such platforms may be limited to certain specific actions (e.g., typing in chat messages), which may or may not bring about a response from the content creator. Moreover, such platforms may be proprietary and custom-built for the specific platform, which may further limit or otherwise hinder development of added interactivity.

### SUMMARY OF THE INVENTION

**[0004]** In accordance with a first aspect of the present disclosure, there is provided a computer-implemented method comprising:

- initiating a translucent layer, that includes a user interface element, for displaying over a content layer on a computing device;
- receiving, from a content source, video content for the content layer;
- receiving input via the user interface element;
- sending the input to the content source to direct the content source to modify the video content;
- receiving modified video content from the content source; and
- displaying the modified video content on the content layer.

**[0005]** In some embodiments, the video content includes live streaming gameplay of a video game.

**[0006]** In some embodiments, the input modifies a gameplay of the video game and

1 the modified video content includes a live reaction to the modified gameplay.

2 **[0007]** In some embodiments, the video content includes live streaming video.

3 **[0008]** In some embodiments, wherein the input includes a prompt for the live  
4 streaming video and the modified video content includes a live reaction to the prompt.

5 **[0009]** In some embodiments, the translucent layer controls at least one of a size or a  
6 location of the video content rendered in the content layer.

7 **[0010]** In some embodiments, the method further comprises:  
8 requesting, by the translucent layer, a second video content for the content layer; and  
9 displaying the video content and the second video content on the content layer.

10 **[0011]** In some embodiments, the method further comprises:  
11 requesting, by the translucent layer, a second video content for the content layer; and  
12 displaying the second video content on the content layer by replacing the video content.

13 **[0012]** In some embodiments, the method further comprises:  
14 reading a time code from the video content; and  
15 synchronizing the translucent layer with the content layer using the time code.

16 **[0013]** In accordance with a second aspect of the present disclosure, there is provided  
17 a system comprising: at least one physical processor; and physical memory comprising  
18 computer-executable instructions that, when executed by the physical processor, cause the  
19 physical processor to: initiate a translucent layer, that includes a user interface element, for  
20 displaying over a content layer on a computing device, receive, from a content source, video  
21 content for the content layer, receive input via the user interface element, send the input  
22 to the content source to direct the content source to modify the video content, receive  
23 modified video content from the content source, and display the modified video content on  
24 the content layer.

25 **[0014]** In some embodiments, the video content includes live streaming gameplay of  
26 a video game; and the input modifies a gameplay of the video game and the modified  
27 video content includes a live reaction to the modified gameplay.

28 **[0015]** In some embodiments, the video content includes live streaming video; and  
29 the input includes a prompt for the live video and the modified video content includes a  
30 live reaction to the prompt.

31 **[0016]** In some embodiments, the translucent layer controls at least one of a size or a  
32 location of the video content rendered in the content layer.

1     **[0017]**     In some embodiments, the instructions further comprise instructions that  
2     cause the physical processor to: request, by the translucent layer, a second video content  
3     for the content layer; and display the video content and the second video content on the  
4     content layer.

5     **[0018]**     In some embodiments, the instructions further comprise instructions that  
6     cause the physical processor to: request, by the translucent layer, a second video content  
7     for the content layer; and display the second video content on the content layer by  
8     replacing the video content.

9     **[0019]**     In some embodiments, the instructions further comprise instructions that  
10    cause the physical processor to: read a time code from the video content; and synchronize  
11    the translucent layer with the content layer using the time code.

12   **[0020]**     In accordance with a third aspect of the present disclosure, there is provided a  
13    non-transitory computer-readable medium comprising one or more computer-executable  
14    instructions that, when executed by at least one processor of a computing device, cause the  
15    computing device to: initiate a translucent layer, that includes a user interface element, for  
16    displaying over a content layer on a computing device; receive, from a content source, video  
17    content for the content layer; receive input via the user interface element; send the input  
18    to the content source to direct the content source to modify the video content; receive  
19    modified video content from the content source; and display the modified video content on  
20    the content layer.

21   **[0021]**     In some embodiments, the video content includes live streaming gameplay of  
22    a video game; and the input modifies a gameplay of the video game and the  
23    modified video content includes a live reaction to the modified gameplay.

24   **[0022]**     In some embodiments, the video content includes live streaming video; and  
25    the input includes a prompt for the live video and the modified video content includes a live  
26    reaction to the prompt.

27   **[0023]**     In some embodiments, the translucent layer controls at least one of a size or a  
28    location of the video content rendered in the content layer.

29   **[0024]**     It will be appreciated that any features described herein as being suitable for  
30    incorporation into one or more aspects or embodiments of the present disclosure are  
31    intended to be generalizable across any and all aspects and embodiments of the present  
32    disclosure. Other aspects of the present disclosure can be understood by those skilled in

the art in light of the description, the claims, and the drawings of the present disclosure. The foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0025]** The accompanying drawings illustrate a number of exemplary embodiments and are a part of the specification. Together with the following description, these drawings demonstrate and explain various principles of the present disclosure.

**[0026]** FIG. 1 is a flow diagram of an exemplary method for operating a live interaction platform.

**[0027]** FIG. 2 is a block diagram of an exemplary system for a live interaction platform.

**[0028]** FIG. 3 is a block diagram of an exemplary network for a live interaction platform.

**[0029]** FIG. 4 is a block diagram of an exemplary data flow for a live interaction platform.

**[0030]** FIGS. 5A-B are example screens for a live interaction platform.

**[0031]** Throughout the drawings, identical reference characters and descriptions indicate similar, but not necessarily identical, elements. While the exemplary embodiments described herein are susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. However, the exemplary embodiments described herein are not intended to be limited to the particular forms disclosed. Rather, the present disclosure covers all modifications, equivalents, and alternatives falling within the scope of the appended claims.

#### DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

**[0032]** The present disclosure is generally directed to a live interaction platform. As will be explained in greater detail below, embodiments of the present disclosure may provide a translucent layer that includes a user interface (“UI”) element that may send input from the user interface element to a content source to direct the content source to modify streaming video content. The modified streaming video content may be displayed on a content layer that is overlaid by the translucent layer. The systems and methods described herein may improve the functioning of a computing device by efficiently providing additional interface elements to streaming video without requiring significant computing resources. In addition, the systems and methods described herein may improve the field of content delivery by providing a lightweight API that may provide additional interactivity.

1     **[0033]**     Features from any of the embodiments described herein may be used in  
2     combination with one another in accordance with the general principles described herein.  
3     These and other embodiments, features, and advantages will be more fully understood  
4     upon reading the following detailed description in conjunction with the accompanying  
5     drawings and claims.

6     **[0034]**     The following will provide, with reference to FIGS. 1-4, detailed descriptions of  
7     a live interaction platform. Detailed descriptions of a method for a live interaction platform  
8     are provided with FIG. 1. Detailed descriptions of an example system for a live interaction  
9     platform are provided with FIG. 2. Detailed descriptions of an example network  
10    environment for a live interaction platform are provided with FIG. 3. Detailed descriptions  
11    of an example data flow for a live interaction platform are provided with FIG. 4. Detailed  
12    descriptions of example screens for a live interaction platform are provided with FIGS. 5A-  
13    B.

14    **[0035]**     FIG. 1 is a flow diagram of an exemplary computer-implemented method 100  
15    for running a live interaction platform. The steps shown in FIG. 1 may be performed by any  
16    suitable computer-executable code and/or computing system, including the system(s)  
17    illustrated in FIGS. 2 and/or 3. In one example, each of the steps shown in FIG. 1 may  
18    represent an algorithm whose structure includes and/or is represented by multiple sub-  
19    steps, examples of which will be provided in greater detail below.

20    **[0036]**     As illustrated in FIG. 1, at step 110 one or more of the systems described herein  
21    may initiate a translucent layer, that includes a user interface element, for displaying over  
22    a content layer on a computing device. For example, a layer module 204 may initiate a  
23    translucent layer 222 for displaying over a content layer 224.

24    **[0037]**     In some embodiments, the term “layer” may refer to a data abstraction for  
25    separating elements of different applications which may be combined for rendering to a  
26    display device. Examples of layers include, without limitation, application windows, user  
27    interface layouts, browser frames, tabs, etc. In some examples, the layers themselves may  
28    be transparent or translucent so as not to obscure elements from underlying layers.

29    **[0038]**     Various systems described herein may perform step 110. For instance, FIG. 2 is  
30    a block diagram of an example system 200 for a live interaction platform. As illustrated in  
31    this figure, example system 200 may include one or more modules 202 for performing one  
32    or more tasks. As will be explained in greater detail herein, modules 202 may include layer

1 module 204, a content module 206, an input module 208, and a display module 210.  
2 Although illustrated as separate elements, one or more of modules 202 in FIG. 2 may  
3 represent portions of a single module or application.

