Director's Brief: Augmented Reality

Molly McKinney
San Jose State University
One Washington Square
San Jose, CA 95192

30 April 2014

Edward Melton
Chief of Branches
San Francisco Public Library
100 Larkin Street
San Francisco, CA 94102-4733

RE: Bringing Augmented Reality to the Mission Library Branch

Dear Mr. Melton,

I am writing to propose we explore the possibilities of augmented reality technology to extend the services of the Mission Library Branch. I believe that augmented reality technology has tremendous power to capitalize on the strengths of this community and the richness of the Mission Library Branch collections. In particular, I believe that augmented reality applications could be developed to showcase the culture of the Mission neighborhood and the Mission Library Branch photographic archive.

What Is Augmented Reality?

"Social software has come full circle, and instead of sending us out into the cloud, it's bringing us back to where we are." (West, 2010a)

Augmented reality (AR) is the use of technology to augment the real world with virtual information. The real world is viewed through the camera of a mobile device (a smartphone or Google Glass, for example), and various types of text, images, sound or video can be superimposed on the real image to enrich the user's experience (this is in contrast to entirely virtual experiences which are **virtual reality**). This video from Common Craft provides a very basic overview of the technology.

"Historic Market Street" Layar layer

Augmented reality has actually been a viable concept for decades, but has gained ground recently due to the strong market penetration of smartphones and other mobile devices (Ekart, 2011; Kho, 2010). Augmented reality is identified by the New Media Consortium as a "key emerging technology" in the NMC Horizon Report: Higher Education edition (Johnson et al, 2014). Two and a half billion AR apps are expected to be downloaded by 2017 (Drell, 2012). AR is being adopted by commercial interests for gaming or marketing purposes (guiding customers to nearby restaurants or shops, for example). However, AR has a lot of potential for libraries to extend their reach into their communities and raise the profile of the library (Farkas, 2010; Kho, 2010; Vecchione & Mellinger. 2012; West, 2010a; West, 2010b).

There are two basic methods by which augmented reality applications provide location-specific information, **markers** and **geo-location** (Ekart, 2011a). **Markers** can be QR codes, RFID chips, or even a "trigger image" that the app will recognize. Markers need to be used in a space or on media controlled by the app provider. They can be used in the "outside world"--on advertising posters, for example--but are most suited for use within the library itself. **Geo-location** relies on GPS data, compass information, wireless network mapping, and sometimes information from a device's camera in order to pinpoint the user's location. Geo-location can extend the reach of the library outside the library walls.

Issues

Augmented reality can be accomplished by developing a mobile website (also called a "mobile-responsive website") or native app, or both. A mobile website is a standard HTML website that has been made "mobile-friendly" (i.e., it displays well on small mobile device screens). A native app is a small independent program that runs on a mobile device and is made available through one of the major mobile app stores, such as iTunes or Android Market (La Counte, 2012).

Mobile Site

Pros

- Less expensive to create
- No delays from requiring app store approval
- Accessible from multiple platforms
- Easier for users to find with a search engine

Cons

- Slower at delivering large amounts of data
- Requires extensive HTML and CSS so pages load slower

Native Apps

Pros

- Allows more complex design
- Secures personal data better than a mobile website
- Performs faster than a mobile website
- Capable of accessing device specific features such as camera or mapping

Cons

- More expensive to create
- Multiple versions needed for different platforms (iOS, Android, etc.)
- Apps must be downloaded from an app store, taking more user effort than finding a website

(Stinson, 2013)

Some Augmented Reality (and Geo-location) Technologies

Aurasma

Aurasma is an augmented reality app that employs trigger images and then overlays videos, pictures or websites. Aurasma calls these overlays "auras." Aurasma is a free app that works with iOS and Android devices. It is becoming popular in K-12 school libraries to enrich learning and has a low barrier to entry (Byrne, 2012; Mulch, 2014).

Google Field Trip

Google Field Trip is an augmented reality app for iOS, Android and Google Glass that pushes content based on location (Russell, 2013). It has good potential for library use (Mathews, 2013).

