

# Technical Disclosure Commons

---

Defensive Publications Series

---

January 2020

## On-demand content generation and insertion during content consumption

Victor Carbune

Alex Damian

Follow this and additional works at: [https://www.tdcommons.org/dpubs\\_series](https://www.tdcommons.org/dpubs_series)

---

### Recommended Citation

Carbune, Victor and Damian, Alex, "On-demand content generation and insertion during content consumption", Technical Disclosure Commons, (January 09, 2020)  
[https://www.tdcommons.org/dpubs\\_series/2851](https://www.tdcommons.org/dpubs_series/2851)



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

This Article is brought to you for free and open access by Technical Disclosure Commons. It has been accepted for inclusion in Defensive Publications Series by an authorized administrator of Technical Disclosure Commons.

## **On-demand content generation and insertion during content consumption**

### **ABSTRACT**

Consumers of media content such as audio or video often like some parts of the content more compared to other parts. Currently, a user must accept the choices of the content creators regarding the number of different parts of the content that match the user's preference. This disclosure describes techniques for on-demand generation and/or insertion of media content at the time of media consumption. To this end, users are provided options that can be invoked to generate additional content similar to the content the user is currently consuming.

### **KEYWORDS**

- On-demand content
- Content generation
- Content recommendation
- Generative Adversarial Networks (GAN)
- Video segments
- News snippets

### **BACKGROUND**

Consumers of media content, such as video or audio, often like some parts of the content more compared to other parts. For example, a person watching a superhero movie may be drawn more to the action scenes compared to the rest of the movie. Yet, the number of action scenes in the movie is typically small. The number of such scenes may have been determined based on a projected optimal fit with the viewing preferences of the average viewer. Currently, a user must accept the choices of the content creators, even if the resultant content is a suboptimal match for the user's content consumption preferences.

## DESCRIPTION

This disclosure describes techniques for on-demand generation of media content at the time of media consumption. Such on-demand content generation enables users to request content of their preference to be generated upon request instead of being limited to a fixed amount of preferred content.

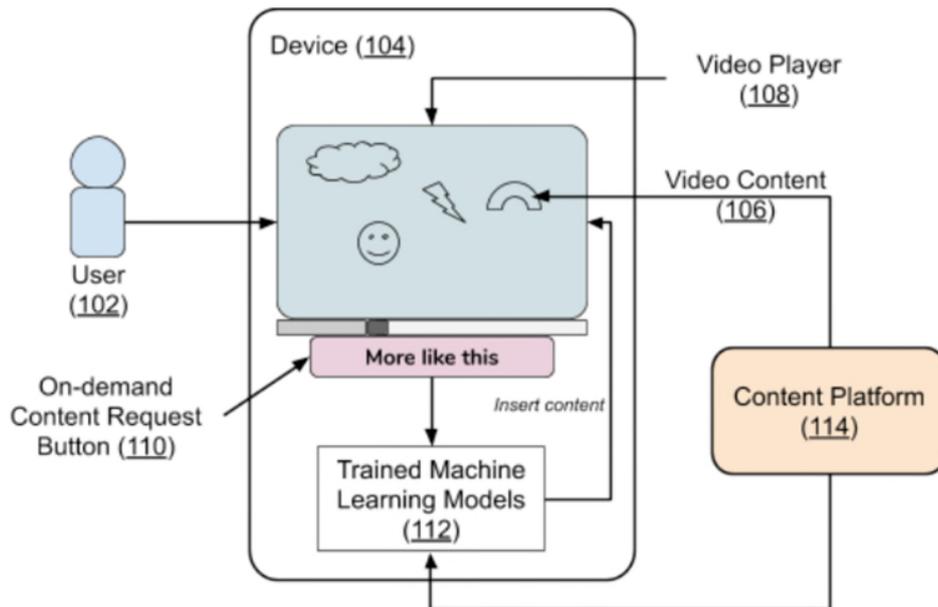
To this end, users are provided an option that can be invoked to generate additional content similar to the content the user is currently consuming. For example, the user can request more content similar to action scenes within a movie, comedy segments within a drama series, etc. The requested content is generated on-demand by a suitable trained machine learning model and inserted during consumption within currently playing content. Such an operation allows the current type of content to be continued longer and avoids the need for the user to switch to a new piece of content after the current content finishes playing. The content generation model can be built by employing a convolutional neural network (CNN) as a building block to create a generative adversarial network (GAN) structure that includes a generator and a discriminator.

