OVERLAYING CONTENT AUGMENTING VIDEO DATA FROM A CONTENT PROVIDER SYSTEM DISPLAYED BY A CLIENT DEVICE

Abstract

A client device execute a browser that obtains a web page including video data. The browser includes an overlay extension that captures interactions with the browser. In response to detecting video data within the web page, the overlay extension transmits metadata identifying the detected video data to an overlay server. Subsequently, the overlay extension receives overlay content selected by the overlay server based on the metadata and renders the overlay content in a video player of the browser rendering the video data. The overlay extension accounts for one or more settings of the video player when rendering the overlay content in conjunction with the video data.

Inventors:	**Barden; Bart (Dublin, IE)**
Applicant:	**SUPER STREAMING TECH INC.** (Dallas, TX)
Family ID:	**1000008476873**
Appl. No.:	**19/054751**
Filed:	**February 14, 2025**

Related U.S. Application Data

us-provisional-application US 63670101 20240711
us-provisional-application US 63553762 20240215

Publication Classification

Int. Cl.: **H04N21/431** (20110101); **H04N21/4402** (20110101); **H04N21/658** (20110101)

U.S. Cl.:

Background/Summary

CROSS REFERENCE TO RELATED APPLICATION [0001] This application claims the benefit of U.S. Provisional Application No. 63/553,762, filed Feb. 15, 2024, and of U.S. Provisional Application No. 63/670, 101, filed Jul. 11, 2024, each of which is incorporated by reference in its entirety.

BACKGROUND
Technical Field
[0002] The described embodiments relate to a client device configured display video content received from a content provider system and to overlay content from a different system over one or more portions of the video content.
Related Art
[0003] Various client devices, such as desktop computers, laptop computers, or mobile devices, obtain video data from one or more content provider systems and display the video data to users. The client device renders the video data to a user of the client device. For example, a client device obtains a web page from a content provider system including video data and renders the video data to the user. A content provider system may provide video data of live events, such as competitions, activities, presentations, or other events to a client device for presentation.
[0004] A content provider system may provide overlay content to a client device in addition to video data, and the client device presents the overlay content in conjunction with the video data. Such overlay content may be images, text, or other types of content that are presented in conjunction with the video data. Overlay content may be presented over one or more portions of the video data or may be presented in a web page in which the video data is presented. However, different content provider systems may differently regulate or limit overlay content that can be provided along with video data. Further, different overlay content may be relevant to different users to whom video data from a content provider system is presented, while various conventional content provider systems provide common overlay content to each user to whom a content provider system presents video data. Conventional content provider systems are also limited to providing overlay content in conjunction with video data to content that is accessible to the content provider system, limiting available content that may be presented in conjunction with video data to users.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0005] FIG. **1** illustrates an example system environment for an overlay extension in a browser executing on a client device to overlay content on content the browser receives from a content provider system, in accordance with one or more embodiments.
[0006] FIG. **2** illustrates an example client device executing a browser including an overlay extension to overlay content on content the browser receives from a content provider system, in accordance with one or more embodiments.
[0007] FIG. **3** illustrates a flowchart of a method for a client device rendering overlay content on video data from a content provider system presented by the client device, in accordance with one or more embodiments.
[0008] FIG. **4** illustrates an example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0009] FIG. **5** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0010] FIG. **6** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0011] FIG. **7** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0012] FIG. **8** illustrates examples of overlay content for a chaser game that may be overlaid on video data by an overlay extension, in accordance with one or more embodiments.

[0013] FIG. **9** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0014] FIG. **10** is an example of an order summary capable of being presented as overlay content by the overlay extension, in accordance with one or more embodiments.

[0015] FIG. **11** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0016] FIG. **12** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

[0017] FIG. **13** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser, in accordance with one or more embodiments.

DETAILED DESCRIPTION

[0018] In various embodiments disclosed herein, a client device executes a browser that obtains a web page including video data. The browser includes an overlay extension that captures interactions with the browser, including interactions by a user with the browser and data received by the browser. In response to detecting video data within the web page, the overlay extension transmits metadata identifying the detected video data to an overlay server. For example, the metadata includes a web page identifier and an identifier of the video data. Subsequently, the overlay extension receives overlay content selected by the overlay server based on the metadata and renders the overlay content in a video player of the browser rendering the video data. The overlay extension accounts for one or more settings of the video player when rendering the overlay content in conjunction with the video data. Example settings of the video player affecting rendering of the overlay content include: a source of the overlay content, a source of the video data, an orientation of the video player (e.g., landscape, portrait, full-size, partial-size), a type of the overlay content, a type of the video data, or other information. Additionally, the overlay extension modifies rendering of the overlay content in response to detecting changes to one or more settings of the video player or settings of the browser to dynamically adjust presentation of the overlay content in the video player to minimize an amount of the video data obscured by the overlay content.

[0019] The overlay server may leverage information about a user of the client device obtained from metadata to select overlay content. For example, the metadata includes history of web pages rendered by the browser that the overlay server leverages to select overlay content matching, or similar to, content in web pages previously rendered by the browser. Additionally, the metadata may identify a user of the overlay server to whom the video data was rendered. The overlay server may use stored associations between the user and one or more accounts maintained by one or more third party systems to select overlay content for the user, allowing the overlay server to leverage information that one or more third party systems maintain for the user or for the video data to select overlay content for rendering in conjunction with the video data. Leveraging such information maintained by one or more third party systems that the user has authorized the overlay server to access enables the overlay server to provide more personalized overlay content to a particular user.

[0020] Similarly, the overlay server may receive a description of an interaction by the user with overlay content from the overlay extension. In response to receiving the description, the overlay server may perform one or more actions. For example, the overlay server transmits a request to a third party system associated with the overlay content with which the user interacted to perform an

action for the user. As an example, in response to the description of the interaction with overlay content identifying overlay content corresponding to a product offered by a third party system, the overlay system transmits an instruction to the third party system identifying the product, identifying the item, and requesting the third party system include the item in an order for the user. In another example, in response to the description of the interaction with overlay content identifying overlay content corresponding to a product offered by a third party system, the overlay system transmits an instruction to the third party system identifying the product, identifying the item, and including a bid amount for the item obtained from the interaction with the overlay content. This simplifies performance of various actions by the user by allowing the user to perform one or more actions through interaction with the overlay content rather than separate interactions with a third party system relevant to the overlay content.

[0021] FIG. **1** illustrates an example system environment for a client device **100** to render overlay content on video data from a content provider system **130**, in accordance with one or more embodiments. The system environment illustrated in FIG. **1** includes a client device **100**, a network **120**, one or more content provider systems **130**A-C (also referred to individually and collectively using reference number **130**), one or more third party systems **140**A, **140**B (also referred to individually and collectively using reference number **140**), and an overlay server **150**. Alternative embodiments may include more, fewer, or different components from those illustrated in FIG. **1**, and the functionality of each component may be divided between the components differently than provided in the description below. Additionally, each component may perform their respective functionalities in response to a request from a human, or automatically without human intervention.

[0022] While FIG. **1** shows a single client device **100** for purposes of illustration, any number of client devices **100** may be included in the system environment. Thus, there may be more than one client device **100** in various embodiments. The client device **100** is a device through which a user may interact with one or more content provider systems **130**, with one or more third party systems **140**, with one or more other client devices **100**, or with one or more other devices. The client device **100** may be a personal computing device or a mobile computing device. Examples of the client device **100** include a smartphone, a tablet, a laptop computer, or a desktop computer. The client device **100** includes one or more input devices configured to receive input from a user. Example input devices include: a touchscreen, a keyboard, a mouse, a microphone, an image capture device, or other devices capable of receiving interaction from a user. Additionally, the client device **100** includes one or more output devices configured to display data, such as content to a user. For example, an output device comprises a display device configured to display video data or image data. An example client device **100** is further described below in conjunction with FIG. **2**.

[0023] In the example shown by FIG. **1**, the client device **100** executes a browser **110**. The browser **110** obtains content from one or more content provider systems **130** or third party systems **140** via the network **120** and presents the obtained content to a user. For example, the browser **110** obtains one or more web pages from a content provider system **130** or from a third party system **140** and displays content from the web page via a display device of the client device **100**. While FIG. **1** shows the client device **100** including a browser **110** for obtaining content from one or more content provider systems **130** or from one or more third party systems **140**, in other embodiments, the client device **100** executes one or more applications to obtain content from one or more content provider systems **130** or from one or more third party systems **140**. For example, the client device **100** executes an application associated with a content provider system **130** to obtain and to present content from the content provider system **130**.

[0024] One or more web pages, or other content, received by the browser **110** via the network **120** include video data. In various embodiments, the browser **110** presents the video data through a video player **112**. The video player **112** retrieves video data identified in a web page from a source location (e.g., a server) identified in the web page. Subsequently, the video player **112** decodes the received video data into frames and renders the frames for display by the client device **100**. For

example, the browser **110** obtains a web page from a content provider system **130** including video data, and the video player **112** retrieves and renders the video data in a portion of the browser **110**. Examples of video data rendered by the video player **112** include video of a sporting event, video of a creator event, video of scripted content, video of unscripted content, or video of one or more other types of events. In some embodiments, a creator event comprises one or more games or activities of a creator's choosing.