Layar

Layar is a popular augmented reality browsing platform that works with iOS, Android, and recently, Google Glass. Users can create a "layer" for Layar with creation tools. When Layar users open the app, they will be able to see any "Layar layers" that are available near their location, or search for a specific layer they are interested in. Programming a Layar layer with a creation tool is analogous to using a blogging platform to design your own web pages, and does not require a lot of coding (Ekart, 2011b, Enis, 2013).

Qualcomm

Qualcomm is a large R&D firm in the telecommunications industry that offers an augmented reality software development kit (SDK) called Vuforia. It works with iOS, Android, and Unity 3D. Using the Vuforia SDK is a greater technical challenge requiring in-house development but offers greater control over the final product, which might make it an attractive choice for libraries with full digital services departments and greater technical capabilities (Ekart, 2011b).

SCVNGR

Although SCVNGR is not an augmented reality application, it is a game-based geo-location application and could be a good way for libraries to test the waters of geo-local learning because of its low barrier to entry. It is easy to become a SCVNGR "builder" and use the interface to create "treks"—quests for users to complete (Foote, 2010; Vecchione & Mellinger, 2012).

Augmented Reality in Library Settings

Libraries have implemented augmented reality projects for a variety of purposes. AR can be used to provide mobile information to library patrons. As early as 2003, the University of Oulu in Finland developed a mobile app titled SmartLibrary that guides library patrons to the book they want on library shelves, and performed user tests demonstrating that SmartLibrary worked better than conventional shelf classification in helping users find books (Aittola, Ryhänen, & Ojala, 2003). There is a Layar layer for the University of California Berkeley Libraries providing directions and information about Cal's libraries. There is also a Layar layer for the Toronto Public Libraries that provides locations, links, hours and phone numbers.

Toronto Public Libraries Layar layer

Augmented reality has also been used by libraries to provide user-friendly mobile access to library archives and special collections, showcasing special aspects of the library. The North Carolina State University Libraries have a campus walking tour called the WolfWalk, briefly demonstrated in this video. A result of collaboration between digital initiatives, digital scholarship and special collections departments, WolfWalk features a location-aware campus map and enables users to browse over a thousand historical photographs from the NCSU's Special Collections Research Center, engaging users with special library collections.

Scan Jose is a project of the San Jose Public Library using augmented reality digitized library collections to create local history walking tours of San Jose, including material from the library's special collections (Stewart, 2011). Funded by a Library Services and Technology Act grant, Scan Jose has implemented both a mobile web site and a Layar layer so that users can take three downtown walking tours. The mobile site can be viewed at scanjose.org.

What can AR do for the San Francisco Mission Library?

I'm interested in history, as I'm walking down the street in San Francisco I want my mobile device to tell about the history here, think of it as a serendipity engine. ~Eric Schmidt, former CEO of Google (Sierra & Casden, 2011)

Lyons (2009) describes how libraries are "bringing a sense of place to the Internet." Hyperlocal web sites can connect online data with real communities, draw out local voices, and demonstrate the relevance of the library to the local population (Lyons, 2009). Hyperlocal materials are particularly appropriate for the Mission neighborhood, a neighborhood with both a long history and a rich and vibrant local culture. The library can have a vital role in preserving this cultural treasure and making it accessible to others.

Mission street scene, ca. 1920, Shades of San Francisco collection

Mission Library Branch has a photographic history archive collected from local residents as part of the Shades of San Francisco project. Materials from this archive could be used to enrich a historic walking tour of the Mission. The famous Mission murals could also be showcased in a walking tour that allows people to learn more about them while viewing them. Both librarian and community member knowledge could create a digital resource that helps preserve and interpret this special Mission treasure. The Scan Jose walking tour project mentioned above is an excellent example of a similar project being successfully implemented.

West (2011a) suggests that geo-location technologies work best in an urban, highly networked environment, a description that fits both San Jose and San Francisco. Recent Pew Research (Lopez, Gonzales-Barrera & Patten, 2013) indicates that the digital divide between Latinos and whites is shrinking, with significant increase in technology adoption among foreign-born and Spanish-dominant Latinos, reducing the divide within the Latino community itself as well. Furthermore, Latino and Black users are significantly more likely than whites to access the internet from a mobile device, indicating that mobile services can help us to reach this underserved population. Ballard and Blaine (2012) argue that "mobile technology is becoming such an important part of the information world that it is inconceivable for libraries to stay away."

