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(54) **SIMULATING MULTI-TOUCH EVENTS ON A BROWSER SYSTEM**

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(57)

ABSTRACT

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The subject technology provides for receiving touch inputs from a touch-input system. The subject technology generates script-callbacks from the touch inputs in which each of the script-callbacks includes properties related to an activity at a contact point of a touch-sensing surface of the touch-input system. The subject technology converts the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard in which each of the compliant touch events comprises data related to the activity at the contact point of the touch-sensing surface of the touch-input system. The subject technology sends the compliant touch events to an application.

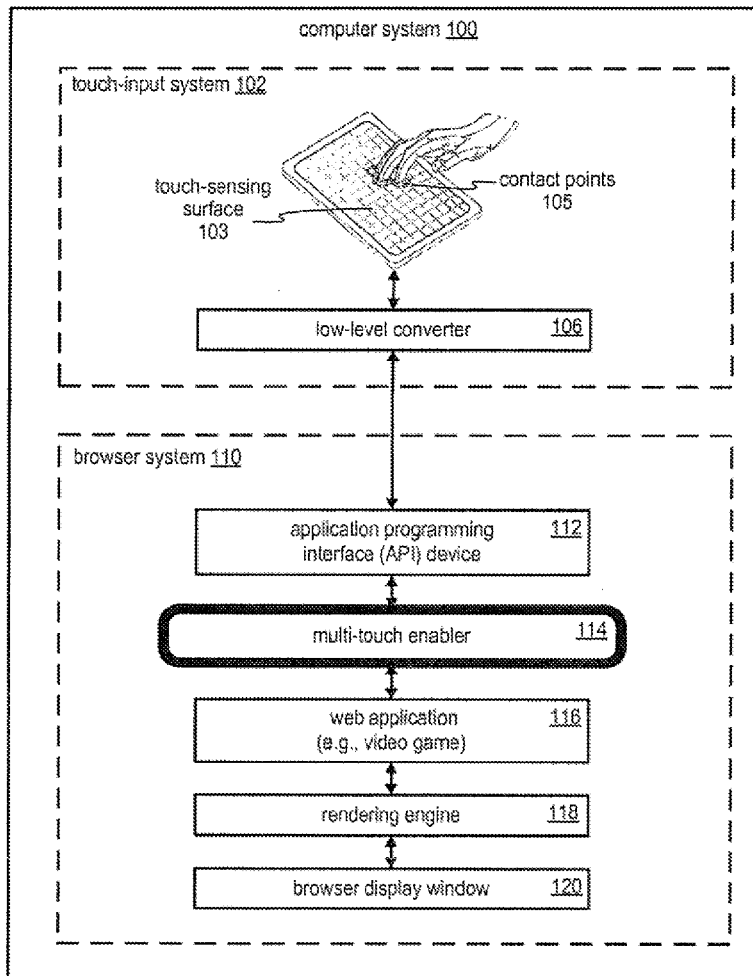
Related U.S. Application Data

(63) Continuation of application No. 13/415,619, filed on Mar. 8, 2012, now Pat. No. 9,891,727.

Publication Classification

(51) **Int. Cl.**

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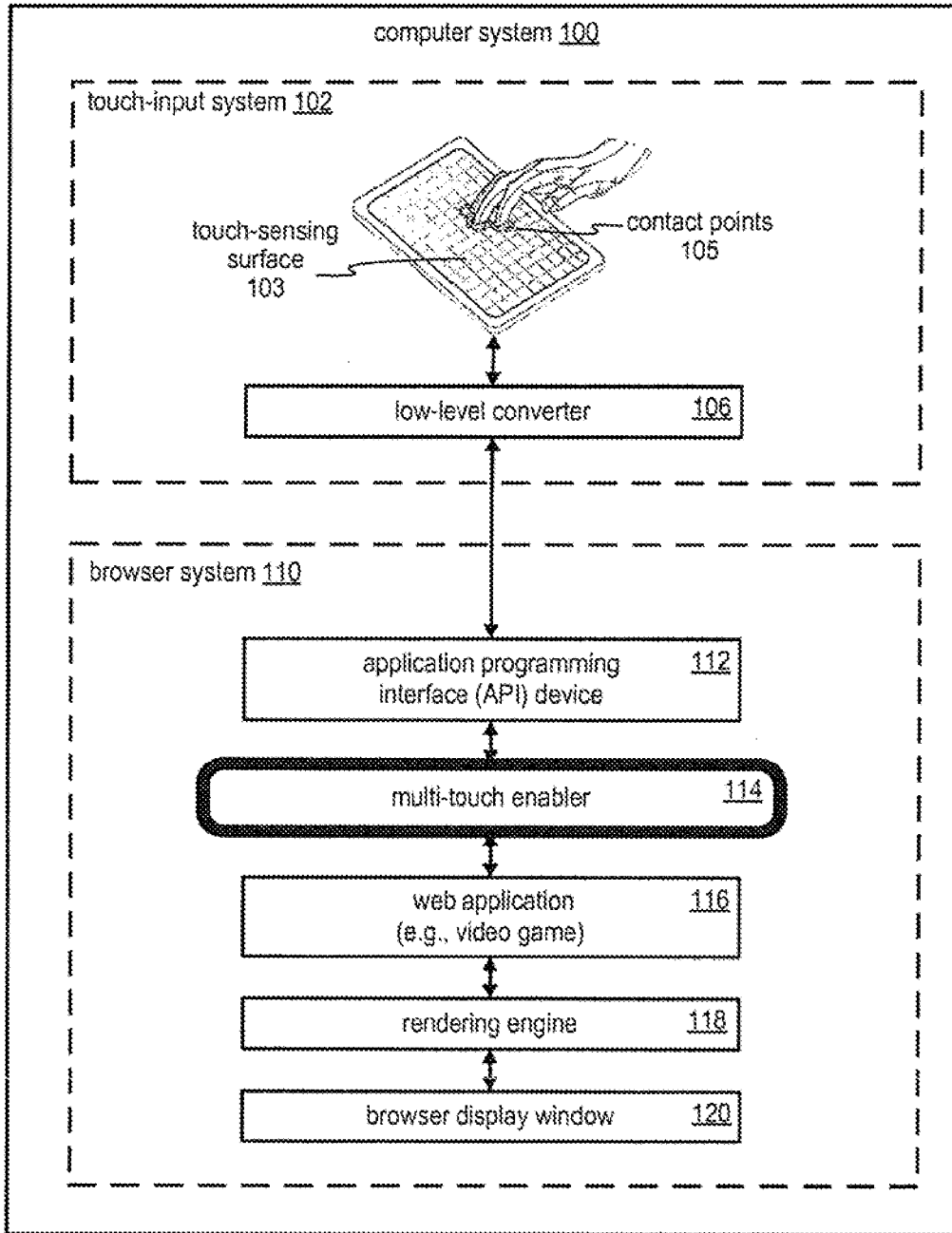