[0025] One or more settings of the video player **112** may be specified by the web page retrieved by the browser **110** or may be specified based on one or more inputs received from the user (e.g., received via the browser **110**). For example, a setting of the video player **112** specifies a resolution of video data displayed by the video player **112**. Another setting of the video player **112** specifies dimensions of the video player **112** within the browser **110**. Other settings may specify different attributes or functionality of the video player **112**.

[0026] While the video player **112** renders video data, or other content, from a content provider system **130**, a third party system **140** or the overlay server **150** may maintain overlay content relevant to the video data from the content provider system **130**. Displaying the overlay content in conjunction with the video data from the content provider system **130** increases a likelihood of a user of the client device **100** interacting with the overlay content or viewing the video data. As further described below, the overlay server **150** allows the video player **112** to render video data from a content provider system **130**, while rendering overlay content from a different system, such as a third party system **140** or the overlay server **150**, in conjunction with the video data. This increases a variety of content that the browser **110** may display to a user at one time, by enabling video data and concurrently presented overlay data to be obtained from disparate sources. As different content provider systems **130** may have different limitations or restrictions on overlay content or enforce different formatting requirements on overlay content presented in conjunction with video data, the overlay server **150** simplifies presentation of content from different sources by the browser **110**.

[0027] To present video data from a content provider system **130** and overlay content from a different server than the content provider system **130**, the browser **110** includes an overlay extension **114**. The overlay extension **114** comprises a set of instructions that, when executed by a processor of the client device **100**, provide functionality further described herein. When installed on the client device **100**, the overlay extension **114** integrates into the browser **110** and captures interactions with the browser **110**. For example, the overlay extension **114** captures web page identifiers, such as universal resource indicators (URIs), of web pages obtained by the browser **110**. Additionally, the overlay extension **114** captures a browser history of web pages previously obtained by the browser **110**. Other interactions with the browser **110** captured by the overlay extension **114** include: web services accessed by the browser **110**, information about the dynamic object model (DOM) of the browser **110**, one or more settings of the browser **110**, modifications or customizations to the browser **110** by a user, content (e.g., video data) included in the web page currently rendered by the browser **110**, selections of content within the browser **110**, and modifications to one or more settings of the browser. Different or additional interactions with the browser **110** may be captured by the overlay extension **114** in various embodiments.

[0028] The overlay extension **114** analyzes the captured interactions with the browser **110**. In various embodiments, the overlay extension **114** analyzes the captured interactions with the browser **110** to detect one or more specific types of content in a web page currently rendered by the browser **110**. For example, the overlay extension **114** detects video data included in the web page currently rendered by the browser **110** based on analysis of captured interactions with the browser **110**.

[0029] In response to detecting video data included in the web page currently rendered by the browser **110**, the overlay extension **114** transmits metadata identifying the detected video data to the overlay server **150** via the network **120**. In various embodiments, the metadata includes at least

a subset of the interactions with the browser **110** captured by the overlay extension **114**. For example, the metadata includes a browser history of web pages previously rendered by the browser **110** and one or more settings of the browser **110**. As another example, the metadata includes a location of the client device **100**. Various subsets of the interactions with the browser captured by the overlay extension **114** are included in the metadata describing the detected video data in different embodiments.

[0030] As further described below, the overlay server **150** selects overlay content based on the metadata received from the overlay extension **114**. For example, the overlay server **150** selects overlay content based on the video data, the web page currently presented by the browser, and the browsing history. As further described below, the overlay content may include product identifiers of one or more products or services available from a third party system **140** and one or more interface elements. Alternatively or additionally, the overlay content includes one or more questions and interface elements for a user to provide answers to the questions in some embodiments. However, in different embodiments, the overlay content includes different data or interface elements.

[0031] The overlay extension **114** receives the overlay content from the overlay server **150** and obtains one or more settings of the video player **112** of the browser **110**. Example settings of the video player **112** obtained by the overlay extension **114** include a size of the video player **112** within the browser **110**, a resolution of video data presented by the video player **112**, or other settings affecting display of video data by the video player **112**. Based on the settings of the video player **112** and the overlay content, the overlay extension **114** renders one or more portions of the overlay content in one or more portions of the video player **112**. The overlay extension **114** renders the one or more portions of the overlay content while the video player is rendered in the video player **112**, so the overlay content is concurrently rendered with the video data. The overlay content may include images, text, animations, video, interactive buttons or other interactive interface elements, or other computer-generated content. In some embodiments, the overlay content and video data are synchronously rendered in real time, or in near real time.

[0032] The overlay extension **114** dynamically overlays the overlay content on one or more portions of the video data as the video data plays, so different overlay content may be rendered at different times within the video data. For example, the overlay content specifies different times in the video data to render different overlay content. Alternatively or additionally, the overlay content is modified or updated based on user interactions with the browser **110** or based on other detected conditions by the overlay extension **114**. In response to the overlay extension **114** detecting one or more changes to one or more settings of the video player **112** or to one or more settings of the browser **110**, the overlay extension **114** modifies rendering of the overlay content in the video player **112**. Accounting for one or more settings of the video player **112** when rendering the overlay content allows the overlay extension **114** to customize or to modify the overlay content as one or more settings of the video player **112** are modified maintaining appearance of the overlay content relative to the video data. For example, a change in size of the video player **112** or a change in size of a display region including the browser **110** causes the overlay extension **114** to modify the overlay content. Similarly, changing one or more of a resolution of video displayed by the video player **112**, a type of the video data rendered by the video player **112**, a scale of the video player **112**, or other setting of the video player **112** modifies rendering of the overlay content by the overlay extension **114**. Other interactions with the browser **110** or information about the browser **110** (e.g., a type of the browser **110**) determine rendering of the overlay content on one or more portions of the video data. In some embodiments, the overlay extension **114** captures interactions with the browser **110** including changes to the video data displayed by the video player **112** and may modify rendering of overlay content in response to the captured interactions, as further described below in conjunction with FIG. **3**. The interactions may be captured in real-time or in near real-time. This allows the overlay extension **114** to render the overlay content in one or more

portions of the video player **112** that are additive and not intrusive to the user viewing the video data via the video player **112**.

[0033] In some embodiments, the overlay content includes one or more conditions for when the overlay content is rendered or how to render the overlay content. The overlay extension **114** determines whether a condition is satisfied based on data from the overlay server **150** or based on one or more interactions with the browser captured by the overlay extension **114**. In response to determining a condition is satisfied, the overlay extension **114** renders or modifies one or more portions of overlay content. For example, a condition specifies that a bid for a product identified by the video data or by the overlay content exceeds a bid previously received from the user; in response to receiving an indication from the overlay server **150** that the overlay server **150** received a bid exceeding the bid previously received from the user, the overlay extension **114** modifies a portion of the overlay content, or renders additional overlay content, to indicate the user has been outbid As another example, a condition specifies that user has won an auction for a product identified by the video data or by the overlay content; in response to receiving an indication from the overlay server **150** that the user has won the auction, the overlay extension **114** modifies a portion of the overlay content, or renders additional overlay content, to display a notification that the user won the auction. The conditions may be specified by the user and stored by the overlay extension **114** (or by the overlay server **150**), allowing a user to customize the information included in the overlay content and when different information is displayed in the overlay content.

[0034] Additionally, the overlay extension **114** may detect an interaction with a portion of the overlay content and transmit information describing the interaction with the portion of the overlay content to the overlay server **150** via the network **120**. For example, the overlay extension **114** detects selection of a specific interface element in the overlay content via the browser **110** and transmits an identifier of the overlay content with which the interaction was detected to the overlay server **150**. As another example, the overlay extension **114** detects input received via an interface element of the overlay content and transmits the received input and an identifier of the interface element to the overlay server **150**.

[0035] For example, an interaction by the user with overlay content is the user selecting an interface element in the overlay content to purchase a product or service identified by a portion of the overlay content or by the video data. As another example, an interaction by the user with overlay content is the user specifying a bid amount for a product or service being auctioned in the video data or in the overlay content. In another example, an interaction by the user with overlay content is the user providing an answer to a question presented via the overlay content. As an additional example, an interaction by the user with overlay content is the user selecting a wager opportunity presented by the overlay content. Further, an interaction by the user with overlay content may be the user selecting a portion of the overlay content to obtain additional information about the video data or about another portion of the overlay content. However, different or additional interactions with overlay content may be performed by a user and captured by the overlay extension **114**.

[0036] In some embodiments, the overlay extension **114** is configured to integrate with one or more messaging applications executing on the client device **100**. This integration allows for a more connected and interactive user experience by enhancing communication and engagement by the user of the client device **100**. Moreover, in some embodiments, the overlay extension **114** is configured to prompt a messaging application executing on the client device **100** to generate messages including one or more notifications, alerts, and confirmations related to overlay content for presentation to the user. This allows users to receive additional updates or notifications about overlay content rendered by the overlay extension **114** via the one or more messaging applications to increase a likelihood of the user viewing or interacting with the overlay content. The overlay extension **114** is further described below in conjunction with FIG. **3**.