4 **[0039]** In certain embodiments, one or more of modules 202 in FIG. 2 may represent  
5 one or more software applications or programs that, when executed by a computing device,  
6 may cause the computing device to perform one or more tasks. For example, and as will be  
7 described in greater detail below, one or more of modules 202 may represent modules  
8 stored and configured to run on one or more computing devices, such as the devices  
9 illustrated in FIG. 3 (e.g., computing device 302 and/or server 306). One or more of modules  
10 202 in FIG. 2 may also represent all or portions of one or more special-purpose computers  
11 configured to perform one or more tasks.

12 **[0040]** As illustrated in FIG. 2, example system 200 may also include one or more  
13 memory devices, such as memory 240. Memory 240 generally represents any type or form  
14 of volatile or non-volatile storage device or medium capable of storing data and/or  
15 computer-readable instructions. In one example, memory 240 may store, load, and/or  
16 maintain one or more of modules 202. Examples of memory 240 include, without limitation,  
17 Random Access Memory (RAM), Read Only Memory (ROM), flash memory, Hard Disk Drives  
18 (HDDs), Solid-State Drives (SSDs), optical disk drives, caches, variations or combinations of  
19 one or more of the same, and/or any other suitable storage memory.

20 **[0041]** As illustrated in FIG. 2, example system 200 may also include one or more  
21 physical processors, such as physical processor 230. Physical processor 230 generally  
22 represents any type or form of hardware-implemented processing unit capable of  
23 interpreting and/or executing computer-readable instructions. In one example, physical  
24 processor 230 may access and/or modify one or more of modules 202 stored in memory  
25 240. Additionally or alternatively, physical processor 230 may execute one or more of  
26 modules 202 to facilitate maintain the mapping system. Examples of physical processor 230  
27 include, without limitation, microprocessors, microcontrollers, Central Processing Units  
28 (CPUs), Field-Programmable Gate Arrays (FPGAs) that implement softcore processors,  
29 Application-Specific Integrated Circuits (ASICs), portions of one or more of the same,  
30 variations or combinations of one or more of the same, and/or any other suitable physical  
31 processor.

32 **[0042]** As illustrated in FIG. 2, example system 200 may also include one or more

1 additional elements 220, such as translucent layer 222, content layer 224, video content  
2 226, and user input 228. Translucent layer 222, content layer 224, video content 226, and/or  
3 user input 228 may be stored on a local storage device, such as memory 240, or may be  
4 accessed remotely. Translucent layer 222 may represent a user interface layer that may be  
5 significantly translucent so as not to obscure content layer 224, as will be explained further  
6 below. Content layer 224 may represent a layer reserved for displaying content such as  
7 video content 226. Video content 226 may represent media content streamed from a  
8 remote server. User input 228 may represent a user input as received by translucent layer  
9 222, as will be explained further below.

10 **[0043]** Example system 200 in FIG. 2 may be implemented in a variety of ways. For  
11 example, all or a portion of example system 200 may represent portions of example network  
12 environment 300 in FIG. 3.

13 **[0044]** FIG. 3 illustrates an exemplary network environment 300 implementing aspects  
14 of the present disclosure. The network environment 300 includes computing device 302, a  
15 network 304, and server 306. Computing device 302 may be a client device or user device,  
16 such as a mobile device, a desktop computer, laptop computer, tablet device, smartphone,  
17 or other computing device. Computing device 302 may include a physical processor 230,  
18 which may be one or more processors, memory 240, which may store data such as one or  
19 more of additional elements 220.

20 **[0045]** Server 306 may represent or include one or more servers capable of hosting  
21 media content. Server 306 may include a physical processor 230, which may include one or  
22 more processors, memory 240, which may store modules 202, and one or more of  
23 additional elements 220.

24 **[0046]** Computing device 302 may be communicatively coupled to server 306 through  
25 network 304. Network 304 may represent any type or form of communication network,  
26 such as the Internet, and may comprise one or more physical connections, such as LAN,  
27 and/or wireless connections, such as WAN.

28 **[0047]** Computing device 302 and/or server 306 may perform the steps described  
29 herein independently or cooperatively. Returning to FIG. 1, the systems described herein  
30 may perform step 110 in a variety of ways. In one example, layer module 204 may initiate  
31 translucent layer 222 concurrently with or after initiating content layer 224. For example,  
32 layer module 204 may initiate translucent layer 222 in response to content layer 224 being



1 initiated. In some examples, layer module 204 may initiate translucent layer 222 before  
2 content layer 224. For example, once initiated, translucent layer 222 may initiate and/or  
3 request content for content layer 224.

4 **[0048]** The various layers described herein (e.g., translucent layer 222 and content  
5 layer 224) may interact with each other directly or indirectly. An example of layer interaction  
6 is shown in FIG. 4. FIG. 4 illustrates a data flow 400 for a live interaction platform. FIG. 4  
7 illustrates a device 402, which may correspond to computing device 302, and a content  
8 server 406, which may correspond to server 306. Device 402 may include an application  
9 layer 420 (which may correspond to one or more of modules 202), a content layer 424  
10 (which may correspond to content layer 224), a translucent layer 422 (which may  
11 correspond to translucent layer 222), a UI element 429, video content 426 (which may  
12 correspond to video content 226), and a user input 428 (which may correspond to user input  
13 228).

14 **[0049]** Application layer 420 may correspond to a base application that a user may use  
15 to find and navigate to media content, such as streaming video content. Application layer  
16 420 may initiate translucent layer 422 when the user selects desired content. In some  
17 examples, translucent layer 422 may initiate content layer 424 and accordingly request the  
18 user's desired content. In other examples, application layer 420 may first initiate content  
19 layer 424 with the desired content, and subsequently initiate translucent layer 422. As  
20 illustrated in FIG. 4, translucent layer 422 may be overlaid onto content layer 424, which in  
21 turn may be overlaid onto application layer 420. The overlaying of layers is further  
22 illustrated in FIGS. 5A and 5B.

23 **[0050]** FIG. 5A illustrates a screen 500 having a translucent layer 522 (which may  
24 correspond to translucent layer 422 and/or translucent layer 222), a content layer 524  
25 (which may correspond to content layer 424 and/or content layer 224), and an application  
26 layer 520 (which may correspond to application layer 420). FIG. 5A illustrates an exploded  
27 view of translucent layer 522, content layer 524, and application layer 520 for illustrative  
28 purposes. As shown in FIG. 5A, application layer 520 may provide an application that a user  
29 may use to select content for viewing. Once the user selects content for viewing, application  
30 layer 520 may initiate content layer 524 and/or translucent layer 522 for overlaying on top  
31 of application layer 520. As further shown in FIG. 5A, translucent layer 522 may be  
32 translucent or transparent so as not to block or obscure the media content playing on

1 content layer 524.

2 **[0051]** FIG. 5B illustrates a screen 501 in which the various layers may be flattened for  
3 display. As will be described further below, FIG. 5B includes a UI element 529, which may  
4 correspond to UI element 429.

5 **[0052]** Turning back to FIG. 1, at step 120 one or more of the systems described herein  
6 may receive, from a content source, video content for the content layer. For example,  
7 content layer 224 may receive video content 226.

8 **[0053]** In some embodiments, the term “video content” may refer to any media  
9 content that may be delivered from a remote server rather than locally stored media  
10 content. Examples of video content include, without limitation, live video, live gameplay of  
11 a video game, streaming video, streaming audio, video-on-demand, video files, audio files,  
12 etc.

13 **[0054]** The systems described herein may perform step 120 in a variety of ways. In one  
14 example, content module 206 may (as part of translucent layer 222 and/or content layer  
15 224) request video content 226 from server 306.

16 **[0055]** In some examples, application layer 420, content layer 424, and/or translucent  
17 layer 422 may request video content 426 from content server 406. For example, the user  
18 may select live streaming gameplay of a video game, a live stream video, and/or an on-  
19 demand video via application layer 420. Content server 406 may deliver the desired content  
20 (e.g., video content 426) to content layer 424. In some examples, the requesting layer (e.g.,  
21 one or more of translucent layer 422, application layer 420, and content layer 424) may  
22 initiate a streaming session with content server 406.

23 **[0056]** As shown in FIG. 5A, application layer 520 may correspond to an application  
24 providing the user with various media content options. Once the user selects the desired  
25 media content for viewing, application layer 520 may request the desired content, initiate  
26 content layer 524 to play the desired content, and overlay translucent layer 522 over  
27 content layer 524. Alternatively, application layer 520 may initiate translucent layer 522  
28 with instructions for playing the desired content. Translucent layer 522 may then request  
29 the desired content and initiate content layer 524 under translucent layer 522 for playing  
30 the requested content.