FIG. 1

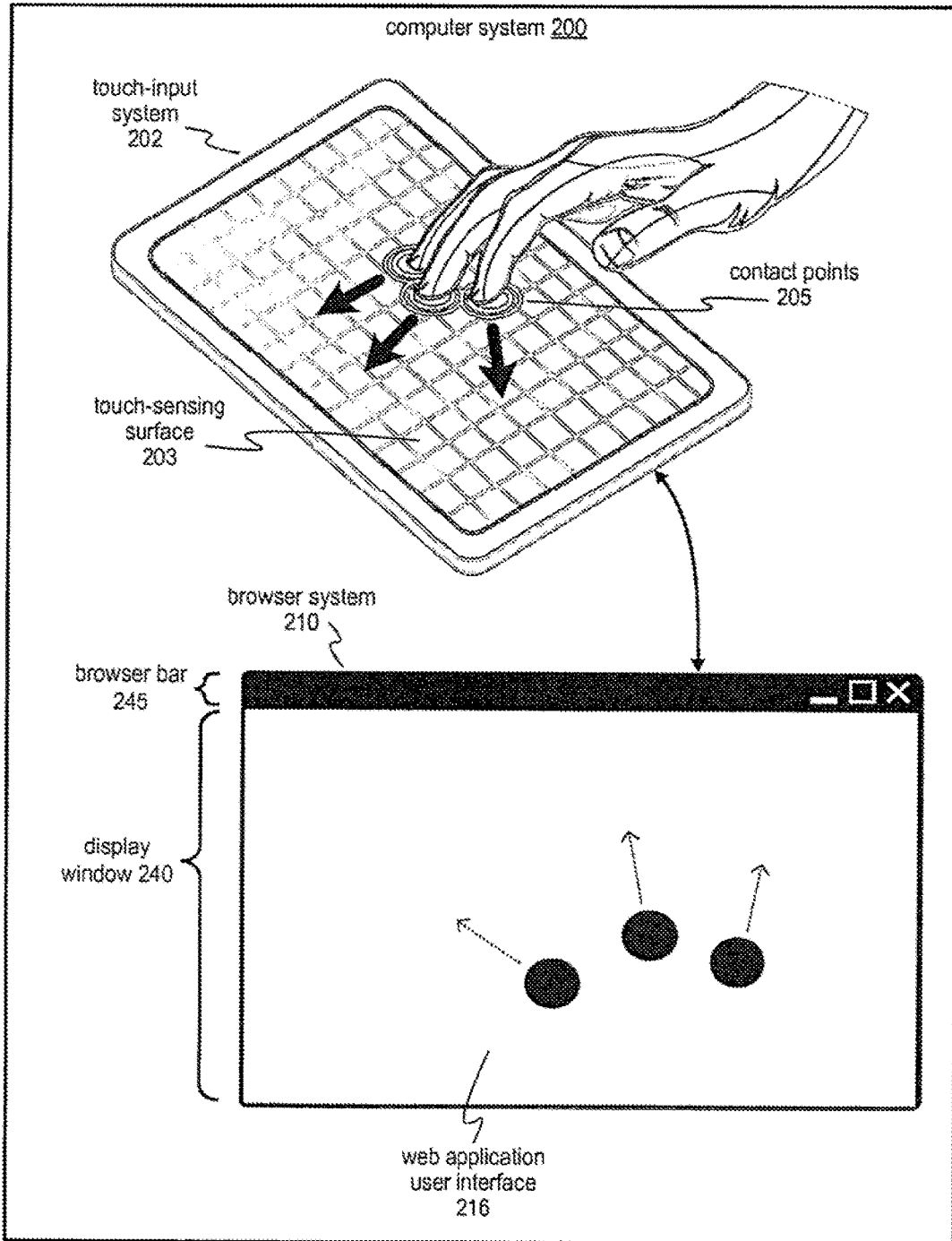


FIG. 2

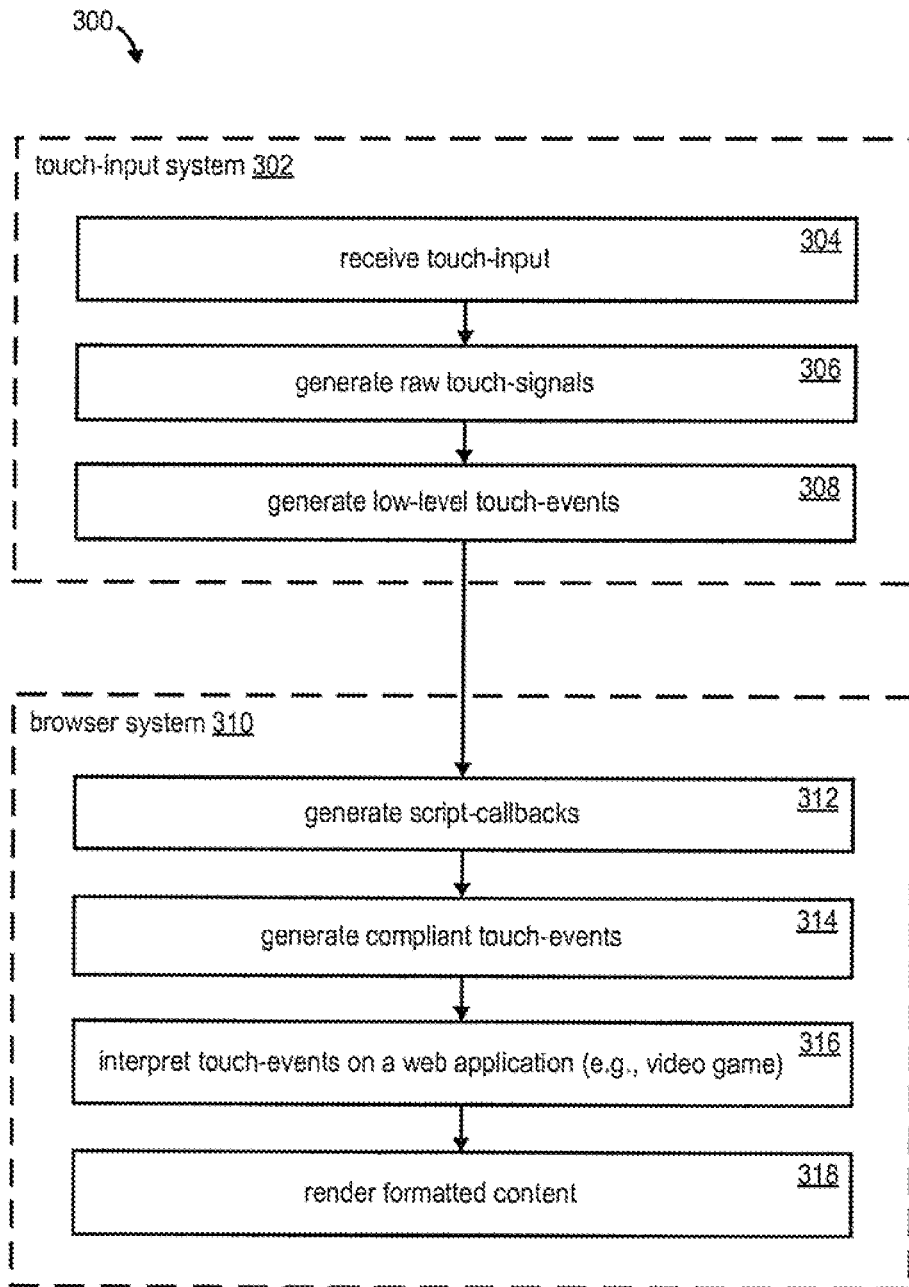


FIG. 3

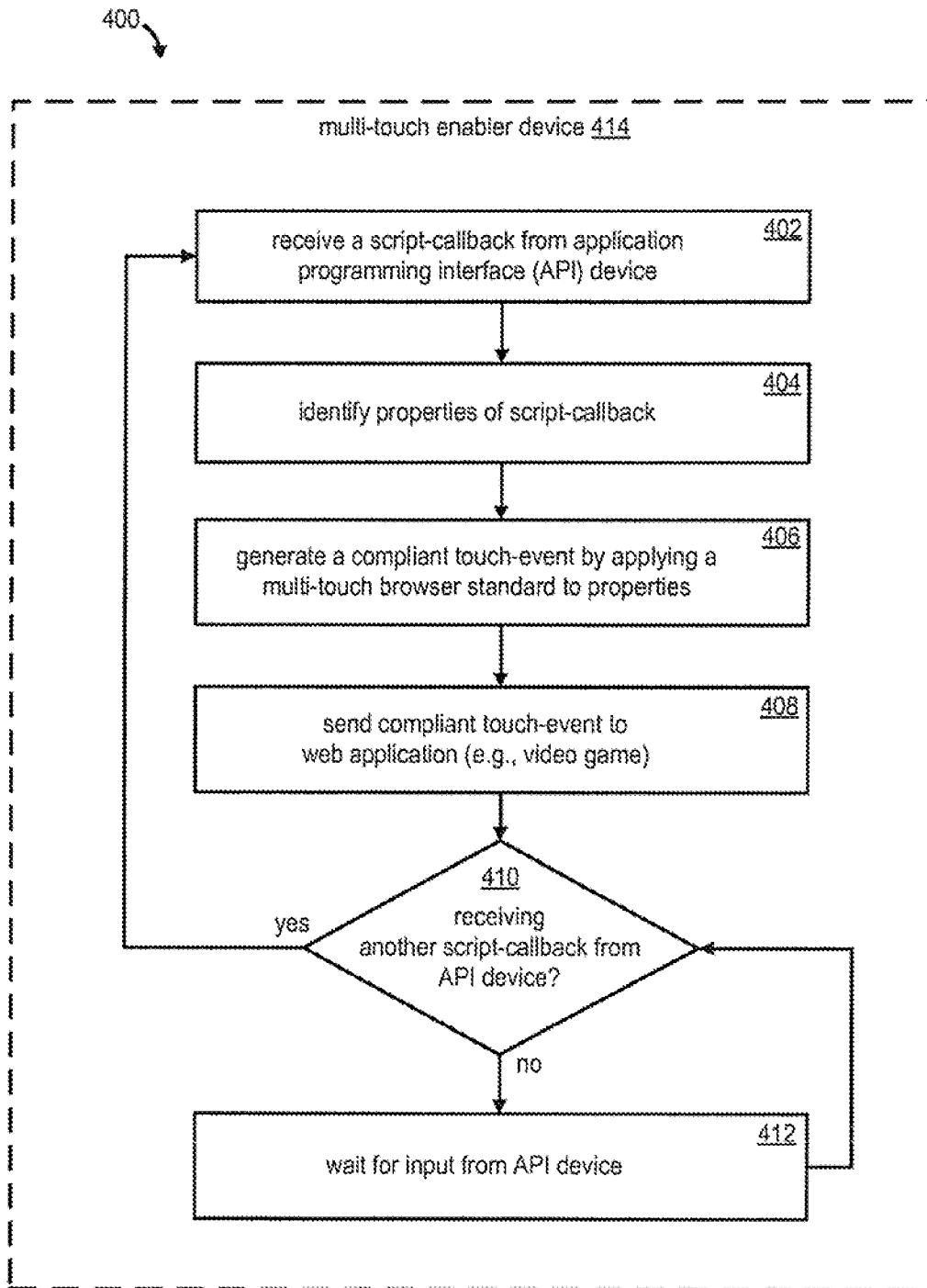


FIG. 4

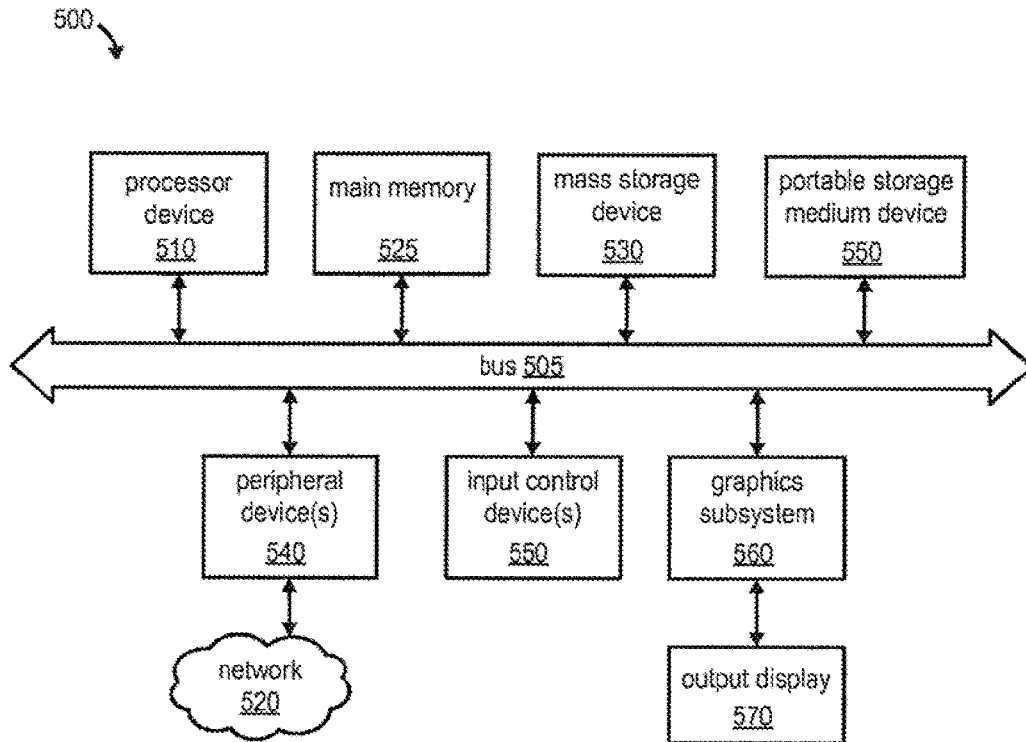


FIG. 5

SIMULATING MULTI-TOUCH EVENTS ON A BROWSER SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of priority under 35 U.S.C. § 120 as a continuation of U.S. patent application Ser. No. 13/415,619 entitled “Simulating Multi-touch Events on a Browser System,” filed on Mar. 8, 2012, the disclosure of which are hereby incorporated by reference in their entirety for all purposes.

BACKGROUND

[0002] Mobile devices, such as smart phones and tablets, usually have a capacitive touch-sensitive screen to capture interactions made with the user’s fingers. Many desktops are equipped with multi-touch hardware. For example, most current Apple Mac™ computers are equipped with a multi-touch-enabled input device of some sort. Multi-touch refers to the ability of a touch-sensing surface (e.g., trackpad or touchscreen) to recognize the presence of two or more points of contact with the surface.

SUMMARY

[0003] The present technology simulates multi-touch events on a browser system. In one example, a method includes the following: receiving low-level touch events from a touch-input system, wherein a low-level touch event is data that