[0037] While FIG. **1** describes an example where a browser **110** obtains and renders video data and

overlay content, but in other embodiments, an application executing on a client device **100** obtains the video data and renders the video data. The application also obtains the overlay content from the overlay server **150**, as further described above, allowing a single application to obtain video data and overlay data from different sources and concurrently render the overlay data and the video data, with the application providing the functionality of the overlay extension **114** further described herein. For example, the single application provides the functionality of the browser **110** and of the overlay extension **114** when the client device **100** is a mobile device. Alternatively, an application executing on the client device **100** obtains video data from a content provider system **130**, while an overlay application executing on the client device **100** obtains overlay content from the overlay server **150**, with the overlay application providing the functionality further described herein for the overlay extension **114**. For example, an application and the overlay application provide functionality of the browser **110** and of the overlay extension **114**, respectively, when the client device **100** is a mobile device.

[0038] The client device **100**, the one or more content provider systems **130**, the one or more third party systems **140**, and the overlay server **150** communicate with each other via the network **120**. The network **120** is a collection of computing devices that communicate via wired or wireless connections. The network **120** may include one or more local area networks (LANs) or one or more wide area networks (WANs). The network **120**, as referred to herein, is an inclusive term that may refer to any or all of the standard layers used to describe a physical or virtual network, such as the physical layer, the data link layer, the network layer, the transport layer, the session layer, the presentation layer, and the application layer. The network **120** may include physical media for communicating data from one computing device to another computing device, such as multiprotocol label switching (MPLS) lines, fiber optic cables, cellular connections (e.g., 3G, 4G, or 5G spectra), or satellites. The network **120** also may use networking protocols, such as TCP/IP, HTTP, SSH, SMS, or FTP, to transmit data between computing devices. In some embodiments, the network **120** may include BLUETOOTH® or near-field communication (NFC) technologies or protocols for local communications between computing devices. The network **120** may transmit encrypted or unencrypted data.

[0039] A content provider system **130** transmits content including video data to one or more client devices **100** via the network **120**. For example, a content provider system **130** maintains one or more web pages including video data. In various embodiments, one or more content provider systems **130** are streaming servers that transmit packets comprising video data to the client device **100** via the network **120**, and the client device **100** renders the video data (e.g., in the video player **112** of the browser **110**) as the video data is received from the content provider system **130**. A content provider system **130** may obtain live video data and transmit the live video data to the client device **100** via the network **120**. For example, the content provider system **130** receives video data captured by, or obtained by, a creator client device **100** via the network **120** and transmit the video data from the creator client device **100** to the client device **100** via the network. Alternatively or additionally, the content provider system **130** maintains stored video data and retrieves stored video data in response to a request from the client device **100** via the network **120**. The content provider system **130** transmits the retrieved video data to the client device **100** via the network **120**.

[0040] Different content provider systems **130**A, **130**B, **130**C may provide different content to the client device **100**. For example, different content provider systems **130**A, **130**B, **130**C transmit video data with different resolutions or different formats. Further, different content provider systems **130**A, **130**B, **130**C maintain different content (e.g., different video data, different overlay content for presentation with video data). As another example, different content provider systems **130**A, **130**B, **130**C includes different overlay content in one or more web pages including video data that is transmitted to the client device **100** from a content provider system **130**A. For example, content provider system **130**A and content provider system **130**B each maintain common video data for transmission to the client device **100**, but content provider system **130**A and content

provider system **130**B each include different overlay content in corresponding web pages including the common video data transmitted to the client device **100**. Further, different content provider systems **130** enforce different regulations or requirements for video data maintained by the different content provider systems **130** or for overlay content that may be provided in conjunction with video data.

[0041] A third party system **140** is a computing system separate from a content provider system **130** and from the overlay server **150**. For example, the third party system **140** is in a domain different from a domain of the overlay server **150** and different from a domain of the content provider system **130**. A third party system **140** maintains data for access by a client device **100** or another system (e.g., a content provider system **130**, the overlay server **150**). As an example, a third party system **140** maintains one or more products or services accessible via the third party system **140** that may be selected for acquisition based on an input received from the client device **100**, or from another client device. The third party system **140** may identify at least a subset of the products or services accessible via the third party system **140** to the overlay server **150**. Additionally, the third party system **140** may receive input or instructions from the overlay server **150** and perform one or more actions in response to the input or instructions from the overlay server **150**. While FIG. **1** shows an example system environment including two third party systems **140**A, **140**B, in other embodiments, the system environment includes a greater number of third party systems **140** or a smaller number of third party systems **140**. Different third party systems **140** maintain different data, or perform different functions, in various embodiments.

[0042] The overlay server **150** exchanges data with one or more of the client device **100**, one or more content provider systems **130**, and one or more third party systems **140** via the network **120**. The overlay server **150** maintains one or more sets of overlay content that are each associated with a combination of metadata identifying video data and a web page identifier (e.g., a uniform resource indicator of a web page). In some embodiments, multiple sets of overlay content may be associated with a combination of metadata identifying video data and a web page identifier. Further, the overlay server **150** may associate overlay content with a combination of metadata identifying video data. For example, metadata identifying video data includes an identifier of the video data, a web page identifier, a browsing history from a browser **110** rendering the web page identifier, and one or more settings of the browser **110** rendering the web page. However, different or additional metadata may be associated with a set of overlay content in various embodiments. In response to receiving particular metadata from the overlay extension **114**, the overlay server **150** selects overlay content associated with the particular metadata (or associated with metadata matching at least a threshold amount of the particular metadata received).

[0043] In various embodiments, the overlay server **150** performs one or more actions in response to receiving descriptions of various interactions with portions of overlay content from an overlay extension **114**. For example, in response to receiving a description of a specific interaction, the overlay server **150** includes a particular item in an order for a user or transmits an instruction to a third party system **140** to include the particular item in the order. As another example, in response to receiving a description of a specific interaction, the overlay server **150** associates a bid amount from a user with particular item in an order for a user or transmits an instruction to a third party system **140** to associate the bid amount from the user with the particular item. In another example, in response to receiving a description of a specific interaction, the overlay server **150** transmits additional overlay content to the overlay extension **115**. For an additional examples, in response to receiving a description of a specific interaction, the overlay server **150** associates data included in the description with a user identified by the description or transmits an instruction to a third party system **140** to associate data included in the description with a user identified by the description. Other actions may be performed by the overlay server **150** in response to receiving one or more descriptions of interactions with overlay content from the overlay extension **114**.

[0044] The overlay server **150** includes a location module in some embodiments. The location

module detemrines a location of a client device **100** from which the overlay server **150** received metadata identifying video data rendered in the video player **112** of the browser executing on the client device **100**. The overlay server **150** selects overlay content for the video data based at least in part on the location of the client device **100**, which may be included in the metadata received from the overlay extension **114**. The overlay server **150** prevents selection of certain overlay content based on the location of the client device **100** or selects specific overlay content based on the location of the client device **100**, in various embodiments.

[0045] In some embodiments, the overlay server **150** includes an authentication module that simplifies access to the overlay server **150** and to the overlay extension **114** for a user. For example, the authentication module allows a user to provide a single authentication credential (e.g., username and password) used to access multiple systems (e.g., a third party system **140**, a content provider system **130**) for accessing the overlay server **150** and for using the overlay extension **114**. For example, the authentication module receives an authentication credential a user provides to the browser **110** and validates the user is capable of accessing the overlay server **150** and the overlay extension **114** in response to validating the authentication credential (e.g., through an authentication server). Similarly, the authentication module may allow a user to associate multiple accounts other servers maintain for the user with a user identifier or user authentication credentials for the other servers with the authentication module. Subsequently, the overlay extension **114** may access one or more accounts associated with the user by the authentication module, providing the overlay extension **114** with additional data or functionality. For example, the overlay extension **114** or the overlay server **150** may access data or content from one or more other servers accessible via one or more accounts maintained for the user and associated with the user by the authentication module.

[0046] In some embodiments, the overlay server **150** exchanges data with one or more third party systems **140**. For example, the overlay server **150** receives payment information or account information for a user via the overlay extension **114** and communicates the payment information or account information to a corresponding third party system **140** on behalf of the user. This allows the user to make payments or perform other interactions with an account a third party system **140** maintains for the user via the overlay extension **114**, simplifying certain interactions by the user with third party systems **140**. Similarly, the overlay server **150** transmits selections of products received via the overlay extension **114** to a third party system **140** or accesses content a third party system **140** associates with the user in various embodiments.

[0047] FIG. **2** is a block diagram of one embodiment of a client device **100** on which a browser **110** including an overlay extension **114** executes. In some embodiments, the client device **100** is configured to operate or to process computer-executable instructions providing the functionality further described above in conjunction with FIG. **1**. Further, in some embodiments, the client device **100** is configured to operate and/or display information within one or more graphical user interfaces (e.g., GUIs) integrated with or coupled to the client device **100**.