31 **[0057]** Returning to FIG. 1, at step 130 one or more of the systems described herein  
32 may receive input via the user interface element. For example, input module 208 may

1 receive user input 228 via a UI element of translucent layer 222.

2 **[0058]** In some embodiments, the term “UI element” may refer to any aspect of a UI  
3 that may allow interaction with the user. Examples of UI elements include, without  
4 limitation, buttons, text fields, controls, menus, as well as inputs from user input devices  
5 (e.g., touchscreens, keyboards, mice, etc.). Such UI elements may be displayed on a device’s  
6 screen without taking up an entirety of the screen.

7 **[0059]** The systems described herein may perform step 130 in a variety of ways. In one  
8 example, translucent layer 422 may be significantly transparent except for UI element 429  
9 such that the user may see video content 426 on content layer 424 along with UI element  
10 429 overlaid onto the content. Translucent layer 422 may be minimally intrusive to the  
11 user’s viewing of content layer 424 while providing one or more visual controls via UI  
12 element 429. The user may input user input 428 via UI element 429.

13 **[0060]** For example, FIG. 5B shows UI element 529 which may cover a portion of  
14 content layer 524. As translucent layer 522 may be translucent except for UI element 529,  
15 FIG. 5B may show only UI element 529 over content layer 524. UI element 529 may include  
16 a button (e.g., “Spawn Obstacle”) but may include additional elements to provide the user  
17 with information, such as the user’s profile information as in FIG. 5B. UI element 529 may  
18 allow the user to provide an input (e.g., user input 428 in FIG. 4) while viewing media  
19 content on content layer 524.

20 **[0061]** In some examples, user input 428 may modify a gameplay of the video game.  
21 For example, user input 428 may include an instruction to change aspects of the gameplay,  
22 such as a location, visual and/or audible aspects, spawning additional obstacles and/or  
23 enemies, selecting and/or voting on game options, other gameplay parameters, etc. In FIG.  
24 5B, content layer 524 may include a live stream of video gameplay. UI element 529 may  
25 allow the user to affect the gameplay by spawning additional obstacles for the game player  
26 to avoid.

27 **[0062]** In some examples, user input 428 may include a prompt for the live video. For  
28 example, user input 428 may include a textual prompt (e.g., a question for the live streamer,  
29 an answer), a user reaction (such as a like, applause, or other reaction), a voting option, etc.

30 **[0063]** In other examples, user input 428 may provide other interactive options for the  
31 user to interact with video content 426 as may be appropriate. User input 428 may  
32 correspond to an instruction that may result in a live modification to video content 426.

1     **[0064]**     In yet other examples, video content 426 may correspond to produced video  
2     content (e.g., video-on-demand) rather than a live stream. In such examples, user input 428  
3     may include instructions for modifying one or more parameters relating to the video  
4     content, such as application of filters, selection of angles or points-of-view, selection of  
5     chapters, etc. Additionally or alternatively, user input 428 may provide added interactivity  
6     related to video content 426, such as providing interactivity (e.g., additional information,  
7     links to related products, etc.) that may complement a viewing experience of video content  
8     426. For example, if video content 426 corresponds to a cooking video, UI element 429 may  
9     provide a button allowing the user to see the recipe (e.g., such that user input 428  
10    corresponds to opening a link), and/or adding recipe ingredients to a shopping cart.

11    **[0065]**     At step 140 one or more of the systems described herein may send the input to  
12    the content source to direct the content source to modify the streaming video content. For  
13    example, input module 208 may send user input 228 to server 306 to direct server 306 to  
14    modify video content 226.

15    **[0066]**     The systems described herein may perform step 140 in a variety of ways. In one  
16    example, translucent layer 422, after receiving user input 428 via UI element 429, may send  
17    user input 428 to content server 406. User input 428 may include an identifier to identify  
18    what media (e.g., live video session, game session, etc.) is being displayed in content layer  
19    424. In some examples, translucent layer 422 may convert or otherwise reformat user input  
20    428 to be suitable for use by content server 406. Based on user input 428, content server  
21    406 may identify and accordingly modify video content 426.

22    **[0067]**     In one example, if video content 426 corresponds to live gameplay and user  
23    input 428 includes instructions for modifying an aspect of the gameplay, content server 406  
24    may accordingly modify the gameplay (e.g., adding new obstacles, etc.) based on user input  
25    428. The game player may then notice the modification and react accordingly such that  
26    video content 426 may be modified to include a live reaction to the modified gameplay. For  
27    instance, in FIG. 5B, when the user selects the “Spawn Obstacle” button (e.g., UI element  
28    529), translucent layer 522 may send a corresponding instruction to the game server to  
29    spawn obstacles that the game player may react to.

30    **[0068]**     In another example, if video content 426 corresponds to a live video stream and  
31    user input 428 includes instructions for prompting the live streamer, content server 406  
32    may accordingly prompt the live streamer (e.g., present the prompt to the live streamer)

1 based on user input 428. The live streamer may then notice the prompt and react  
2 accordingly such that video content 426 may be modified to include a live reaction to the  
3 prompt.

4 **[0069]** In yet another example, if video content 426 corresponds to statically produced  
5 video such as video-on-demand (instead of a live stream) and user input 428 includes  
6 instructions for modifying the video content, content server 406 may accordingly apply the  
7 instructions to video content 426.

8 **[0070]** In some examples, video content 426 and/or content server 406 may be  
9 associated with a third party with respect to application layer 420. In such examples,  
10 application layer 420 and/or translucent layer 422 may provide an API that may allow  
11 content server 406 to receive instructions (e.g., user input 428) for modifying video content  
12 426. The third party may configure content server 406 for a much or as little interactivity  
13 functionalities as desired. For example, in FIG. 5A, application layer 520 and translucent  
14 layer 522 may provide an API that various third-party servers may interface with for  
15 interactive functionalities.

16 **[0071]** In addition, although user input 428 may direct content server 406 to modify or  
17 otherwise update video content 426, in some examples, such modification may not produce  
18 an immediately noticeable change. For example, even after content server 406 modifies  
19 aspects of the live stream, the live streamer may choose to ignore or may not noticeably  
20 react to the modification.

21 **[0072]** At step 150 one or more of the systems described herein may receive modified  
22 streaming video content from the content source. For example, display module 210 may  
23 receive video content 226.

24 **[0073]** The systems described herein may perform step 150 in a variety of ways. In one  
25 example, content layer 424 may receive, from content server 406, video content 426 that  
26 has been modified by content server 406 in direct and/or indirect response to user input  
27 428. Although FIG. 4 presents video content 426 as a discrete instance of content, in some  
28 examples content server 406 may be continuously delivering video content 426, which may  
29 be updated in real time in response to user input 428 as described herein. For example in  
30 FIGS. 5A and 5B, content layer 524 may continuously play video content as received from  
31 the content server.

32 **[0074]** At step 160 one or more of the systems described herein may display the

1 modified streaming video content on the content layer. For example, display module 210  
2 may display video content 226 on content layer 224. FIGS. 5A and 5B illustrate how content  
3 may be displayed on content layer 524.

4 **[0075]** The systems described herein may perform step 160 in a variety of ways. In one  
5 example, translucent layer 422 may control how video content 426 is displayed on content  
6 layer 424, rather than application layer 420 or content layer 424. For example, translucent  
7 layer 422 may control at least one of a size or a location of the streaming video content  
8 rendered in the content layer. In such examples, content layer 424 may act as a placeholder  
9 layer for arranging content as controlled by translucent layer 422. Content layer 424 may  
10 be unaware that its content may be rendered differently. For instance, content layer 424 or  
11 the content itself may not natively allow resizing and/or relocating the content. Translucent  
12 layer 422 may provide such functionality by controlling how content layer 424 itself is  
13 rendered.

14 **[0076]** In some examples, translucent layer 422 may request a second streaming video  
15 content for the content layer and display video content 426 and the second streaming video  
16 content on content layer 424. For example, the user may select (e.g., via application layer  
17 420 and/or translucent layer 422) additional content for side-by-side viewing (or other  
18 arrangements such as overlapping windows) with video content 426. Alternatively,  
19 translucent layer 422 may display the second streaming video content on content layer 424  
20 by replacing video content 426 with the second streaming video content.