describes an activity at a contact point of a touch-sensing surface of the touch-input system; generating script-callbacks from the low-level touch events, wherein a script-callback includes properties that describe a contact point at the touch-sensing surface of the touch-input system, and wherein the script-callbacks enable the browser system to communicate with the touch-input system; converting the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard; and sending the compliant touch events to a web application.

[0004] The technology encompasses other implementations configured as set forth above and with other features and alternatives. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Implementations described herein will be readily understood by the following detailed description in conjunction with the accompanying drawings.

[0006] FIG. 1 is a block diagram of a computer system configured to simulate multi-touch events;

[0007] FIG. 2 is an example of user interface of a web application running on a browser system of a computer system;

[0008] FIG. 3 is an overview of a method for simulating multi-touch events on a browser system;

[0009] FIG. 4 is an overview of a method for the multi-touch enabler of FIG. 1; and

[0010] FIG. 5 is a block diagram of a general purpose or special purpose computer system.

DETAILED DESCRIPTION

[0011] The technology here addresses the problem of conventional desktop browsers being unable to handle multi-touch events. As the mobile web evolves to enable increasingly sophisticated applications, web developers need a way to handle multi-touch events. For example, nearly any fast-paced game requires the player to press multiple buttons at once, which, in the context of a touch-screen, implies multi-touch. In mobile development, it is often easier to start prototyping on a desktop and later tackle the mobile-specific parts on supported devices.

[0012] Unfortunately, a conventional desktop browser is not configured to handle multi-touch input. Even though an operating system of a desktop computer may be equipped to handle multi-touch input, conventional desktop browsers are unequipped to handle multi-touch input from a multi-touch input device. As a result, a web application is unable to respond to multi-touch events due to conventional desktop browsers being unable to handle multi-touch events.

[0013] Implementations of the technology enable a developer to write a multi-touch web application (e.g., video game) for a browser system on a computer (e.g., desktop computer or laptop computer). As a result, a mobile computer (e.g., tablet or cell phone) may run the substantially same multi-touch web application.