[0048] In some embodiments, the client device **100** comprises one or more processors **205**. In some embodiments, at least one processor **205** resides in, or is coupled to, one or more servers coupled to the client device **100** via the network **120**. In some embodiments, the client device **100** includes a network interface **210** and an application interface **215** coupled to the least one processor **205** capable of processing at least one operating system **220**. Further, in some embodiments, the network interface **210** and the application interface **215** coupled to at least one processor **205** are configured to process one or more applications **225**, such as the browser **110** further described above in conjunction with FIG. **1**. One or more applications **225** may include server-based software that the client device **100** obtains via the network interface **210** and the network **120** for execution by a processor **205**. In some embodiments, an application **225** is configured to host at least one user account or at least one client account, or are configured to transfer data between one or more of these accounts using one or more processors **205**.

[0049] The client device **100** executes various computer-implemented program steps involving data

stored on one or more non-transitory computer readable storage media according to some embodiments. For example, computer-readable instructions for executing the overlay extension **114**, as well as to provide other functionality described herein, are stored in computer-readable storage media within the client device **100** or stored in computer-readable storage media coupled to the client device **100** according to some embodiments. In some embodiments, the client device **100** comprises at least one computer readable storage medium **245** coupled to at least one of at least one data source **230**, at least one data storage device **235**, and/or at least one input/output (I/O) device **240**. In some embodiments, the computer readable storage medium **245** includes any type of data storage that stores data, which is configured to thereafter be read by a computing device (such as client device **100**). In some embodiments, the non-transitory computer readable storage medium **245** includes any physical or material medium used to tangibly store the desired information, steps, and/or instructions and which is configured to be accessed by the processor **205**. In some embodiments, the non-transitory computer readable storage medium **245** includes hard drives, network attached storage (NAS), read-only memory, random-access memory, FLASH-based memory, CD-ROMs, CD-Rs, CD-RWs, DVDs, magnetic tapes, and/or other optical and non-optical data storage. In some embodiments, one or more applications **225** are configured to send and receive data from a database (e.g., from a computer readable storage medium **245** including one or more data sources **230** and data storage comprising a database), and data is configured to be received by an application **225** from at least one other source. In some embodiments, at least one application **225** (e.g., the browser **110**) is configured to be implemented by the client device **100** to output data to at least one user via at least one graphical user interface rendered on at least one display device comprising an I/O device **240**. For example, an application **225** comprises a browser **110** that receives web pages and renders the web pages for display via a display device.

[0050] In some embodiments, the one or more non-transitory computer readable storage media are distributed over the network via the network interface **210**, so the non-transitory computer readable storage media are stored and executed in a distributed fashion. For example, in some embodiments, one or more components of the client device **100** are configured to send or receive data through the network **120**, as further described above in conjunction with FIG. **1**.

[0051] FIG. **3** illustrates a flowchart of a method for a client device rendering overlay content on video data from a content provider system presented by the client device, in accordance with one or more embodiments. Alternative embodiments may include more, fewer, or different steps from those illustrated in FIG. **3**, and the steps may be performed in a different order from that illustrated in FIG. **3**. These steps may be performed by the overlay extension **114**, or by another component, in various embodiments. Additionally, each of these steps may be performed automatically by the overlay extension **114** without human intervention.

[0052] A browser **110** executing on a client device **100** includes an overlay extension **114**, as further described above in conjunction with FIG. **1**. When the browser **110** operates on the client device **100**, the browser **110** obtains web pages from one or more content provider systems **130** or third party systems **140** and renders content from a web page for display in a portion of a display device of the client device **100**. The overlay extension **114** captures **305** interactions with the browser **110** by the user and by one or more other systems. An interaction with the browser **110** includes web pages or other content received by the browser **110** from a content provider system **130** or from a third party system **140**. Additional examples of interactions with the browser **110** include inputs the browser **110** receives from the user or inputs, or inputs the browser **110** receives one or more other applications executing on the client device **100**. In various embodiments, the overlay extension **114** passively captures **305** and logs interactions with the browser **110** while the browser **110** operates on the client device **100**. The overlay extension **114** may maintain a log of captured interactions in various embodiments.

[0053] For example, the overlay extension **114** captures **305** web page identifiers, such as universal resource indicators (URIs), of web pages obtained by the browser **110**. Additionally, the overlay

extension **114** captures **305** a browser history of web pages previously obtained by the browser **110**. Other interactions with the browser **110** captured **305** by the overlay extension **114** include: web services accessed by the browser **110**, information about the dynamic object model (DOM) of the browser **110**, one or more settings of the browser **110**, a geographic location of the client device **100**, modifications or customizations to the browser **110** by a user, and content (e.g., video data) included in the web page currently rendered by the browser **110**. Different or additional interactions with the browser **110** may be captured by the overlay extension **114** in various embodiments. The overlay extension **114** may transmit at least a subset of captured interactions to the overlay server **150** in various embodiments.

[0054] Based on the captured interactions, the overlay extension **114** detects **310** video data within a web page rendered by the browser **110**. In various embodiments, the overlay extension **114** determines whether the web page rendered by the browser **110** identifies video data for presentation based on data in the web page. In response to detecting **310** video data within the web page rendered by the browser **110**, the overlay extension transmits **315** metadata identifying the video data to the overlay server **150** via the network **120**. The metadata identifying the detected video data includes a web page identifier (e.g., a URI) of the web page rendered by the browser **110** and an identifier of the video data detected **310** with in the web page. Additional information is included in the metadata in various embodiments. For example, the metadata includes at least a subset of the interactions with the browser **110** captured by the overlay extension **114**. As an example, the metadata includes a browser history of web pages previously rendered by the browser **110** and a location of the client device **100** along with the web page identifier and an identifier of the video data. In some embodiments, the metadata includes one or more settings of the browser **110** or of the video player **112** included in the browser **110**. Various subsets of the interactions with the browser captured **305** by the overlay extension **114** may be included in the metadata describing the detected video data in different embodiments.

[0055] In response to receiving the metadata identifying the detected video data from the overlay extension **114**, the overlay server **150** selects overlay content based on the metadata received from the overlay extension **114**. The overlay server **150** obtains data from one or more third party systems **140** and maintains sets of overlay content based on the obtained data. For example, a third party system **140** offers products or services for acquisition, and the overlay server **150** obtains a product catalog identifying attributes of various products or services offered by the third party system **140**. Attributes of a product or service include an available inventory by the overlay server **150**, pricing information, descriptive information, fulfillment information, or other information maintained by the third party system **140** for a product or service. As another example, the overlay server **150** obtains a set of questions from a third party system **140**, with one or more of the questions corresponding to one or more events or subjects in video data. In some embodiments, the overlay server **150** locally generates one or more sets of overlay data, such as one or more sets of questions. For example, the overlay server **150** generates and updates one or more questions based on video data or identifies products associated with the video data. The overlay server **150** may dynamically configure and arrange portions of overlay data, such as questions or identifiers of products or services. Alternatively, a third party system **140** locally generates a set of overlay content and transmits the overlay content generated by the third party system **140** to the overlay server **150**, which maintains the overlay content received from the third party system **140**.

[0056] The overlay server **150** associates sets of overlay content with a combination of metadata identifying video data and a web page identifier (e.g., a uniform resource indicator of a web page). Different sets of overlay content is associated with different combinations of metadata identifying video data and a web page identifier in various embodiments. In some embodiments, multiple sets of overlay content may be associated with a combination of metadata identifying video data and a web page identifier. Further, the overlay server **150** may associate overlay content with a combination of metadata identifying video data. This allows different portions of the metadata

identifying video data to affect overlay content selected by the overlay server **150**. For example, metadata identifying video data includes an identifier of the video data, a web page identifier, a browsing history from a browser **110** rendering the web page identifier, and one or more settings of the browser **110** rendering the web page. However, different or additional metadata may be associated with a set of overlay content in various embodiments.

[0057] Based on the metadata identifying the detected video data received from the overlay extension **114**, the overlay server **150** selects a set of overlay content. In various embodiments, the overlay server **150** selects a set of overlay content that the overlay server **150** associated with a web page identifier and metadata identifying the video data received from the overlay extension **114**. Selecting the overlay content using the received metadata identifying the detected video data tailors the set of overlay content to a particular browser **110** by accounting for interactions with the browser **110** included in the metadata. For example, a history of web pages rendered by the browser **110** may be leveraged to select overlay content matching, or similar to, content in web pages previously rendered by the browser **110**. As an example, the overlay server **150** selects a set of overlay content associated with a web page identifier in the received metadata, associated with an identifier of the video data in the received metadata, and associated with a browsing history that at least partially matches a browsing history included in the received metadata.