21 **[0077]** In addition, translucent layer 422 may read a time code from video content 426  
22 and synchronize translucent layer 422 with content layer 424 using the time code. For  
23 example, translucent layer 422 may update UI element 429 to synchronize with video  
24 content 426 (e.g., by updating a location and/or a visibility of UI element 429 to align with  
25 timing cues in video content 426).

26 **[0078]** Thus, the systems and methods described herein may provide a live interaction  
27 platform that provides content viewers with increased interactivity with live content  
28 creators. The various layers, for example application layer 520, content layer 524, and  
29 translucent layer 522 as illustrated in FIG. 5A, may interact with content servers to provide  
30 interactivity. FIG. 5B illustrates an example of a user viewing live video gameplay. As the  
31 user views the live gameplay (e.g., on content layer 524), the user may be interested in  
32 active interaction rather than passive viewing. Using UI element 529, the user may instruct

1 the game server to spawn more obstacles in the game session that the user is viewing. The  
2 user may then see the added obstacles (e.g., on content layer 524) and also see how the  
3 game player reacts to the new obstacles.

4 **[0079]** The present disclosure is directed to enabling interactivity with video streaming.  
5 A live streaming experience, such as live streaming a someone playing a video game, is  
6 traditionally limited to either playing the game, or watching someone play the game,  
7 representing two ends of a spectrum between immersion and interactivity. To provide an  
8 experience between these extremes (e.g., by adding interactivity to live stream viewing),  
9 developers would have to build an application specifically providing such features. The  
10 present disclosure provides a flexible platform for adding interactivity to any video without  
11 being limited to a particular application. A translucent layer may be overlaid onto a video  
12 layer, providing a user interface for interactivity. The translucent layer may communicate  
13 with a server to enable interactions with video content. For example, a live stream viewer  
14 watching a live stream of a video game may, via the user interface, be able to control aspects  
15 of the game environment and see the game player respond to changes in real time. The  
16 translucent layer may further control or modify the video layer, such as resizing the video,  
17 swapping different video streams, playing multiple video streams, etc.

18 **[0080]** The translucent layer may be a translucent webview overlaid on top of a  
19 variable number of live video components. The translucent webview may set a state of the  
20 video, allow creation and/or destruction of video components, etc. The third-party servers  
21 associated with the live stream may communicate with their own servers to update the live  
22 stream based on inputs and/or instructions provided by the translucent webview. For  
23 example, the translucent webview may provide a viewer watching live gameplay with  
24 buttons for spawning more enemies in the game being viewed. When the viewer clicks one  
25 of the buttons, the translucent webview may send an event (e.g., a spawn enemy event) to  
26 the game server that may accordingly spawn more enemies. The content may change  
27 because the streamer may see the newly spawned enemies and react accordingly, updating  
28 the live stream based on the viewer's input.

29 **[0081] Example Embodiments**

30 **[0082]** Example 1: A computer-implemented method comprising: (i) initiating a  
31 translucent layer, that includes a user interface element, for displaying over a content layer  
32 on a computing device; (ii) receiving, from a content source, video content for the content

layer; (iii) receiving input via the user interface element; (iv) sending the input to the content source to direct the content source to modify the video content; (v) receiving modified video content from the content source; and (vi) displaying the modified video content on the content layer.

**[0083]** Example 2: The method of Example 1, wherein the video content includes live streaming gameplay of a video game.

**[0084]** Example 3: The method of Example 2, wherein the input modifies a gameplay of the video game and the modified video content includes a live reaction to the modified gameplay.

**[0085]** Example 4: The method of Example 1, 2, or 3, wherein the video content includes live streaming video.

**[0086]** Example 5: The method of Example 4, wherein the input includes a prompt for the live streaming video and the modified video content includes a live reaction to the prompt.

**[0087]** Example 6: The method of any of Examples 1-5, wherein the translucent layer controls at least one of a size or a location of the video content rendered in the content layer.

**[0088]** Example 7: The method of any of Examples 1-6, further comprising: requesting, by the translucent layer, a second video content for the content layer; and displaying the video content and the second video content on the content layer.

**[0089]** Example 8: The method of any of Examples 1-7, further comprising: requesting, by the translucent layer, a second video content for the content layer; and displaying the second video content on the content layer by replacing the video content.

**[0090]** Example 9: The method of any of Examples 1-8, further comprising: reading a time code from the video content; and synchronizing the translucent layer with the content layer using the time code.

**[0091]** Example 10: A system comprising: at least one physical processor; physical memory comprising computer-executable instructions that, when executed by the physical processor, cause the physical processor to: (i) initiate a translucent layer, that includes a user interface element, for displaying over a content layer on a computing device; (ii) receive, from a content source, video content for the content layer; (iii) receive input via the user interface element; (iv) send the input to the content source to direct the content



1 source to modify the video content; (v) receive modified video content from the content  
2 source; and (vi) display the modified video content on the content layer.

3 **[0092]** Example 11: The system of Example 10, wherein: the video content includes live  
4 streaming gameplay of a video game; and the input modifies a gameplay of the video game  
5 and the modified video content includes a live reaction to the modified gameplay.

6 **[0093]** Example 12: The system of Example 10 or 11, wherein: the video content  
7 includes live streaming video; and the input includes a prompt for the live streaming video  
8 and the modified video content includes a live reaction to the prompt.

9 **[0094]** Example 13: The system of Example 10, 11, or 12, wherein the translucent layer  
10 controls at least one of a size or a location of the video content rendered in the content  
11 layer.

12 **[0095]** Example 14: The system of any of Examples 10-13, wherein the instructions  
13 further comprise instructions that cause the physical processor to: request, by the  
14 translucent layer, a second video content for the content layer; and display the video  
15 content and the second video content on the content layer.

16 **[0096]** Example 15: The system of any of Examples 10-14, wherein the instructions  
17 further comprise instructions that cause the physical processor to: request, by the  
18 translucent layer, a second video content for the content layer; and display the second video  
19 content on the content layer by replacing the video content.

20 **[0097]** Example 16: The system of any of Examples 10-16, wherein the instructions  
21 further comprise instructions that cause the physical processor to: read a time code from  
22 the video content; and synchronize the translucent layer with the content layer using the  
23 time code.

24 **[0098]** Example 17: A non-transitory computer-readable medium comprising one or  
25 more computer-executable instructions that, when executed by at least one processor of a  
26 computing device, cause the computing device to: (i) initiate a translucent layer, that  
27 includes a user interface element, for displaying over a content layer on a computing device;  
28 (ii) receive, from a content source, video content for the content layer; (iii) receive input via  
29 the user interface element; (iv) send the input to the content source to direct the content  
30 source to modify the video content; (v) receive modified video content from the content  
31 source; and (vi) display the modified video content on the content layer.

32 **[0099]** Example 18: The non-transitory computer-readable medium of Example 17,

1 wherein: the video content includes live streaming gameplay of a video game; and the input  
2 modifies a gameplay of the video game and the modified video content includes a live  
3 reaction to the modified gameplay.

4 **[0100]** Example 19: The non-transitory computer-readable medium of Example 17 or  
5 18, wherein: the video content includes live video; and the input includes a prompt for the  
6 live video and the modified video content includes a live reaction to the prompt.

7 **[0101]** Example 20: The non-transitory computer-readable medium of Example 17, 18,  
8 or 19, wherein the translucent layer controls at least one of a size or a location of the video  
9 content rendered in the content layer.

10 **[0102]** As detailed above, the computing devices and systems described and/or illustrated  
11 herein broadly represent any type or form of computing device or system capable of  
12 executing computer-readable instructions, such as those contained within the modules  
13 described herein. In their most basic configuration, these computing device(s) may each  
14 include at least one memory device and at least one physical processor.

15 **[0103]** In some examples, the term “memory device” generally refers to any type or form  
16 of volatile or non-volatile storage device or medium capable of storing data and/or  
17 computer-readable instructions. In one example, a memory device may store, load, and/or  
18 maintain one or more of the modules described herein. Examples of memory devices  
19 include, without limitation, Random Access Memory (RAM), Read Only Memory (ROM),  
20 flash memory, Hard Disk Drives (HDDs), Solid-State Drives (SSDs), optical disk drives, caches,  
21 variations or combinations of one or more of the same, or any other suitable storage  
22 memory.

23 **[0104]** In some examples, the term “physical processor” generally refers to any type or form  
24 of hardware-implemented processing unit capable of interpreting and/or executing  
25 computer-readable instructions. In one example, a physical processor may access and/or  
26 modify one or more modules stored in the above-described memory device. Examples of  
27 physical processors include, without limitation, microprocessors, microcontrollers, Central  
28 Processing Units (CPUs), Field-Programmable Gate Arrays (FPGAs) that implement softcore  
29 processors, Application-Specific Integrated Circuits (ASICs), portions of one or more of the  
30 same, variations or combinations of one or more of the same, or any other suitable physical  
31 processor.