Browser Capable of Simulating Multi-Touch Events

[0014] FIG. 1 is a block diagram of a computer system **100** configured to simulate multi-touch events. The computer system **100** includes a browser system **110** and a touch-input system **102**, among other systems. Although the computer system **100** may include an operating system that is able to handle multi-touch events, a conventional browser system running on the computer system **110** would be unable to handle multi-touch events. Fortunately, the browser system **110** is able to handle multi-touch events, as further described below.

[0015] The browser system **110** is coupled to a touch-input system **102**. The browser system includes an application programming interface (API) device **112**, a multi-touch enabler **114**, a web application **116**, a rendering engine **118**, and a browser display window **120**, among other devices. The touch-input system **102** includes a touch-sensing surface **103** and a low-level converter **106**, among other devices.

[0016] The touch-input system **102** can recognize the presence of one or more contact points **105** via the touch-sensing surface **103**. The contact points **105** are typically associated with a finger, a stylus, and/or a pointing device, among other things. Examples of the touch-input system **102** include a touchscreen, a trackpad, and/or any device that supports multi-touch input. The touch-sensing surface **103** receives touch input and generates raw touch-signals. The touch-sensing surface **103** sends raw touch-signals to a low-level converter **106**.

[0017] The low-level converter **106** is software on the operating system of the computer system **100** that converts raw touch-signals into low-level touch events that the browser system **110** can interpret. The low-level converter **106** allows the browser system **110** to communicate directly with the touch-input system **102**. An example of a low-level converter **106** is the TongSeng TUIO (tangible user interface objects) tracker for the Mac MagicPad™. TongSeng TUIO

is a software wrapper for the Mac OS™ that generates low-level touch events that comply with a TUIO (tangible user interface objects) protocol.

[0018] The low-level converter 106 continually sends low-level touch events to the API device 112 as fingers touch and move across the touch-sensing surface. A low-level touch event provides a snapshot of each touch during a multi-touch sequence or single-touch sequence, particularly the touches that are new or have changed for a particular target. For example, a multi-touch sequence may begin when a finger first touches the surface. Other fingers may subsequently touch the surface, and all fingers may move across the surface. The sequence may end when the last of these fingers is lifted from the surface. The API device 112 receives touch events during each activity of a touch.

[0019] A low-level touch event is data that describes an activity at a contact point 105 of the touch-sensing surface 103. Examples of low-level touch events are provided below in Table 1:

TABLE 1

Examples of low-level touch events generated by the low-level converter.
touch-start (sent upon an initial contact on the surface)
touch-move (sent when a contact moves on the surface)
touch-end (sent when a contact ends on the surface)

[0020] The API device 112 receives low-level touch events from the low-level converter 106 and generates script-callbacks. An example of the API device 112 is a NPAPI plug-in (Netscape Program Application Program Interface plug-in). Alternatively, the API device 112 may be code built into the browser system 110, rather than a plug-in added to the browser system 110. The script-callbacks can be JavaScript™ callbacks, or callbacks of another scripting language that enables dynamic and interactive Web pages.

[0021] Script-callbacks enable the browser system 110 to communicate with the touch-input system 102. The properties of a script-callback include details that describe a touch event (e.g., activity of a contact point at the touch-sensing surface). Properties include, for example, an identifier of a contact, a position of a contact, and/or a type of a contact, among other properties. Examples of properties of a script-callback are provided below in Table 2:

TABLE 2

Examples of properties of a script-callback generated by the API device.
identifier (e.g., ID = contact #4)
position (e.g., x position = 125, y position = 200)
type (e.g., start, move, or end)

[0022] A problem here is the properties (e.g., identifier, position, type, etc.) of a script-callback are in a format that is non-compliant with a multi-touch browser standard. At this point, a web developer would still have difficulty developing a web application on the browser system that would reliably run on a mobile device. Accordingly, the API device 112 is configured to send the script-callbacks to the multi-touch enabler 114.

[0023] The multi-touch enabler 114 receives script-callbacks from the API device 112 and generates compliant

touch events that comply with a multi-touch browser standard, such as the W3C™ (World Wide Web Consortium) Touch Events standard, which is hereby incorporated by reference in its entirety. These compliant touch events can also be JavaScript™ events and JavaScript™ function call backs, but in a standardized format instead of the format generated by API device 112. Accordingly, a web application can be written that uses these compliant touch events, and then run within any web browser capable of producing compliant touch events. For example, a web application written, tested, and run on the desktop, can be expected to behave the same when that web application is run on a mobile device in a mobile browser, because that mobile browser can also generate compliant touch events for the web application. Touch events generated by an operating system like Windows of Mac OS™ can be processed by the native browser into compliant touch events for the web application. Similarly, touch events generated by a mobile operating system, which may be different than those generated by a desktop operating system, can also be processed by the mobile web browser to generate compliant touch events. In some cases, a particular operating system or browser may generate compliant touch events, removing the need to process non-compliant events into compliant events.

[0024] An example of the multi-touch enabler 114 is a script library that complies with a scripting language that enables dynamic and interactive Web pages. For instance, the multi-touch enabler 114 can be a JavaScript™ library. Example implementations of the multi-touch enabler 114 include an aftermarket browser plug-in and/or code that is built into the code of the browser system 110.

[0025] Continuing with FIG. 1, the multi-touch enabler 114 identifies properties of script-callbacks. As described above, example properties of a script-callback include an identifier, a position, and/or a type, among other properties. An identifier uniquely distinguishes each contact point from other contact points at the touch-sensing surface. A position describes the location of a contact point at the touch-sensing surface by using, for example, horizontal and vertical coordinates. A type describes a particular contact as being a start (e.g., a finger initially touching a track pad), a move (e.g., a finger moving on a track pad), and/or an end (e.g., a finger lifting off a track pad).

