

Privacy Approaches for Internet Video Advertising

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As a result of the disruption of the print advertising business by Internet technologies, as Ad revenues have moved to the web, the massive invasion of privacy known as “consumer tracking” has increased dramatically. A number of corporate entities now quietly but confidently brag that they know more about you than you or your mother ¹. These companies aggressively track consumer activities on the Web and collect private personal attributes into enormous databases where they are indexed and instantly available for use by advertisers. More disconcerting than the accumulation of this private information is the often highly inaccurate information assembled, creating potentially damaging personal images that can be used for covert discrimination in a realm where people spend increasing amounts of time, and where they do more of their daily business.

The impetus for these consumer tracking activities is about to increase dramatically, as the distribution of video moves from cable and broadcast TV to the web. This is a rapidly developing trend as more TVs, game platforms, and media players become web connected ². There will be a much larger disruption than what we have seen in the print space. TV advertising is a \$150 Billion worldwide business supporting multi-trillion dollar value chains. These interests threaten to overwhelm consumer privacy rights. The largely unregulated consumer tracking business that justifies itself as aiding the consumer by enabling more relevant advertising will increase its activities and become even more worrisome unless we can come up with much more effective ways to match Ads to consumer interests without this insidious tracking. We propose ways to do just that for Ad supported Internet Video. We propose technologies that, when properly integrated, provide the following benefits:

1. Scalability and efficiency properties that allow the approach to almost completely displace Ad targeting based on tracking.
2. Advertisers can precisely and more accurately target Ads to consumers
3. Consumers never need to reveal personal information to anyone, and there is no incentive for consumers to be tracked
4. Ad matching is performed using mechanisms that allow for consumer visibility and control
5. The approach is especially well-suited to passive consumer interaction characteristic of TV viewing, but it can be used for more interactive content and Ads, including Ad-funded games and apps.

The technology platform we have designed to enable this, called Tradewind, works as follows: Video content providers package their content in any format but include Ad slots and rules requiring auctions for filling those Ad slots, along with an objective function that is optimized during the auction. The objective function can include many conditions

¹ <http://online.wsj.com/article/SB10001424052748703294904575385532109190198.html>

² <http://www.businessinsider.com/cable-cutting-its-real-and-coming-to-households-near-you-2010-10>

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that disable various types of bidders (such as Ads that have adult content). These providers then distribute their content using any convenient means.

Advertisers package their Ads with rules in a bidding control program that declare under what conditions they will pay different amounts for an Ad impression. The conditions can reference values for consumer's personal metadata attributes, content metadata, and environmental metadata (such as rendering device type, geolocation, time-of-day, etc.). The Ads are then made available on the Internet for discovery by web crawlers.

When a consumer watches a video on a device that is at least intermittently connected to the Internet, the rendering device will encounter the Ad slots, and an auction is held using bids from Ads in the consumer's personalized Ad queue. The metadata values referenced in the bidding control are matched against the consumer's personal attributes stored either in the device or in a cloud-based virtual device controlled by the consumer, and an Ad is selected and rendered. Ad rendering events are periodically reported to a clearing house. The reports include identifiers for the Advertiser and the content providers and anonymous attribute values pertinent to the auctions.

Key to the approach are three processes performed within the consumer's computing domain: 1) Accumulation of consumer attributes, 2) an incognito search for Ads to fill a personalized Ad queue using those attributes for keywords and filters, and 3) the auctions of the Ad slots. For each of these processes our approach uses the concept of a personal agent/broker. A Personal Agent (PA) is an abstraction for an entity that acts in the interest of a person when interacting with various Internet services. A consumer's PA has access to his personal information, but uses that information to search incognito for Ads that will likely be of interest to that consumer. The consumer's information need never be shared with an Advertiser, and is not made available to trackers. When the time comes to display an Ad, the PA selects the best match from the personalized queue at the time the Ad is rendered. The PA's selection takes into account the interests of the consumer, the advertiser, and the content provider, and uses a variety of personal metadata as well as content and environmental metadata (time of day, device type, geolocation, etc.) to match values associated with the Ad provided by the Advertiser. Since this matching is all done privately, in the consumer's computing domain, the use of highly personal information that expresses a consumer's current interests is much more advisable.

The Tradewind platform was developed over the past 2 years by a research team at Intertrust Technologies, and it is scheduled to be deployed in commercial trials in January of 2011. A number of refinements will be required and ultimately we believe that standards will need to be developed in a number of related areas including the embodiment of the PA User Interface that allows a consumer (or consumer advocate) to customize the PA, audit its activities, and influence (within integrity bounds and the interests of all stakeholders) the PA's behavior (for example, forbid certain attributes from being used at all). In addition, while the approach provides explicit protection for

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personal information, we'll need guidelines for a privacy model and a security model that prevents personal information from leaking.