32 **[0105]** Although illustrated as separate elements, the modules described and/or illustrated

1        herein may represent portions of a single module or application. In addition, in certain  
2        embodiments one or more of these modules may represent one or more software  
3        applications or programs that, when executed by a computing device, may cause the  
4        computing device to perform one or more tasks. For example, one or more of the modules  
5        described and/or illustrated herein may represent modules stored and configured to run on  
6        one or more of the computing devices or systems described and/or illustrated herein. One  
7        or more of these modules may also represent all or portions of one or more special-purpose  
8        computers configured to perform one or more tasks.

9        **[0106]** In addition, one or more of the modules described herein may transform data,  
10       physical devices, and/or representations of physical devices from one form to another. For  
11       example, one or more of the modules recited herein may receive user input data to be  
12       transformed, transform the user input data, output a result of the transformation to instruct  
13       a content server, use the result of the transformation to receive updated video content, and  
14       store the result of the transformation to display the updated video content. Additionally or  
15       alternatively, one or more of the modules recited herein may transform a processor, volatile  
16       memory, non-volatile memory, and/or any other portion of a physical computing device  
17       from one form to another by executing on the computing device, storing data on the  
18       computing device, and/or otherwise interacting with the computing device.

19       **[0107]**        In some embodiments, the term “computer-readable medium” generally refers  
20       to any form of device, carrier, or medium capable of storing or carrying computer-readable  
21       instructions. Examples of computer-readable media include, without limitation,  
22       transmission-type media, such as carrier waves, and non-transitory-type media, such as  
23       magnetic-storage media (e.g., hard disk drives, tape drives, and floppy disks), optical-  
24       storage media (e.g., Compact Disks (CDs), Digital Video Disks (DVDs), and BLU-RAY disks),  
25       electronic-storage media (e.g., solid-state drives and flash media), and other distribution  
26       systems.

27       **[0108]**        The process parameters and sequence of the steps described and/or illustrated  
28       herein are given by way of example only and can be varied as desired. For example, while  
29       the steps illustrated and/or described herein may be shown or discussed in a particular  
30       order, these steps do not necessarily need to be performed in the order illustrated or  
31       discussed. The various exemplary methods described and/or illustrated herein may also  
32       omit one or more of the steps described or illustrated herein or include additional steps in

1 addition to those disclosed.

2 **[0109]** The preceding description has been provided to enable others skilled in the art  
3 to best utilize various aspects of the exemplary embodiments disclosed herein. This  
4 exemplary description is not intended to be exhaustive or to be limited to any precise form  
5 disclosed. Many modifications and variations are possible without departing from the scope  
6 of the present disclosure. The embodiments disclosed herein should be considered in all  
7 respects illustrative and not restrictive. Reference should be made to the appended claims  
8 and their equivalents in determining the scope of the present disclosure.

9 **[0110]** Unless otherwise noted, the terms “connected to” and “coupled to” (and their  
10 derivatives), as used in the specification and claims, are to be construed as permitting both  
11 direct and indirect (i.e., via other elements or components) connection. In addition, the  
12 terms “a” or “an,” as used in the specification and claims, are to be construed as meaning  
13 “at least one of.” Finally, for ease of use, the terms “including” and “having” (and their  
14 derivatives), as used in the specification and claims, are interchangeable with and have the  
15 same meaning as the word “comprising.”  
16

## 1 CLAIMS:

2 1. A computer-implemented method comprising:

3 initiating a translucent layer, that includes a user interface element, for displaying over a  
4 content layer on a computing device;

5 receiving, from a content source, video content for the content layer;

6 receiving input via the user interface element;

7 sending the input to the content source to direct the content source to modify the video  
8 content;

9 receiving modified video content from the content source; and

10 displaying the modified video content on the content layer.

11 2. The method of claim 1, wherein the video content includes live streaming gameplay  
12 of a video game.13 3. The method of claim 2, wherein the input modifies a gameplay of the video game and  
14 the modified video content includes a live reaction to the modified gameplay.15 4. The method of any preceding claim, wherein the video content includes live  
16 streaming video;17 optionally, wherein the input includes a prompt for the live streaming video and the  
18 modified video content includes a live reaction to the prompt.19 5. The method of any preceding claim, wherein the translucent layer controls at least  
20 one of a size or a location of the video content rendered in the content layer.

21 6. The method of any preceding claim, further comprising:

22 requesting, by the translucent layer, a second video content for the content layer; and  
23 displaying the video content and the second video content on the content layer.

24 7. The method of any preceding claim, further comprising:

25 requesting, by the translucent layer, a second video content for the content layer; and  
26 displaying the second video content on the content layer by replacing the video content.

27 8. The method of any preceding claim, further comprising:

28 reading a time code from the video content; and

29 synchronizing the translucent layer with the content layer using the time code.

30 9. A system comprising:

31 at least one physical processor; and

32 physical memory comprising computer-executable instructions that, when executed by the

1 physical processor, cause the physical processor to:  
2 initiate a translucent layer, that includes a user interface element, for displaying over a  
3 content layer on a computing device,  
4 receive, from a content source, video content for the content layer,  
5 receive input via the user interface element,  
6 send the input to the content source to direct the content source to modify the video  
7 content,  
8 receive modified video content from the content source, and  
9 display the modified video content on the content layer.

10 10. The system of claim 9, and one or more of the following:  
11 a) the video content includes live streaming gameplay of a video game; and  
12 the input modifies a gameplay of the video game and the modified video content includes  
13 a live reaction to the modified gameplay;  
14 b) the video content includes live streaming video; and  
15 the input includes a prompt for the live video and the modified video content includes a  
16 live reaction to the prompt;  
17 c) the translucent layer controls at least one of a size or a location of the video content  
18 rendered in the content layer.

19 11. The system of claim 9 or claim 10, wherein the instructions further comprise  
20 instructions that cause the physical processor to:  
21 request, by the translucent layer, a second video content for the content layer; and  
22 display the video content and the second video content on the content layer.

23 12. The system of any one of claims 9 to 11, wherein the instructions further comprise  
24 instructions that cause the physical processor to:  
25 request, by the translucent layer, a second video content for the content layer; and  
26 display the second video content on the content layer by replacing the video content.

27 13. The system of any one of claims 9 to 12, wherein the instructions further comprise  
28 instructions that cause the physical processor to:  
29 read a time code from the video content; and  
30 synchronize the translucent layer with the content layer using the time code.

31 14. A non-transitory computer-readable medium comprising one or more computer-  
32 executable instructions that, when executed by at least one processor of a computing

1 device, cause the computing device to:  
2 initiate a translucent layer, that includes a user interface element, for displaying over a  
3 content layer on a computing device;  
4 receive, from a content source, video content for the content layer;  
5 receive input via the user interface element;  
6 send the input to the content source to direct the content source to modify the video  
7 content;  
8 receive modified video content from the content source; and  
9 display the modified video content on the content layer.