[0026] The multi-touch enabler 114 generates compliant touch events by applying a multi-touch browser standard to the non-compliant properties of the script-callbacks. In particular, the multi-touch enabler 114 may convert an non-compliant identifier into a compliant identifier, may convert an non-compliant position into a compliant position, and/or may convert an non-compliant type into a compliant touch type, and so on. The result is a compliant touch event that includes one or more of these compliant properties. Examples of properties of a compliant touch event are provided below in Table 3:

TABLE 3

Examples of properties of a compliant touch event generated by the multi-touch enabler.
identifier in a format that complies with W3C™
position in a format that complies with W3C™
type in a format that complies with W3C™

[0027] The multi-touch enabler **114** of FIG. **1** sends compliant touch events to the web application **116**. The web application **116** (e.g., video game) receives compliant touch events and can then combine the compliant touch events to perform high-level actions. For example, the web application **116** can perform high-level functionality by interpreting touch events as being a multi-point gesture or a single-point gesture. Examples of high-level actions of the web application **116** are provided below in Table 4:

TABLE 4

Examples of high-level actions of a web application.

zooming out upon interpreting compliant touch events as being two fingers pinching together
 zooming in upon interpreting compliant touch events as being two finger un-pinching apart
 activating a program upon interpreting compliant touch events as being four fingers swiping
 rotating an image upon interpreting compliant touch events as being two fingers rotating
 moving a graphical object upon interpreting compliant touch events as being one stylus swiping

[0028] The web application **116** can then generate properly formatted content and send the properly formatted content to the rendering engine **118**. The rendering engine **118** receives the formatted content from the web application **116** and instructs the browser display window **120** to display the formatted content.

[0029] Accordingly, the compliant touch events enable the web application **116**, and thus the browser display window **120** and the browser system **110**, to function reliably. The technology enables a developer to write a multi-touch web application (e.g., video game) for a browser system on a computer (e.g., desktop computer or laptop computer). As a result, a mobile computer (e.g., tablet or cell phone) may run the substantially same multi-touch web application.

[0030] FIG. **2** is an example of a user interface **216** of a web application running on a browser system **210** of a computer system **210**. The computer system **200** includes a touch-input system **202** coupled to a browser system **210**, among other systems. The browser system **210** can run on a desktop computer, a laptop computer, or other computer.

[0031] The web application running on the browser system **210** of FIG. **2** is equipped to respond reliably to touch events from the touch-input system **202**. As illustrated, the user interface **216** displays formatted content on the display window **240** in a reliable manner with respect to the contact points **205**. Accordingly, the web application, interactive via the display window **240**, functions reliably with respect to the contact points **205** at the touch-sensing surface **203**.

[0032] Examples of the web application include a video game, a web application, or a mobile web application, among other applications. The web application may be developed by using various resources, such as HTML (Hypertext Markup Language) files, XML (Extensible Markup language) files, CSS (Cascading Style Sheet) files, XSL (eXtensible Stylesheet Language) files, JavaScript™ files, image files (e.g., JPEG, GIF, PNG, etc.), and/or other resources.

Method Overviews

[0033] FIG. **3** is an overview of a method **300** for simulating multi-touch events on a browser system **310**. In some

implementations, the computer system **100** of FIG. **1** may carry out this method **300** of FIG. **3**.

[0034] In an act **304**, the touch-input system **302** receives touch-input. For example, a touch-sensing surface recognizes the presence of one or more contact points.

[0035] In an act **306**, the touch-input system **302** generates raw touch-signals. For example, a touch-sensing surface generates raw touch-signals and sends the raw touch-signals to a low-level converter.

[0036] In an act **308**, the touch-input system **302** generates low-level touch events. For example, a low-level converter may generate low-level touch events that comply with a TUIO (tangible user interface objects) protocol.

[0037] In an act **312**, the browser system **310** generates script-callbacks from the low-level touch events. For example, a NPAPI (Netscape Program Application Program Interface) plug-in device may generate callbacks that comport with JavaScript™ or another scripting language that enables a generating of dynamic and interactive Web pages.

[0038] In an act **314**, the browser system **314** generates compliant touch events from the script-callbacks. For example, a multi-touch enabler may generate compliant touch events that comply with the Touch Events specification of the W3C™ (World Wide Web Consortium). A multi-touch enabler is also discussed below with reference to FIG. **4**.

[0039] In an act **316**, the web application running on the browser system **314** interprets the touch events. For example, a video game receives compliant touch events from the multi-touch enabler of the browser system **310**.

[0040] In an act **318**, the browser system **310** renders the formatted content in a reliable manner. For example, the browser system **310** renders the graphics of a video game in a reliable manner on a display window of the browser system **310**. The graphics of the video game reliably correlate with the activity of the contact points discussed above with respect to the act **304**.

[0041] FIG. **4** is an overview of a method **400** for the multi-touch enabler **114** of FIG. **1**. In an act **402**, the multi-touch enabler **414** receives a script-callback from an API (application programming interface) device. For example, the multi-touch enabler **414** may include a JavaScript™ library that is configured to receive and interpret a JavaScript™ callback.

[0042] In an act **404**, the multi-touch enabler **414** identifies properties of the script-callback. The properties include details that describe a particular contact point at the touch-sensing surface.

[0043] In an act **406**, the multi-touch enabler **414** generates a compliant touch event by applying a multi-touch browser standard to the non-compliant properties of the script-callback. For example, the multi-touch enabler **414** may convert the non-compliant properties to a compliant touch event. The compliant touch events can be generated using a conversion code (e.g., a set of JavaScript™ functions or a JavaScript™ library) running within the web browser, for example, as part of the developed web application, a background page, a web application, or a browser extension. This conversion code may also be included in the web application itself, and dynamically enabled as necessary depending on the platform. Alternatively, the code may be enabled while developing an application on one platform, such as a desktop platform, and then disabled before that code is deployed for another platform, such as a mobile platform. This conver-

sion code can create new compliant JavaScript™ events and JavaScript™ callbacks based on non-compliant JavaScript™ events and callbacks, for example, by changing properties of the non-compliant events into a format that complies with a multi-touch standard.