[0058] Additionally, the video data detected **310** by the overlay extension **114** may be used when selecting the set of overlay content. For example, the overlay server **150** maintains associations between identifiers of video data and sets of overlay content. Such an association may be received from a third party system **140** or from a content provider system **130** to specify a specific set of overlay content for particular video data or for a combination of web page identifier and the particular video data. Alternatively, the overlay server **150** determines an association between a set of overlay content and an identifier of video data or a combination of the identifier of video data and a web page identifier (or a set of overlay content and a combination of metadata). Further, selecting a set of overlay content based on a combination of interactions with the browser **110** captured **305** by the overlay extension **114** and with an identifier of the video data allows the overlay server **150** to select overlay content based on content of the video that is also personalized based on interactions with the browser **110**, such as web pages previously rendered by the browser **110**, increasing a relevance of the overlay content to a user of the browser **110**.

[0059] In some embodiments, the overlay server **150** dynamically generates overlay content based on information obtained from another client device **100** or from a third party system **140** and based on the metadata. For example, the overlay server **150** obtains content items (e.g., questions, descriptions of products, etc.) from another client device **100** or from a third party system **140** and selects a set of the content items for overlay content based on characteristics of the content item and the metadata. For example, the overlay server **150** generates overlay content as content items having at least a threshold measure of similarity to the video data identified by the metadata (e.g., based on comparison of characteristics of the video data to characteristics of different content items, based on measures of similarity between embeddings for the content items and an embedding for the video data, etc.). The overlay server **150** accounts for attributes of the user of the client device **100** when generating overlay content in some embodiments. For example, the overlay server **150** leverages a browser history included in the metadata to infer preferences or likelihood of interaction with content items of a user and selects one or more content items for overlay content based on the preferences or likelihoods of interaction by the user. In various embodiments, the overlay server **150** leverages content of the video data identified by the metadata as well as characteristics of a user of the client device **100** to select overlay content. For example, the overlay server **150** selects a set of candidate content items based on the video data identified by the metadata and determines probabilities of the user interacting with each candidate content item based on attributes of the user from the metadata and characteristics of each candidate content item. Based on the determined probabilities, the overlay server **150** selects a set of candidate content

items as overlay content. For example, the overlay server **150** ranks candidate content items based on their determined probabilities and selects candidate content items having at least a threshold position in the ranking as overlay content. In another embodiment, the overlay server **150** selects candidate content items having at least a threshold probability.

[0060] The overlay server **150** may account for additional information from a third party system **140** about content items obtained from a third party system **140** when selecting overlay content. For example, a third party system **140** provides content items and information about prior interactions with content items the third party system **140** received from users. The overlay server **150** selects one or more content items from the third party system **140** for overlay content based on the prior interactions from the third party system **140**. For example, the third party system **140** specifies a frequency with which users previously interacted with one or more content items when presented by the third party system **140**, and the overlay server **150** selects one or more content items for overlay content based on the frequencies (e.g., selects content items having at least a threshold position in a ranking based on frequencies of interaction, selects content items having at least a threshold frequency of interaction, etc.). Alternatively, the overlay server **150** determines a frequency of interaction with content items previously presented as overlay content based on information from one or more overlay extensions **114** and uses the determined frequency of interaction to select content items for overlay content, as further described above. The overlay server **150** may also account for a frequency of interaction with video data identified by the metadata when selecting overlay content. For example, the overlay server **150** selects content items having higher frequencies of interaction for video data having a higher frequency of interaction (e.g., videos data viewed by a greater number of users, etc.). In some embodiments, the overlay extension **114** selects specific overlay content received from the overlay server **150** using the information described above for the overlay server **150** to select overlay content.

[0061] Additionally, the metadata may identify a user of the overlay server **150** to whom the video data was rendered. The overlay server **150** may use stored associations between the user and one or more accounts maintained by one or more third party systems **140** to select overlay content for the user, allowing the overlay server **150** to leverage information that one or more third party systems **140** maintain for the user or for the video data to select overlay content for the video data. For example, the overlay server **150** maintains authentication information for the user to access one or more third party systems **140** in response to receiving authorization from the user. The overlay server **150** stores combinations of authentication information and third party systems **140** in association with a user identifier maintained by the overlay server **150**. Received metadata includes the user identifier maintained by the overlay server **150**, enabling the overlay server **150** to access one or more of the third party systems **140** on behalf of the user and to leverage information the third party system **140** maintains for the user. For example, a third party system **140** associates specific content with the user based on prior interactions by the user with the third party system **140** (e.g., prior products obtained by the user, prior products the user selected or interact with, etc.) and transmits overlay content to the overlay system **150** for the user. Leveraging such information maintained by one or more third party systems that the user has authorized the overlay server to access enables the overlay server to provide more personalized overlay content to a particular user.

[0062] As another example, the metadata includes a geographic location of the client device **100**, and the overlay server **150** selects a set of overlay content based at least in part on the geographic location. For example, the overlay server **150** selects a set of overlay content associated with a web page identifier, metadata identifying the video data received from the overlay extension **114**, and metadata identifying the geographic location of the client device **100**. In another example, the overlay server **150** filters sets of overlay content to remove one or more sets of overlay content indicated as being unable to be presented in the geographic location identified by the metadata. The overlay server **150** subsequently selects a set of overlay content from the filtered sets of overlay content, allowing the geographic location of the client device **100** to at least partially determine the

overlay content selected by the overlay server **150**.

[0063] Further, in various embodiments, the overlay server **150** selects overlay content in response to receiving a specific input from a third party system **140** or from a client device **100**. For example, a creator for whom video data is captured and transmitted by a content provider system **130** transmits a specific input to the overlay server **150** through a client device **100** used by the creator or by a third party system **140**. The specific input identifies video data and overlay content for the video data. Subsequently, the overlay server **150** selects the overlay content identified by the specific input for metadata identifying the video data from the specific input, allowing a creator or a third party system **140** to initiate presentation of particular overlay content for video data. For example, a creator included in video data rendered by the video player **112** transmits a specific instruction to the overlay server **150** to select overlay content including an auction for or product identifiers for one or more items (e.g., items included in the video data or associated with the video data) or including one or more specific questions about the video data in response to receiving metadata from a client device **100** that identifies the video data.

[0064] For example, a set of overlay content comprises a chaser game that is a skill-based interaction involving a competition of questions that are displayed in overlay content by the overlay extension **114**. The overlay server **150** selects the chaser game based on the received metadata identifying the video data. In some embodiments, the set of overlay content displays one or more questions of the chaser game before an event occurs in the video data (e.g., before a particular event begins in the video data). The overlay server **150** maintains or obtains different sets of questions for different video data, with questions of a set customized for content of particular video data, such as for a particular event shown in the video data. The selected set of overlay content may include multiple subsets of questions, with different subsets of questions corresponding to different events in the video data (or corresponding to different times in the video data), so the overlay extension **114** presents different subsets of questions based on events occurring in the video data or based on a time elapsed by the video data). Partitioning the set of overlay content into subsets of questions may be based on a type of content included in the video data, which may be identified in the metadata received from the overlay extension **114**. The overlay server **150** may transmit multiple subsets of overlay data to the overlay extension **114**, which locally selects which subset of overlay data to render based on the video data. Alternatively, the overlay server **150** transmits different subsets of overlay data to the overlay extension **114** at different times based on events or other content in the video data based on metadata received from the overlay extension **114** identifying the video data at different times.

[0065] In some embodiments, the overlay content includes instructions for the overlay extension **114** to display an indication of a correct or incorrect answer to a question in a portion of the overlay content, providing a user with feedback about responses to the questions. For example, the overlay extension **114** displays a specific interface element in the overlay content in response to determining an answer previously received from the user to a question presented by the overlay content was incorrect (or in response to receiving an indication from the overlay server **150** that the answer previously received from the user to the question presented by the overlay content was incorrect). In some embodiments, the overlay content prevents a user from answering all questions of the set at the same time. Further, the set of questions may be dynamically modified based on one or more events detected within the video data and identified by the overlay extension **114** or by the overlay server **150**. For example, the overlay server **150** (or the overlay extension **114**) increases question difficulty over time, presents questions that are specific or nuanced to events occurring in the video data (e.g., specific events, specific patterns of movement, etc.), presents questions including trivia that may or may not be related to events in the video data, or performs other actions to modify questions presented by the overlay content over time. Additionally, the set of overlay content transmitted to the overlay extension **114** includes rules for users to answer questions in the overlay content, timing information for answering questions in the overlay content, as well as other

information used by the overlay extension **114** to present the overlay content and manage interaction by users with the overlay content.

[0066] In various embodiments, such a chaser game comprising overlay content including one or more expert users, called "chasers." A chaser may be a skilled user with experience or familiarity with one or more events presented by the video data. In some embodiments, a skilled user is a user having a percentage of winning the chaser game equaling or exceeding a threshold percentage. In response to the overlay server **150** selecting a set of overlay content comprising a chaser game, the overlay content displays questions to multiple users who are viewing the video data identified by the received metadata, with the overlay content presenting a common set of questions to chasers and to other users. The overlay server **150** receives answers to questions presented via overlay content from chasers and users and generates a score for the users and for the chasers. The overlay server **150** may reduce a score for a chaser by a handicap in some embodiments. In some embodiments, a user is "ahead" of a chaser when the user has a score greater than the chaser's score.