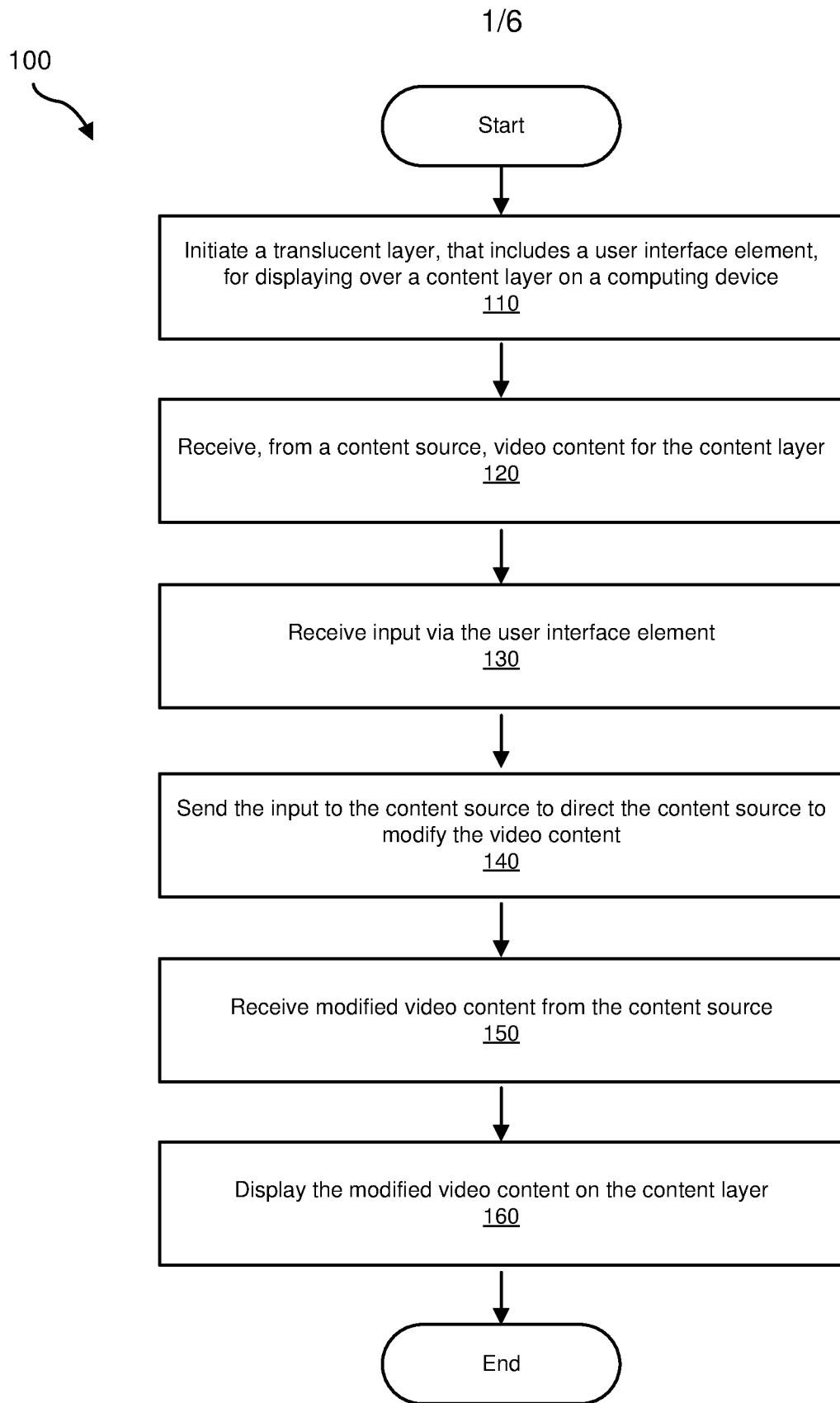
10 15. The non-transitory computer-readable medium of claim 14, and one or more of the  
11 following:

12 a) the video content includes live streaming gameplay of a video game; and  
13 the input modifies a gameplay of the video game and the modified video content includes  
14 a live reaction to the modified gameplay;

15 b) the video content includes live streaming video; and  
16 the input includes a prompt for the live video and the modified video content includes a live  
17 reaction to the prompt;

18 c) the translucent layer controls at least one of a size or a location of the video content  
19 rendered in the content layer.

20

**FIG. 1**



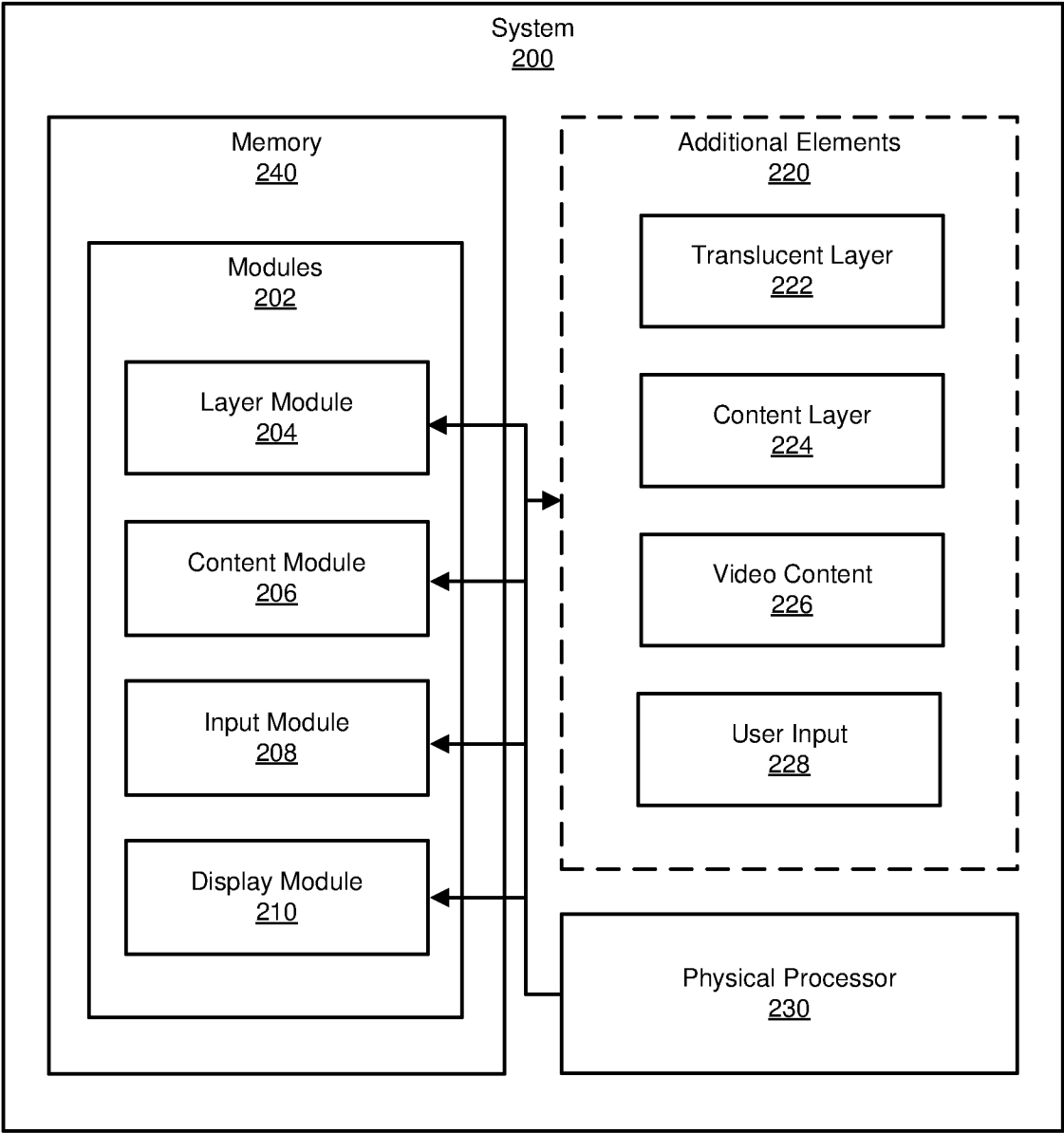
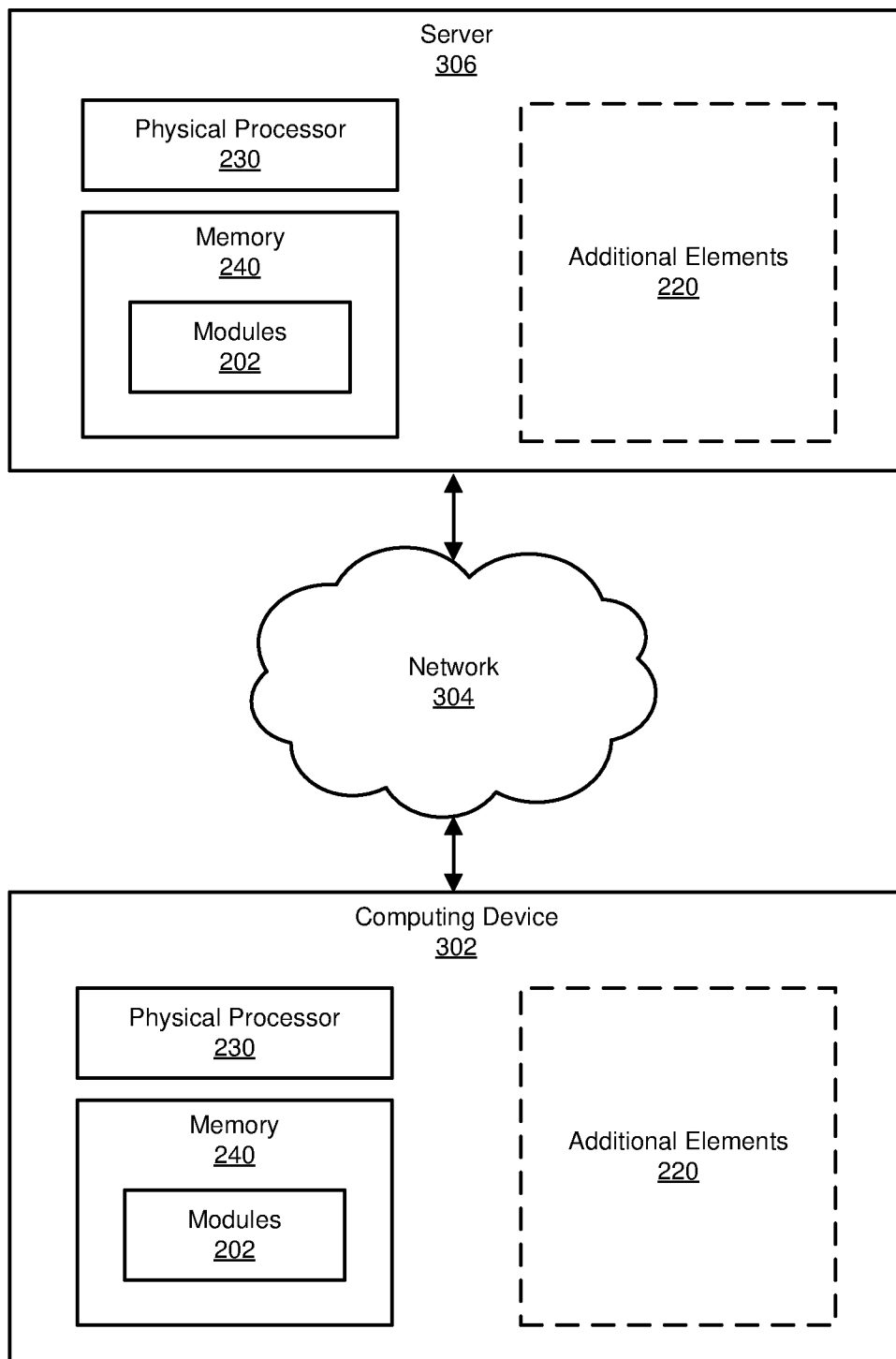