[0044] In an act **408**, the multi-touch enabler **414** sends the compliant touch event to a web application. The web application may include an application (e.g., video game) that is interactive via a display window of the browser system. The multi-touch enabler **414** enables the web application to function reliably with respect to the particular contact point at the touch-sensing surface.

[0045] In a decision operation **410**, the multi-touch enabler **414** determines if another script-callback is being received from the API device. Script-callbacks are typically rapidly occurring. For example, the multi-touch enabler **414** may receive as many as hundreds, or even thousands, of script-callbacks per second. Accordingly, this decision operation **410** and other acts in this method **400** are rapidly occurring. This decision operation **410** is primarily where the multi-touch enabler **414** determines if there is a multi-touch situation. For example, if a contact at the touch-sensing surface has not ended before another contact starts, then the multi-touch enabler **414** is likely in the midst of a multi-touch situation. Accordingly, the multi-touch enabler **414** can handle multi-touch events (e.g., two or more contact points at once) or a single touch event (e.g., one contact point at once).

[0046] If the multi-touch enabler **414** is not in the midst of receiving another script-callback from the API-device (e.g., if there is no activity of a contact at the touch-sensing surface), then the method **400** moves to an act **412** where the multi-touch enabler **414** waits for input from the API device. The multi-touch enabler **414** may continue this loop of waiting and determining if a script-callback is being received, until the multi-touch enabler **414** receives another script-callback.

[0047] If the multi-touch enabler **414** determines a script-callback is being received at decision operation **410**, then the method **400** moves to the act **402** where the multi-touch enabler **414** receives this script-callback. The method **400** continues until, for example, the computer system deactivates the touch-input device, deactivates the browser system, and/or shuts down, among other reasons for discontinuing the method **400**.

[0048] Note these methods may include other acts and/or details that are not discussed in these method overviews. Other acts and/or details are discussed with reference to other figures and may be a part of the methods, depending on the implementation.

Example Computer Implementation

[0049] FIG. 5 is a block diagram of a general purpose or special purpose computer system **500**. The computer system **500** may include, for example, a server, a client computer, a user device, and/or a user computer, among other things. A device (e.g., apparatus or machine) is hardware or a combination of hardware and software.

[0050] The computer system **500** preferably includes without limitation a processor device **510**, a main memory **525**, and an interconnect bus **505**. The processor device **510** may include without limitation a single microprocessor, or may include a plurality of microprocessors for configuring the computer system **500** as a multi-processor system. The

main memory **525** stores, among other things, instructions and/or data for execution by the processor device **510**. If the system for generating a synthetic table of contents is partially implemented in software, the main memory **525** stores the executable code when in operation. The main memory **525** may include banks of DRAM (dynamic random access memory), as well as cache memory.

[0051] The computer system **500** may further include a mass storage device **530**, peripheral device(s) **540**, portable storage medium device(s) **550**, input control device(s) **580**, a graphics subsystem **560**, and/or an output display **570**. For explanatory purposes, all components in the computer system **500** are shown in FIG. 5 as being coupled via the bus **505**. However, the computer system **500** is not so limited. Devices of the computer system **500** may be coupled through one or more data transport means. For example, the processor device **510** and/or the main memory **525** may be coupled via a local microprocessor bus. The mass storage device **530**, peripheral device(s) **540**, portable storage medium device(s) **550**, and/or graphics subsystem **560** may be coupled via one or more input/output (I/O) buses. The mass storage device **530** is preferably a nonvolatile storage device for storing data and/or instructions for use by the processor device **510**. The mass storage device **530**, which may be implemented, for example, with a magnetic disk drive or an optical disk drive. In a software implementation, the mass storage device **530** is preferably configured to load contents of the mass storage device **530** into the main memory **525**.

[0052] The portable storage medium device **550** operates in conjunction with a nonvolatile portable storage medium, such as, for example, a CD ROM (compact disc read only memory), to input and output data and code to and from the computer system **500**. In some implementations, the software for generating a synthetic table of contents may be stored on a portable storage medium, and may be inputted into the computer system **500** via the portable storage medium device **550**. The peripheral device(s) **540** may include any type of computer support device, such as, for example, an I/O (input/output) interface configured to add additional functionality to the computer system **500**. For example, the peripheral device(s) **540** may include a network interface card for interfacing the computer system **500** with a network **520**.

[0053] The input control device(s) **580** provide a portion of the user interface for a user of the computer system **500**. The input control device(s) **580** may include a keypad and/or a cursor control device. The keypad may be configured to input alphanumeric and/or other key information. The cursor control device may include, for example, a mouse, a trackball, a stylus, a touchpad, and/or cursor direction keys. In order to display textual and graphical information, the computer system **500** preferably includes the graphics subsystem **560** and the output display **570**. The output display **570** may include a CRT (cathode ray tube) display and/or a LCD (liquid crystal display). The graphics subsystem **560** receives textual and graphical information, and processes the information for output to the output display **570**.

[0054] Each component of the computer system **500** may represent a broad category of a computer component of a general and/or special purpose computer. Components of the computer system **500** are not limited to the specific implementations provided here.

[0055] Portions of the present technology may be conveniently implemented by using a general purpose computer, a specialized digital computer and/or a microprocessor programmed according to the teachings of the present description, as will be apparent to those skilled in the computer art. Appropriate software coding may readily be prepared by skilled programmers based on the teachings of the present disclosure. Some implementations may also be implemented by the preparation of application-specific integrated circuits or by interconnecting an appropriate network of component circuits.

[0056] Some implementations include a computer program product. The computer program product may be a storage medium and/or media having instructions stored thereon and/or therein which can be used to control, or cause, a computer to perform any of the processes of the technology. The storage medium may include without limitation floppy disk, mini disk, optical disc, Blu-ray Disc, DVD, CD-ROM, micro-drive, magneto-optical disk, ROM, RAM, EPROM, EEPROM, DRAM, VRAM, flash memory, flash card, magnetic card, optical card, nanosystems, molecular memory integrated circuit, RAID, remote data storage/archive/warehousing, and/or any other type of device suitable for storing instructions and/or data.