[0067] The set of overlay content may display one or more answers to the overlay server **150** received from one or more chasers to at least a portion of the other users (e.g., users accessing the video data via a particular web page, users accessing the video data from a client device **100** having a particular geographic location) before the overlay server **150** generates scores for users based on answers to the questions received from the users. For example, the overlay server **150** transmits overlay content to the overlay extension **114** including answers received from one or more chasers to other users after an event in the video data concludes, but before the overlay server **150** evaluates answers from the users. The overlay server **150** and the overlay extension **114** communicate with each other to manage delays in different client devices **100** receiving the video data to prevent different client devices from displaying overlay content before other client devices **100** that received the overlay content render the overlay content when overlay content includes one or more questions relating to portions of the video data.

[0068] In some embodiments, the overlay server **150** receives answers to the questions presented as overlay content from various users via the overlay extension **114** and determines a winner of the chaser game as a user having a score based on their answers that was greater than a score for one or more chasers for a maximum amount of time. If multiple users had scores greater than a score for one or more chasers for a common amount of time, the overlay server **150** identifies each of the multiple users as winners. The overlay server **150** may obtain compensation from one or more users participating in the chase game in some embodiments. FIGS. **4-8** illustrate examples of overlay content for presentation as part of a chaser game.

[0069] As another example, overlay content includes information about one or more products or services. The products or services may be included in the video data or may be associated with the video data by the overlay server **150** or by a third party system **140**. In various embodiments, overlay content includes product identifiers for various products or services, with a product identifier including one or more attributes of the product. A product identifier includes one or more interface elements in various embodiments. An interface element may retrieve additional information about a product when selected by a user in some embodiments. Alternatively, an interface element transmits an instruction to include the product corresponding to the product identifier in an order for the user to a third party system **140** or to the overlay server **150**. In another example, an interface element transmits a bid amount for the product corresponding to the product identifier in an order for the user to a third party system **140** or to the overlay server **150**.

[0070] In some embodiments, the overlay extension applies one or more machine learning models to the video data to identify one or more products in the video data. Subsequently, the overlay extension **114** selects a portion of overlay content received from the overlay server **150** corresponding to the identified one or more products for rendering, as further described below. This allows the overlay extension **114** to dynamically select portions of overlay content to render based

on content of the video data.

[0071] The overlay extension **114** receives **320** the overlay content selected by the overlay server **150** and obtains **325** one or more settings of the video player **112** of the browser **110**. Example settings of the video player **112** obtained **325** by the overlay extension **114** include a size of the video player **112** within the browser **110**, a resolution of video data presented by the video player **112**, or other settings affecting display of video data by the video player **112**. Based on one or more settings of the video player **112** and the overlay content, the overlay extension **114** renders **330** one or more portions of the overlay content in one or more portions of the video player **112**. The overlay extension **114** renders **330** the one or more portions of the overlay content while the video player is rendered in the video player **112**. Hence, the overlay content and the video data are visible in the video player **112** in various embodiments. Alternatively, the overlay extension **114** renders **330** the overlay content proximate to the video player **112** within the browser **110**. The overlay content may include images, text, animations, video, interactive buttons or other interactive interface elements, or other computer-generated content.

[0072] Accounting for one or more settings of the video player **112** when rendering **330** the overlay content allows the overlay extension **114** to customize or to modify the overlay content as one or more settings of the video player **112** are modified. For example, a change in one or more dimensions of the video player **112** or a change in one or more dimensions of a display region including the browser **110** causes the overlay extension **114** to modify the overlay content. Similarly, modifications to one or more of: a resolution of video displayed by the video player **112**, a type of the video data rendered by the video player **112**, a scale of the video player **112**, or other setting of the video player **112** affects rendering **330** of the overlay content by the overlay extension **114**. Other interactions with the browser **110** or information about the browser **110** (e.g., a type of the browser **110**, a location of the client device **100**) determine rendering of the overlay content on one or more portions of the video data. This allows the overlay extension **114** to render the overlay content in one or more portions of the video player **112** that are additive and not intrusive to the video data for the user. In response to the overlay extension **114** detecting one or more changes to one or more settings of the video player **112** or one or more settings of the browser **110**, the overlay extension **114** modifies rendering of the overlay content in the video player **112** based on the one or more changed settings.

[0073] In various embodiments, the overlay extension **114** dynamically renders **330** one or more portions of the overlay content on one or more portions of the video data as the video player **112** renders the video data, so different overlay content may be rendered at different times within the video data. For example, the overlay content includes timing information for different portions of the overlay content, with the timing information specifying times within the video data when different portions of the overlay content is rendered **330** by the overlay extension **114**. As another example, the overlay content includes associations between different portions of overlay content and events or objects in the video data; the overlay extension **114** applies one or more machine learning models to the video data to detect events or objects in the video data and renders **330** portions of the overlay content corresponding to detected events or objects in the video data. Alternatively or additionally, the overlay extension **114** modifies or updates the overlay content based on user interactions with the browser **110** or based on other detected conditions by the overlay extension **114**.

[0074] In some embodiments, the overlay extension **114** captures an interaction with the browser that modifies one or more settings of the video player **112**, and the overlay extension **114** modifies the overlay content based on the one or more modified settings of the video player **112**. For example, the user of the client device **100** (or the client device **100**) resizes the video player **112**, and the overlay extension **114** modifies one or more dimensions of the overlay content and a position of the overlay content within the video player **112** so the overlay content does not obscure additional portions of the video data in the resized video player **112**. As another example, a setting

of the video player **112** is modified to change a resolution of video data rendered in the video player **112**, so the overlay extension **114** modifies a resolution of the overlay content based on the changed resolution of the video player (e.g., modifies the resolution of the overlay content to match the changed resolution of the video data rendered in the video player **112**). Similarly, modifications to one or more browser settings captured by the overlay extension **114** cause the overlay extension **114** to modify the overlay content. For example, changing dimensions of a display area (e.g., a window) in which the browser **110** is displayed affects the sizing of the video player **112**, so the overlay extension **114** resizes and repositions the overlay content within the video player **112** based on the updated sizing of the video player **112**. The overlay extension **114** modifies the overlay content in response to capturing modifications to one or more other settings of the video player **112** or to capturing modifications to one or more other browser settings in various embodiments.

[0075] While rendering **330** the overlay content in one or more portions of the video player **112**, the overlay extension **114** detects **335** an interaction with a portion of the overlay content and transmits **340** information describing the interaction with the portion of the overlay content to the overlay server **150**. For example, the overlay extension **114** detects **335** an interaction by the user with an interface element (e.g., a link, a button, a slider, etc.) included in the overlay content and transmits **340** a description of the interaction and an identifier of the interface element to the overlay server **150**. Oher information describing the interaction may be transmitted **340**, such as a time when the interaction was detected,

[0076] In various embodiments, the overlay server **150** performs one or more actions in response to receiving the information describing the detected interaction. For example, the overlay server **150** selects additional overlay content based on the detected interaction and transmits the additional overlay content to the overlay extension **114**, which renders **330** the additional overlay content in conjunction with the video data. The additional overlay content may replace a portion of the previously rendered overlay content in the video player **112** or may be rendered **330** in addition to the previously rendered overlay content. For example, in response to the detected interaction comprising receiving an answer to a question presented by the overlay content, the overlay server **150** determines an indication whether the received answer is correct and transmits the determined indication to the overlay extension **114** for presentation via overlay content. As another example, the detected interaction is a request for information, and the overlay server **150** transmits information corresponding to the request to the overlay extension **114** for presentation as overlay content.

[0077] As another example, the overlay content rendered **330** by the overlay extension **114** includes one or more product identifiers and associated interface elements. The overlay extension **114** transmits **340** information identifying a product identifier associated with an interface element that the user selected (and identifying the interface element the user selected in some embodiments). The overlay server **150** includes the product corresponding to the identified product identifier in an order for the user in response to receiving the information identifying the product identifier and the selected interface element. As another example, the overlay server **150** associates a bid for the product corresponding to the identified product identifier in response to receiving the information identifying the product identifier and the selected interface element. The overlay server **150** may transmit the information describing the interaction with the portion of the overlay content to a third party system **140**, which performs an action based on the information describing the interaction with the portion of the overlay content. For example, a third party system **140** offering the product includes the product in an order or associates a bid from the user with the product in response to receiving the information describing the interaction with the portion of the overlay content from the overlay server **150**.

[0078] In other embodiments, the overlay extension **114** transmits **340** information describing the interaction with the portion of the overlay content to a third party system **140** rather than to the overlay server **150**. The overlay content includes instructions for whether to transmit **340**

information describing one or more detected interactions to the overlay server **150** or to a third party system **140**. The instructions may specify transmission of a set of interactions or interactions with a set of portions of overlay content to a third party system **140** identified by the instructions and specify transmission of an alternative set of interactions or interactions with an alternative set of portions of overlay content to the overlay server **150**. This allows the overlay extension **114** to transmit **340** information describing detected interactions with one or more portions of the overlay content to the overlay server **150** or to a third party system **140**.

