Viewer-Centric Analytics for Display Saturated Environments

Mateusz Mikusz and Nigel Davies
m.mikusz@lancaster.ac.uk, nigel@comp.lancs.ac.uk
Lancaster University, UK

Public displays are becoming widely adopted and have been deployed throughout urban spaces such as train stations, shopping malls, and across city centres. Recent examples including the InLink UK deployment across London and LinkNYC in New York City. These provide a network of around 7,500 public displays that have replaced phone boxes and illustrate the trend towards environments saturated with displays in which public displays are constantly present for passers-by. A key challenge of such deployments lies in understanding the effectiveness and value of both displays and content. In the Web, analytics tools have been developed that support the tracking of users across multiple websites and provide very fine-grained and detailed tracking and insights into the behaviour and navigation patterns of users. This has helped drive up the quality of the user experience in the web. However, no such tools exist for saturated display environments. Existing commercial systems such as video analytics typically only capture insights specific to individual displays such as viewer dwell times, view impressions and audience demographics [1]. However, in saturated display environments viewer-centric analytics are required to understand how viewers interact and engage with both content and displays across multiple locations in order to help with the viewer experience and ultimately improve the value of public displays and content for the passers-by [2]. In essence - what is required is the signage equivalent of click path.

We have begun to address these challenges by investigating and developing novel forms of analytics for the digital signage domain that use viewer mobility data in combination with data captured on the sign (e.g. records of content shown) to create detailed insights into viewer interaction and navigation patterns. Examples of such novel insights include reports on the number of unique viewers who have seen a piece of content across the public display network, and the order and variety of content a viewer experiences. However, the use of viewer mobility data can be considered highly privacy invasive. To address this concern we have developed a *synthetic analytics* approach specifically designed to provide detailed viewer-centric insights without violating viewer privacy [2]. In this approach a set of mobility models representing the typical population of a space are used to generate navigation traces. Using such data as a foundation we are able to produce viewer-centric analytics reports without the requirement to actually track individuals. Our work has been evaluated in the context of the e-Campus display testbed that provides digital signage for an audience in excess of 12,000 people and consists of over 65 displays situated across the Lancaster University campus in departmental buildings, colleges and lecture theatres. Uniquely, this testbed also offers display personalisation via BLE beacons and data from this system enables us to evaluate the use of both synthetic and real mobility traces for future display analytics.

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