In addition to generating the on-demand content, a separate trained machine learning model is used to identify a suitable point within the currently playing content where the generated content can be inserted as well as the length of time for playback of the generated content. The model can be implemented as a simple classifier that indicates whether a given content frame is well-suited for insertion of additional content. The content generation and insertion point detection models can be trained on existing content, such as TV series or videos, with a lot of scenes of similar types. Such an approach involves treating long videos as composed of shorter segments of multiple scene segments, with the segment boundaries indicating opportune places for insertion of generated content.

Pre-existing pieces of content can also be added to the currently playing content. For instance, if existing content matching the user-preferred type of content is available, such content can be chosen and inserted. Similarly, when a user requests content similar to the theme of a short clip, additional clips that match the theme of the current short clip can be appended such that these are shown after the current content finishes playing. Such an operation is particularly applicable to content platforms that contain an extensive collection of short clips of similar types, such as news snippets, comedy segments, etc. Dynamically inserting content in the user's playstream while the user consumes content eliminates the need for the user to indicate content selections to move from one piece of content to another.

The described approach can be further applied to cases where content is available in multiple versions, such as a short and a long version. For instance, news providers often compile daily news from short video clips of major news stories created from respective longer versions of the videos with more details on the corresponding story. In such cases, where a longer version of the currently playing content is available, the user can be shown such content upon expressing interest in the corresponding shorter clip.

Users can access the functionality described above via any type of user interface (UI) elements such as a "continue current scene" button on the content player and/or the remote control, a "more of this" button during relevant scenes in the middle of video content for which similar content is available, an "expand" button available for shorter content clips, a plus (+) symbol to invoke longer versions of the current content, etc. Whenever the user selects the UI element, the corresponding on-demand content is invoked and inserted within the currently playing content. For example, whenever the user taps the plus symbol when viewing a news snippet, the longer version of the new story is shown.



**Fig. 1: Inserting content of similar type within currently playing content**

Fig. 1 illustrates a user (102) watching video content (106) from a content platform (114) within a video player (108) on a device (104). While watching a scene within the video, the user presses the on-demand content request button (110) to indicate that the user wishes to view content similar to the currently playing scene. A set of trained machine learning models (112) are employed to generate similar content and/or retrieve similar content from the content platform (114). The generated and/or retrieved content is inserted within the currently playing content at an appropriate place.

An alternative to the described approach is to use similar content segments that were excluded from the original content (left on the cutting room floor). However, such an approach can result in excessive content of the same type. In contrast, the described techniques utilize user preferences regarding certain types of content, thus providing better information for ranking content recommendations.

The techniques described in this disclosure can be implemented as part of a content player (e.g., a video or audio player), a content hosting service, etc. that enable multimedia content creation as well as consumption. Such multimedia content can include video, audio, or other suitable content. The techniques can also be incorporated within products that provide user-generated multimedia content feeds and stories. In such cases, the techniques can be employed for on-demand dynamic introduction of story content of interest, while keeping the original story focused and coherent.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

## CONCLUSION

This disclosure describes techniques for on-demand generation and/or insertion of media content at the time of media consumption. To this end, users are provided options that can be invoked to generate additional content similar to the content the user is currently consuming. The requested content is generated on-demand by a suitable trained machine learning model or

retrieved from stored content, and is inserted during consumption within the currently playing content. A trained machine learning model is used to identify a suitable point within the currently playing content where the generated content is inserted as well as the length of time for playback of the generated content. The techniques described in this disclosure can be implemented as part of a content player (e.g., a video or audio player), a content hosting service, etc. that enable multimedia content creation as well as consumption. The techniques can also be incorporated within products that provide user-generated multimedia content feeds and stories.