FIG. 2

3/6

300

**FIG. 3**

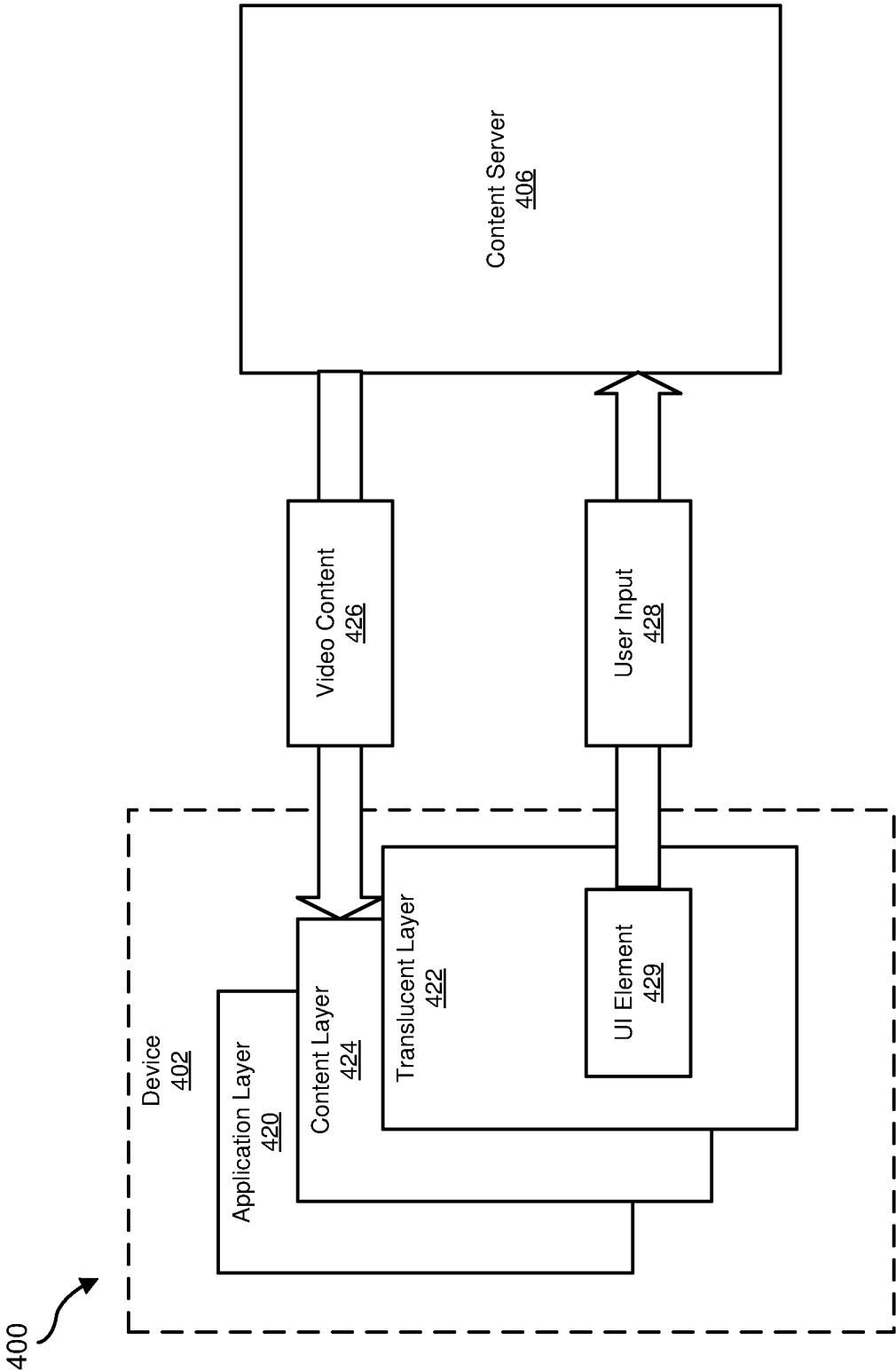
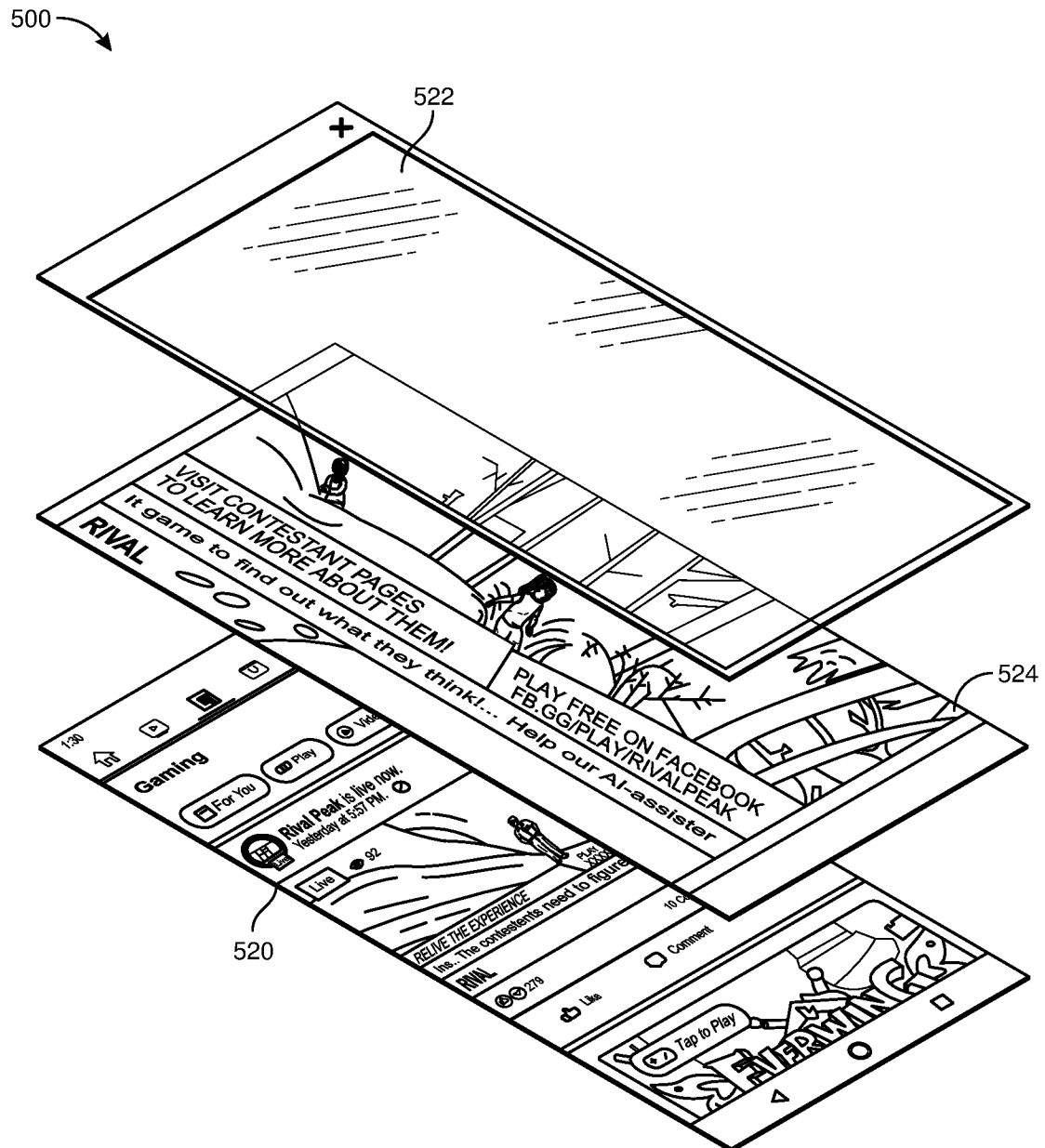


