

Title: Augmentation Concerns

**Positional paper for the W3C Workshop: Augmented Reality on the Web
June 15 - 16, 2010 Barcelona**

Author: Andrew Braun

(firstname.lastname@sonyericsson.com)

Augmenting the world

If the web's success can be summed up in a word it is augmentation. As we know hypertext is merely a method of connect (hopefully relevant) information. Hypertext augments the existing information with other information. Wikipedia flourishes not just because of its community driven articles but primarily because we are able to augment each article with links to other articles. The meta data explosion was next adding delightful user experiences such album art. Today augmented reality is extending these concepts from the online world to the natural world. The increasing power of smartphones provide an excellent vehicle for displaying existing meta-data associated with the natural world. They also provide the power to further capture information.

While the opportunities in this space are immense, I believe there are a number of complex issues that must be dealt with prior to AR moving from novelty to mainstream. While the idea of augmenting reality is very old today's technologies make it far more compelling. For decades one has been able to go into a zero or museum and listen to an audio recording augmenting the reality. Obviously this augmented reality was a static experience not tailored to the user. Today's AR promises a world of customize experiences. Of course customization is not possible without the use of personal data.

Privacy

Example: *The common location based advertising based augmented reality solution consists of a consumer passing by a shop window or let's say vending machine. The user then receives a customized display. For me the vending machine display Diet Mt. Dew but my neighbor sees Cherry Coke.*

This relatively innocuous behavior represents an incredible privacy challenge. Today many customers gladly give up their spending habits to the local merchants through the use of loyalty cards that provide discounts. Certainly this data could be used to augment the vending machine at the office but should the merchant sell my habits to the high

bidder. This is the first area where the handset can play a major role. In a world of customized augmented reality filtering must take place but where that filtering takes place is debatable. The typical view today would be the AR stream would be filtered at its source. That is the vending machine “recognizes” me as I walk and serves up the appropriate information. I have published my preferences and the system has decided what is appropriate. However the reverse scenario can work equally well. The machine could broadcast its unfiltered stream of augmentation data. The handset could then do the filtering based on its local preference engine. In this way the user's privacy is maintained. The second scenario is certainly less bandwidth and computationally friendly but in a world of ever increasing power this may not be an issue.

Example: *I like computers and beer. AR is being displayed on my tablet computing device. The device receives an augmented reality stream based on the usual factors. However, I may not be comfortable with the broader sharing my stream based on context.*

Today many people segment the social graph whether be through the use of groups or even separate networks. Segmenting your social networks by using Facebook for family, LinkedIn for business and twitter for public domain is not uncommon today. When using AR, how do I maintain the proper contextual basis. Again the handset can play a key role in this filtering. By interacting with environmental sensors the handset can apply rules to create the most appropriate stream. Even modifying today's profiles used for ringtones could provide a simple and intuitive extension for the user

Example: *I walk by a person in the street, my heads up display shows his likes and dislikes and his 5 closest friends. I learn his favorite sports team and where his kids go to school. All this information is readily available as part of his social graph.*

While this scenario can end the awkward occasion situation of not remembering someone's name, it has unleashed a set of digital data that was not intended to be used in the real world in this way. I suggest meta data attached to an avatar that is scanned strictly in cyber space is quite different from that same data being attached to your person wherever you may go. While this may be perfectly ok, it is important to consider providing privacy tags not just for groups but also context.

Identity

The one thing each of these scenarios share is they are intimately connected. First a look at identity, users are continually giving away “meta-data” about themselves in exchange for free services. For example, public info on facebook or shopping patterns in the super market. Today this data is often not felt outside of its collected medium. I get coupons for things I buy in the mail to bring me to the store to buy more stuff. However as more APIs become available, who controls access to this data? One school of thought on Internet identity suggests the user retakes control of this data. For example, do I collect it and “sell it back the grocery store” in exchange for the same

deals. How do we tag the data in such a way that my shopping pattern is not available to everyone? What if not are we comfortable with a AR stream that places 1 to 5 beer cans on your house based on consumption patterns? How do I protect or publish data in such a way to make it available to AR streams.

As a side note it is worth considering if data privacy is a right or if we have an obligation to make it available. Of course I may not want anyone to know if I frequent the bar every Tuesday night. But if my data can be accurately collected and safely anonymized, shouldn't I make it available freely for the betterment of all?

Paper Trail

There is also the flip side as I interact with augmented reality who owns this contextual data? How do my interactions with world increase the amount of meta data at any one place. If I walk in to restaurant in Barcelona does the augmented reality count of US citizens that frequent that restaurant increase?

Clutter

Finally one other issue that is worth considering is how do we make sure AR enhances and doesn't detract. Do I need to visit the Eiffel Tower sponsored by Disney (hey check out this clip from National Treasure 2!). AR can certainly enhance the knowledge available to us but when looking at the Mona Lisa for the first time should the art be cluttered with hyperlinks and contextual information? I am not sure. The initial rush on AR will be dominated by those looking to tag the world. Much as I can find thousands of websites on any one topic, the amount of AR data attached to any one thing will likely grow to an staggering number. This data has the potential to educate and add value if it can be properly filtered but it also has the possibility to overwhelm.

Also check out this article in Wired on possible side effects of AR on education.
http://www.wired.com/magazine/2010/05/ff_nicholas_carr/