[0079] FIG. **4** illustrates an example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **400** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **405**A, **405**B (also referred to individually and collectively using reference number **405**) from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **4**, the overlay content **405** displays information for an interactive game based on the content of the video data **400**. The overlay content **405**B in the example of FIG. **4** displays one or more predictive questions based on the video data. The overlay content **405**A in the example of FIG. **4** includes an analytics portion **410** presenting statistics obtained from analysis of the video data **400** (e.g., analysis of a competitive event shown by the video data **400**). As shown in FIG. **4**, the overlay extension **114** is configured to position the overlay content **405** in the video player **112** to prevent the overlay content **405** from obscuring one or more portions of the video data **400**. For example, the overlay extension **114** renders the overlay content **405**B in a position of the video player **112** that does not obscure the video data portion **402** of the video data **400**, or other portions of the video data **400**.

[0080] FIG. **5** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **400** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **405**A, **405**B (also referred to individually and collectively using reference number **405**) from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **5**, the overlay content **405** displays information for an interactive game based on the content of the video data **400**, including analytics based on the video data **400** in overlay content **405**A and one or more questions based on the video data **400** in overlay content **405**B. Further, in the example of FIG. **5**, the overlay extension **1140** renders additional overlay content **500** in another portion of the video data **400**. The additional overlay content **500** in FIG. **5** comprises a subset of information about a user viewing the video data **400** maintained by or obtained by the overlay server **150**. For example, the overlay server **150** maintains a digital "wallet" that securely stores user information such as payments, accounts, passwords, and answer history and/or results. In some embodiments, the digital wallet is configured to communicate with one or more third party systems **140** to enable electronic debits and credits to a user's account associated with the overlay server **150**. In some embodiments, the digital wallet can integrate with various third-party applications accessible via the browser **110** through the overlay extension **114**. In some embodiments, the additional overlay content **500** is rendered in response to the overlay extension **114** receiving an interaction with a portion of overlay content **405**A or with a portion of overlay content **405**B. Similarly, in response to receiving an alternative interaction with the portion of overlay content **405**A or the portion of overlay content **405**B, the overlay extension **114** stops rendering the additional overlay content **500**. In other embodiments, the overlay extension **114** stops rendering the additional overlay content **500** in response to receiving an interaction with a portion of the additional overlay content **500**.

[0081] FIG. **6** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1**

and **3**, a browser **110** executing on a client device **100** renders video data **400** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **405**A, **405**B (also referred to individually and collectively using reference number **405**) from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **6**, the overlay content **405** displays information for an interactive game based on the content of the video data **400**, including analytics based on the video data **400** in overlay content **405**A and one or more questions based on the video data **400** in overlay content **405**B. Additionally, in the example of FIG. **6**, the overlay extension **114** renders additional overlay content **600** in another portion of the video player **112**. The additional overlay content **600** in FIG. **6** displays data relating to a status of one or more portions of the overlay content **405**A. For example, the overlay content **405**A presents questions based on the video data **400**, and the additional overlay content **600** displays information about answers to questions obtained by the overlay server **150** or by the overlay extension **114**. In some embodiments, the additional overlay content **600** displays statistical representations of the answers the overlay server **150** or the overlay extension **114** received for questions presented in the overlay content **405**B. In some embodiments, the additional overlay content **600** is rendered in response to the overlay extension **114** receiving an interaction with a portion of overlay content **405**A or a portion of overlay content **405**B. Similarly, in response to receiving an alternative interaction with the portion of overlay content **405**A or the portion overlay content **405**B, the overlay extension **114** stops rendering the additional overlay content **600**. In other embodiments, the overlay extension **114** stops rendering the additional overlay content **600** in response to receiving an interaction with a portion of the additional overlay content **600**.

[0082] FIG. **7** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **400** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **405**A, **405**B (also referred to individually and collectively using reference number **405**) from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **7**, the overlay content **405** displays information for an interactive game based on the content of the video data **400**, including analytics based on the video data **400** in overlay content **405**A and one or more questions based on the video data **400** in overlay content **405**B. Additionally, in the example of FIG. **7**, the overlay extension **114** renders additional overlay content **700** in another portion of the video data **400**.

[0083] In various embodiments, the overlay content **405**A or the overlay content **405**B displays questions or other interactive elements that a user viewing the video data **400** may interact with by providing answers or other input via interaction with the overlay content **405**A or with the overlay content **405**B. Interactions with the overlay content **405**A or with the overlay content **405**B accumulate points for the user at the overlay server **150**. The points may correspond to monetary values or some other form of compensation. The additional overlay content **700** enables a user to redeem points accumulated through the overlay server **150**, displays live balance updating of points accumulated by the user, or displays a leaderboard of users based on their accumulated points. In some embodiments, the additional overlay content **700** is rendered in response to the overlay extension **114** receiving an interaction with a portion of overlay content **405**A or with a portion of overlay content **405**B. Alternatively, the overlay extension **114** receives an instruction to display the additional overlay content **700** in response to the overlay server **150** determining information maintained for the user satisfies one or more criteria (e.g., the overlay server **150** maintains at least a threshold amount of points for the user based on answers received from the user to questions included in the overlay content **405**B). Similarly, in response to receiving an alternative interaction with the portion of overlay content **405**A or the portion overlay content **405**B, the overlay extension **114** stops rendering the additional overlay content **700**. In other embodiments, the

overlay extension **1140** stops rendering the additional overlay content **700** in response to receiving an interaction with a portion of the additional overlay content **700**.

[0084] FIG. **8** illustrates examples of overlay content for a chaser game that may be overlaid on video data by an overlay extension **114**. As further described above in conjunction with FIG. **3**, overlay content may comprise a chaser game, with portions of overlay content including questions for a user to whom the overlay content is presented providing answers to the questions by interacting with the overlay content. One or more portions of the overlay content may identify a user's relative performance in the chaser game. For example, a status view **800** included in the overlay content depicts user identifiers of different users in a relative order based on the number of points accumulated from answering questions via the overlay content. The status view **800** includes a position view **805** in various embodiments, with the position view **805** displaying a user identifier **810**, such as an avatar, of a user in a relative position to user identifiers of one or more other users. A distance between the user identifier **810** and another user identifier in the position view **805** is directly related to a difference in points maintained by the overlay server **150** for the users corresponding to the user identifiers, so a greater distance between user identifier **810** in the position view **805** indicates a larger difference between points maintained by the overlay server **150** for the corresponding users and vice versa.

[0085] Additionally or alternatively, the overlay content includes a leaderboard **815** displaying user identifiers of users in a ranking based on points associated with the users by the overlay server **150**. The leaderboard **815** may identify an amount of points the overlay server **150** associated with a user in conjunction with a user identifier of the user in some embodiments. Additional or alternative information may be displayed in conjunction with user identifier in the leaderboard **815** in various embodiments. In some embodiments, the overlay server **150** allocates rewards to one or more users based on the positions of the one or more users in the leaderboard **815**.

[0086] FIG. **9** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **900** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **905** from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **9**, the overlay content **905** displays product identifiers **915**A, **915**B (also referred to individually and collectively using reference number **915**). A product identifier **915** may include a description of a product, as well as one or more interface elements for purchasing the product or for placing a bid for a product. For example, a product identifier **915** includes an interface element for a user to place a bid for obtaining a product identified by the product identifier **915**. In other embodiments, receiving a selection of an interface element in a product identifier **915** includes a product offered by a third party system **140** in an order for the user. As further described above in conjunction with FIGS. **1** and **3**, the overlay extension **114** positions the overlay content **905** in a video player **112** of a browser so the video data **900** is not obscured, or is minimally obscured, by the overlay content **905**.

[0087] FIG. **10** is an example of an order summary capable of being presented as overlay content by the overlay extension **114**. The order summary **1000** includes one or more products previously selected by a user via interaction with the overlay content rendered by the overlay extension **114** (or through interactions with a third party system **140**). The overlay extension **114** displays the order summary **1000** as a portion of overlay content, and may display the order summary **1000** in response to detecting a specific interaction by the user, such as a selection of a specific element of the overlay content.

[0088] FIG. **11** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **1100** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110**

obtains overlay content **1105** from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **11**, the overlay content **1105** displays product identifiers for one or more products available from a third party system **140**. Interaction with a product identifier in the overlay content **1105** includes a corresponding product in an order or places a bid for a corresponding product.

[0089] In the example of FIG. **11**, the overlay extension **114** renders additional overlay content **1110** over a portion of the video data **1100**. The additional overlay content **1110** in FIG. **11** presents a maximum bid received by the overlay server **150** for a product, such as for a product corresponding to a product identifier selected by the user via the overlay content **1105**. In various embodiments, the overlay extension **114** displays the additional overlay content **1110** in response to detecting a selection of an interface element in the overlay content **1105**. As another example, the overlay extension **114** displays the additional overlay content **1110** in response to receiving an instruction from the overlay server **150**, such as in response to the overlay server **150** determining a specific condition was satisfied (e.g., an indication the overlay server **150** received an updated bid for a product).