[0057] Stored on any one of the computer-readable storage medium and/or media, some implementations include software for controlling both the hardware of the general and/or special computer or microprocessor, and for enabling the computer or microprocessor to interact with a human user or other mechanism utilizing the results of the technology. Such software may include without limitation device drivers, operating systems, and user applications. Ultimately, such computer-readable storage media further includes software for performing aspects of the technology, as described above.

[0058] Included in the programming and/or software of the general and/or special purpose computer or microprocessor are software modules for implementing the processes described above. The processes described above may include without limitation the following: receiving low-level touch events from a touch-input system, wherein a low-level touch event is data that describes an activity at a contact point of a touch-sensing surface of the touch-input system; generating script-callbacks from the low-level touch events, wherein a script-callback includes properties that describe a contact point at the touch-sensing surface of the touch-input system, and wherein the script-callbacks enable the browser system to communicate with the touch-input system; converting the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard; and sending the compliant touch events to a web application.

CONCLUSION

[0059] A technology is provided for simulating multi-touch events on a browser system. Advantageously, the present technology provides a browser system that is configured to function reliably with respect to multi-touch input. Accordingly, the technology enables a developer to write a multi-touch web application (e.g., video game) for a browser system on a computer (e.g., laptop computer). As a result, a mobile computer (e.g., tablet or cell phone) may run the substantially same multi-touch web application.

[0060] In the foregoing specification, the technology has been described with reference to specific implementations

thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the technology. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A method to support multi-touch events on a browser system, the method comprising:

receiving touch inputs from a touch-input system;
generating script-callbacks from the touch inputs, wherein each of the script-callbacks includes properties related to an activity at a contact point of a touch-sensing surface of the touch-input system;

converting the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard, wherein each of the compliant touch events comprises data related to the activity at the contact point of the touch-sensing surface of the touch-input system; and

sending the compliant touch events to an application.

2. The method of claim 1, wherein each of the touch inputs corresponds to a low-level touch event, the low-level touch event comprising data related to the activity at the contact point of the touch-sensing surface of the touch-input system.

3. The method of claim 1, wherein the script-callbacks enable the browser system to communicate with the touch-input system, and the script-callbacks are non-compliant with the multi-touch browser standard.

4. The method of claim 1, wherein the properties comprise a contact identifier, a contact position, and a contact type related to the activity at the contact point of the touch-sensing surface of the touch-input system, and the script-callbacks comprise callbacks of a scripting language.

5. The method of claim 1, wherein the converting further comprises at least one of converting, using code built into the browser system, a non-compliant position into a compliant position, converting, using the code built into the browser system, a non-compliant touch type into a compliant touch type, and converting, using the code built into the browser system, a non-compliant identifier into a compliant identifier.

6. The method of claim 1, wherein the application is configured to combine the compliant touch events to perform high-level actions.

7. The method of claim 1, wherein a multi-touch enabler is configured to convert the script-callbacks into the compliant touch events, and the application is configured to receive the compliant touch events from the multi-touch enabler, and generate properly formatted content for a rendering engine of the browser system.

8. The method of claim 7, wherein the rendering engine is further configured to receive the formatted content from the application, and instruct a browser display window to display the formatted content.

9. The method of claim 1, wherein a script library that complies with a scripting language is configured to convert the script-callbacks to the compliant touch events.

10. The method of claim 1, wherein converting the script-callbacks includes identifying the properties of the script callbacks and converting the identified properties to a second format compliant with the multi-touch browser standard.

11. A browser system that supports multi-touch events, the browser system comprising:

- an application programming interface (API) device configured to receive touch inputs from a touch-input system and generate script-callbacks from the touch inputs, wherein each of the script-callbacks includes properties related to an activity at a contact point of a touch-sensing surface of the touch-input system; and
- a multi-touch enabler configured to convert the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard and send the compliant touch events to an application, wherein each of the compliant touch events comprises data related to the activity at the contact point of the touch-sensing surface of the touch-input system.

12. The browser system of claim **11**, wherein each of the touch inputs corresponds to a low-level touch event, the low-level touch event comprising data related to the activity at the contact point of the touch-sensing surface of the touch-input system.

13. The browser system of claim **11**, wherein the script-callbacks enable the browser system to communicate with the touch-input system, and the script-callbacks are incompatible with the multi-touch browser standard.

14. The browser system of claim **11**, wherein the properties comprise a contact identifier, a contact position, and a contact type related to the activity at the contact point of the touch-sensing surface of the touch-input system, and the script-callbacks comprise callbacks of a scripting language.

15. The browser system of claim **11**, wherein to convert the script-callbacks further comprises at least one of converting, using code built into the browser system, an incompatible position into a compliant position, converting, using the code built into the browser system, an incompatible touch

type into a compliant touch type, and converting, using the code built into the browser system, an incompatible identifier into a compliant identifier.

16. The browser system of claim **11**, wherein the application is configured to combine the compliant touch events to perform high-level actions.

17. The browser system of claim **11**, wherein the application is configured to receive the compliant touch events from the multi-touch enabler, and generate properly formatted content for a rendering engine of the browser system.

18. The browser system of claim **17**, wherein the rendering engine is further configured to:

- receive the formatted content from the application; and
- instruct a browser display window to display the formatted content.

19. The browser system of claim **11**, wherein the multi-touch enabler further comprises a script library that complies with a scripting language, and the script library is configured to convert the script-callbacks to the compliant touch events.

20. A non-transitory computer-readable storage media storing instructions that when executed cause one or more processors to perform operations comprising:

- receiving touch inputs from a touch-input system;
- generating script-callbacks from the touch inputs, wherein each of the script-callbacks includes properties related to an activity at a contact point of a touch-sensing surface of the touch-input system;
- converting the script-callbacks into compliant touch events that are compliant with a multi-touch browser standard, wherein each of the compliant touch events comprises data related to the activity at the contact point of the touch-sensing surface of the touch-input system; and
- sending the compliant touch events to an application.

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