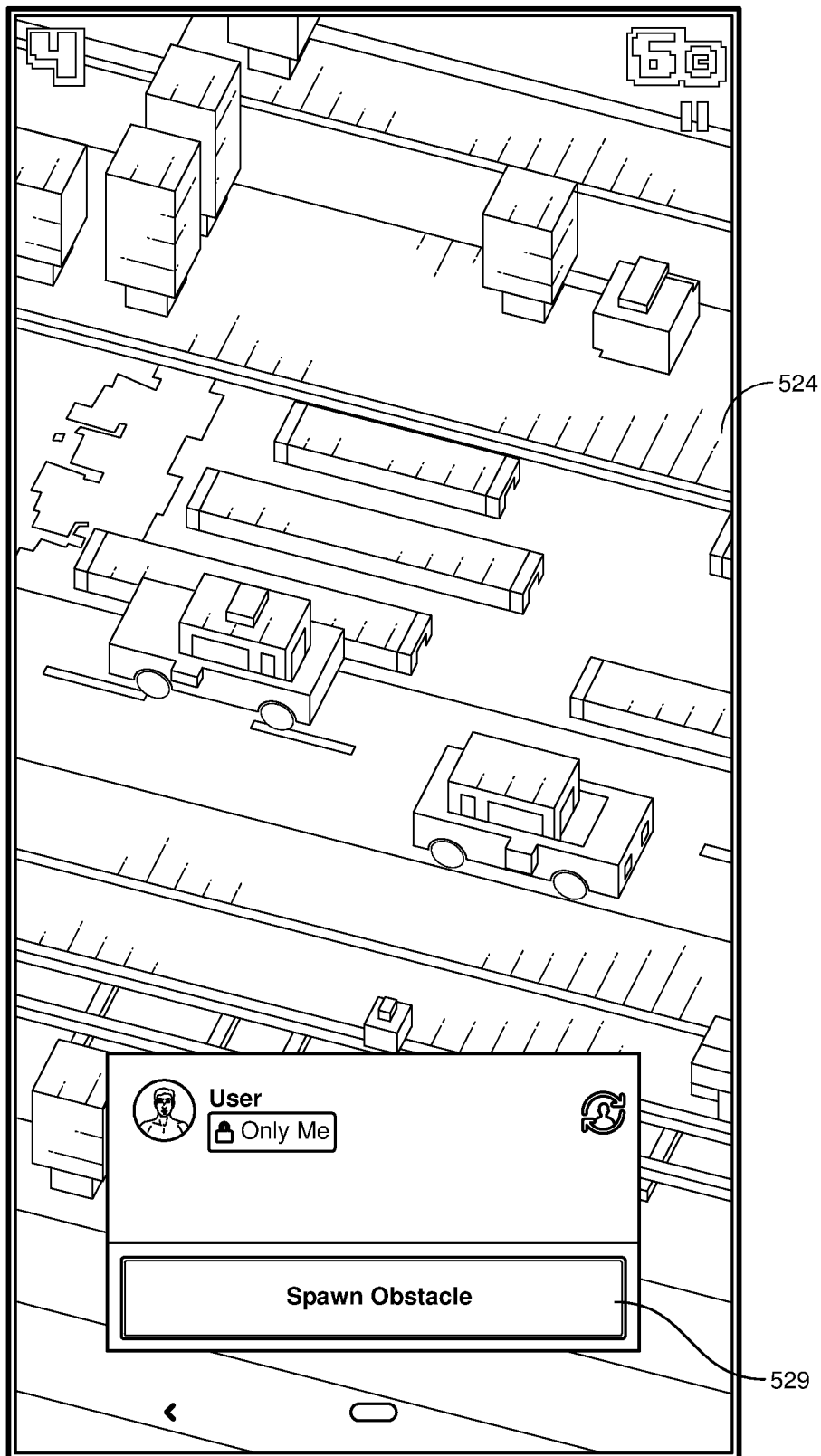
FIG. 4



**FIG. 5A**

6/6

501



**FIG. 5B**

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2022/041596

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br><b>INV.</b> <b>A63F13/355</b> <b>A63F13/86</b> <b>A63F13/47</b> <b>A63F13/53</b> <b>G11B27/10</b><br><b>G06F3/048</b><br><b>ADD.</b><br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br><b>A63F</b><br><br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br><br>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br><b>EPO-Internal</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                                                                                             | Relevant to claim No.                                                       |
| <b>X</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>US 2018/139257 A1 (NINOLES FABIEN [CA] ET AL) 17 May 2018 (2018-05-17)</b><br><b>paragraphs [0014] - [0016], [0019] - [0026], [0040], [0058] - [0066], [0068], [0069]; figures 2,3,4</b><br><b>paragraphs [0015] - [0017], [0021], [0033], [0040], [0058] - [0069]</b><br><b>paragraph [14ff]</b><br><b>paragraphs [35ff], [0041] - [0045], [0053], [0055]</b><br><br><div style="text-align: center;">-----<br/>-/--</div> | <b>1-15</b>                                                                 |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
| * Special categories of cited documents :<br><div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p> </div> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                             |
| Date of the actual completion of the international search<br><br><b>16 November 2022</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                | Date of mailing of the international search report<br><br><b>23/11/2022</b> |
| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                | Authorized officer<br><br><b>Ruf, Andreas</b>                               |

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2022/041596

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category*                                            | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                                                                                                                                                                                           | Relevant to claim No. |
| X                                                    | <p>US 11 051 067 B1 (BAXTER GARRETT [US] ET AL) 29 June 2021 (2021-06-29)<br/> column 2, paragraph 23 - column 3, paragraph 11<br/> column 4, paragraph 39ff<br/> column 5, paragraphs 15ff, 20ff, 64ff<br/> column 17, paragraph 21 - column 18, paragraph 59<br/> column 5, paragraphs 15ff, 27-50<br/> column 17, paragraph 12ff<br/> columns 9, 12, 20<br/> columns 18, 19<br/> figures 2, 5A, 7<br/> column 3, paragraphs 6-11, 27-35<br/> column 5, paragraphs 20ff, 64ff</p> <p style="text-align: center;">-----</p> | 1-15                  |
| X                                                    | <p>US 2016/241929 A1 (SHENKLER ANDREW M [US]) 18 August 2016 (2016-08-18)<br/> paragraphs [0042] - [0044], [0052] - [0054], [0059], [0061] - [0065], [0068], [0069], [0071] - [0073], [0087]; figures 3, 7-9, 13, 14<br/> paragraphs [0068], [0069], [0075]<br/> paragraphs [0056], [0-58], [0062], [0069], [0111]</p> <p style="text-align: center;">-----</p>                                                                                                                                                              | 1-15                  |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

**PCT/US2022/041596**

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
| <b>US 2018139257 A1</b>                   | <b>17-05-2018</b>   | <b>NONE</b>                |                     |
| <hr/>                                     |                     |                            |                     |
| <b>US 11051067 B1</b>                     | <b>29-06-2021</b>   | <b>US 11051067 B1</b>      | <b>29-06-2021</b>   |
|                                           |                     | <b>US 2022053233 A1</b>    | <b>17-02-2022</b>   |
|                                           |                     | <b>US 2022272408 A1</b>    | <b>25-08-2022</b>   |
|                                           |                     | <b>WO 2022036037 A1</b>    | <b>17-02-2022</b>   |
| <hr/>                                     |                     |                            |                     |
| <b>US 2016241929 A1</b>                   | <b>18-08-2016</b>   | <b>NONE</b>                |                     |
| <hr/>                                     |                     |                            |                     |