[0090] FIG. **12** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **1200** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **1205** from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **12**, the overlay content **1205** displays product identifiers for one or more products available from a third party system **140**. Interaction with a product identifier in the overlay content **1205** includes a corresponding product in an order, places a bid for a corresponding product, or obtains information about the corresponding product.

[0091] In the example of FIG. **12**, the overlay extension **114** renders additional overlay content **1210** over a portion of the video data **1200**. The additional overlay content **1210** in FIG. **12** presents additional details about a product, such as a product corresponding to a product identifier selected by the user via the overlay content **1205**. In various embodiments, the overlay extension **114** displays the additional overlay content **1210** response to capturing a selection of an interface element in the overlay content **1205**. As another example, the overlay extension **114** displays the additional overlay content **1210** in response to receiving an instruction from the overlay server **150**, which may be received in response to the overlay server **150** determining a specific condition was satisfied (e.g., a product was detected in the video data **1200**).

[0092] FIG. **13** illustrates an additional example interface including overlay content rendered over video data in a video player of a browser. As further described above in conjunction with FIGS. **1** and **3**, a browser **110** executing on a client device **100** renders video data **1300** from a content provider system **130** in a video player **112**. An overlay extension **114** executing in the browser **110** obtains overlay content **1305** from an overlay server **150**, as further described above in conjunction with FIGS. **1** and **3**. In the example of FIG. **13**, the overlay content **1305** displays product identifiers for one or more products available from a third party system **140**. Interaction with a product identifier in the overlay content **1305** includes a corresponding product in an order, places a bid for a corresponding product, or obtains additional information about the corresponding product.

[0093] In the example of FIG. **13**, the overlay extension **114** renders additional overlay content **1310** over a portion of the video data **1300**. The additional overlay content **1310** in FIG. **13** presents order information identifying one or more products for which the overlay server **150** received selections from the overlay extension **114** for inclusion in an order or for which a third party system **140** received selections for inclusion in an order. The overlay extension **114** displays the additional overlay content **1310** comprising the order information in response to capturing a specific interaction by the user, such as a selection of a specific element of the overlay content

1305.

[0094] The foregoing description of the embodiments has been presented for the purpose of illustration; many modifications and variations are possible while remaining within the principles and teachings of the above description.

[0095] Any of the steps, operations, or processes described herein may be performed or implemented with one or more hardware or software modules, alone or in combination with other devices. In some embodiments, a software module is implemented with a computer program product comprising one or more computer-readable media storing computer program code or instructions, which can be executed by a computer processor for performing any or all of the steps, operations, or processes described. In some embodiments, a computer-readable medium comprises one or more computer-readable media that, individually or together, comprise instructions that, when executed by one or more processors, cause the one or more processors to perform, individually or together, the steps of the instructions stored on the one or more computer-readable media. Similarly, a processor comprises one or more processors or processing units that, individually or together, perform the steps of instructions stored on a computer-readable medium.

[0096] Embodiments may also relate to a product that is produced by a computing process described herein. Such a product may store information resulting from a computing process, where the information is stored on a non-transitory, tangible computer-readable medium and may include a computer program product or other data combination described herein.

[0097] The description herein may describe processes and systems that use machine-learning models in the performance of their described functionalities. A "machine-learning model," as used herein, comprises one or more machine-learning models that perform the described functionality. Machine-learning models may be stored on one or more computer-readable media with a set of weights. These weights are parameters used by the machine-learning model to transform input data received by the model into output data. The weights may be generated through a training process, whereby the machine-learning model is trained based on a set of training examples and labels associated with the training examples. The training process may include: applying the machine-learning model to a training example, comparing an output of the machine-learning model to the label associated with the training example, and updating weights associated with the machine-learning model through a back-propagation process. The weights may be stored on one or more computer-readable media, and are used by a system when applying the machine-learning model to new data.

[0098] The language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to narrow the inventive subject matter. It is therefore intended that the scope of the patent rights be limited not by this detailed description, but rather by any claims that issue on an application based hereon.

[0099] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having," or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive "or" and not to an exclusive "or." For example, a condition "A or B" is satisfied by any one of the following: A is true (or present) and B is false (or not present); A is false (or not present) and B is true (or present); and both A and B are true (or present). Similarly, a condition "A, B, or C" is satisfied by any combination of A, B, and C being true (or present). As a non-limiting example, the condition "A, B, or C" is satisfied when A and B are true (or present) and C is false (or not present). Similarly, as another non-limiting example, the condition "A, B, or C" is satisfied when A is true (or present) and B and C are false (or not present).

Claims

1. A method comprising: capturing, by an overlay extension of a browser executing on a client device, interactions with the browser; detecting, by the overlay extension, video data within a web page rendered by the browser based on the captured interactions; transmitting metadata identifying the detected video data from the overlay extension to an overlay server; receiving overlay content from the overlay server, the overlay content selected by the overlay server based on metadata from the overlay extension; obtaining, by the overlay extension, one or more settings of a video player within the browser presenting the video data; and rendering, by the overlay extension, one or more portions of the overlay content in one or more portions of the video player based at least in part on the one or more settings of the video player, the overlay content rendered while the video data is rendered in the video player.

2. The method of claim 1, further comprising: detecting, by the overlay extension, an interaction with a portion of the overlay content; and transmitting information from the overlay extension to the overlay server describing the interaction with the portion of the overlay content.

3. The method of claim 2, further comprising: receiving, at the overlay extension, additional overlay content from the overlay server selected by the overlay server based on the information describing the interaction with the portion of the overlay content; and rendering, by the overlay extension, the additional overlay content in apportion of the video player in conjunction with the video data.

4. The method of claim 1, further comprising: capturing, by the overlay extension, an interaction with the browser modifying one or more settings of the video player; and modifying, by the overlay extension, the overlay content based on the one or more modified settings of the video player.

5. The method of claim 4, wherein the interaction with the browser modifying one or more settings of the video player comprises an interaction modifying one or more dimensions of the video player.

6. The method of claim 4, wherein the interaction with the browser modifying one or more settings of the video player comprises an interaction modifying a resolution with which the video player renders the video data.

7. The method of claim 1, wherein the overlay content comprises one or more questions based on the video data.

8. The method of claim 1, wherein the overlay content comprises product identifiers of one or more products.

9. The method of claim 8, wherein the overlay content further comprises one or more interface elements associated with each product identifier.

10. The method of claim 1, wherein the browser obtains the video data from a content provider system separate from the overlay server.

11. A non-transitory computer readable storage medium having instructions encoded thereon that, when executed by a processor, cause the processor to perform steps comprising: capturing, by an overlay extension of a browser executing on a client device, interactions with the browser; detecting, by the overlay extension, video data within a web page rendered by the browser based on the captured interactions; transmitting metadata identifying the detected video data from the overlay extension to an overlay server; receiving overlay content from the overlay server, the overlay content selected by the overlay server based on metadata from the overlay extension; obtaining, by the overlay extension, one or more settings of a video player within the browser presenting the video data; and rendering, by the overlay extension, one or more portions of the overlay content in one or more portions of the video player based at least in part on the one or more settings of the video player, the overlay content rendered while the video data is rendered in the video player.

12. The non-transitory computer readable storage medium of claim 11, having further instructions

encoded thereon that, when executed by the processor, cause the processor to perform steps comprising: detecting, by the overlay extension, an interaction with a portion of the overlay content; and transmitting information from the overlay extension to the overlay server describing the interaction with the portion of the overlay content.

13. The non-transitory computer readable storage medium of claim 12, having further instructions encoded thereon that, when executed by the processor, cause the processor to perform steps comprising: receiving, at the overlay extension, additional overlay content from the overlay server selected by the overlay server based on the information describing the interaction with the portion of the overlay content; and rendering, by the overlay extension, the additional overlay content in apportion of the video player in conjunction with the video data.

14. The non-transitory computer readable storage medium of claim 11, having further instructions encoded thereon that, when executed by the processor, cause the processor to perform steps comprising: capturing, by the overlay extension, an interaction with the browser modifying one or more settings of the video player; and modifying, by the overlay extension, the overlay content based on the one or more modified settings of the video player.

15. The non-transitory computer readable storage medium of claim 14, wherein the interaction with the browser modifying one or more settings of the video player comprises an interaction modifying one or more dimensions of the video player.

16. The non-transitory computer readable storage medium of claim 14, wherein the interaction with the browser modifying one or more settings of the video player comprises an interaction modifying a resolution with which the video player renders the video data.

17. The non-transitory computer readable storage medium of claim 11, wherein the overlay content comprises one or more questions based on the video data.

18. The non-transitory computer readable storage medium of claim 11, wherein the overlay content comprises product identifiers of one or more products.

19. The non-transitory computer readable storage medium of claim 18, wherein the overlay content further comprises one or more interface elements associated with each product identifier.

20. The non-transitory computer readable storage medium of claim 14, wherein the browser obtains the video data from a content provider system separate from the overlay server.