Guidance for Implementation

Aittola, Ryhänen, & Ojala (2003) and La Counte (2012) recommend surveying users in order to determine what mobile technology patrons use and what they want in mobile library services. Support for the project within the library and within the community would need to be assessed before beginning a project. As argued by Ekart (2011b) an augmented reality project is a serious undertaking and will require a real commitment of resources including programmer support. An exploratory committee should be formed with appropriate representation from SFPL's technical services department, branch library representatives, and community representatives. Bay Area colleagues involved in the UC Berkeley Layar project and the Scan Jose project could also be a valuable resource in planning and implementing an augmented reality project.

Although a project of this nature would require significant funding support, there are potential funding sources in the type of cultural grant that funded the Scan Jose project. In addition, we might consider approaching local technology firms (including Google) for sponsorship.

Conclusion

Casey and Savastinuk (2006) urge librarians to see customers as collaborators, giving library users a chance to participate in library service. Our local library users have contributed photographs to the Shades of San Francisco archive project, but they are not just contributors to

the collection. They hold in themselves a valuable part of our collection—their thoughts and memories and dreams, as expressed in the Mission murals, make this neighborhood special. If we can tap into this rich collective history, we will be fulfilling the library's role as "an act of inspiration architecture and a keystone of culture" (Morville, 2013).

Lankes, Silverstein and Nicholson write, "Knowledge is created through conversation. Libraries are in the knowledge business. Therefore, libraries are in the conversation business" (Lankes, Silverstein & Nicholson, 2012). Implementing augmented reality would invite the people of the Mission to participate in a rich conversation with us, both inside and outside of the library.

Thank you for your consideration,

Molly McKinney

Balmy Alley Mural, Mission

References

Aittola, M., Ryhänen, T. & Ojala, T. (2003). SmartLibrary: Location-aware mobile library service. Proceedings from Fifth International Symposium on Human Computer Interaction with Mobile Devices and Services. Udine, Italy. Retrieved from http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCsQFjAA&url=http%3A%2F%2Fwww.mediateam.oulu.fi%2Fpublications%2Fpdf%2F442.pdf&ei=hslfU8_eMYGPyAT6koGwCQ&usg=AFQjCNGm3ZIbgxFFRruRveApvWJZ4ZohXQ&bvm=bv.65636070,d.aWw

Ballard, T. L., & Blaine, A. (2013). A library in the palm of your hand. *New Library World, 114* (5/6), 251-258. doi:10.1108/03074801311326876

Byrne, R.,. (2012). Augmented reality adds a layer to learning. *School Library Journal, 58*(10), 17-17. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=83527015&site=ehost-live

Casey, M. E., & Savastinuk, L. C. (2007). *Library 2.0: A guide to participatory library service*. Medford, NJ: Information Today.

Drell, L. (2012, December 19). 7 ways augmented reality will improve your life [Web log post]. Mashable.com. Retrieved from http://mashable.com/2012/12/19/augmented-reality-city/

Ekart, D.F. (2011a). Augmenting your reality. *Computers in Libraries*, 31(9), 36-37.

Ekart, D.F. (2011b). Augmenting your reality part 2: Nuts and bolts edition. *Computers in Libraries*, 31(10), 36-37.

Enis, M. (2013, February 12). Mobile evolution: How apps are adapting to a new device ecosystem [Web log post]. *The Digital Shift. Library Journal*. Retrieved from http://www.thedigitalshift.com/2013/02/mobile/mobile-evolution/

Farkas, M. (2010). Your reality, augmented. *American Libraries, 41*(9), 24-24. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=502999219&site=ehost-live

Foote, A. (2010, October 20). Four geolocation trends to watch [Web log post]. *Edelman Digital.* Retrieved from http://www.edelmandigital.com/2010/10/20/four-geolocation-trends-to-watch/

Kho, N. D. (2010). Location, location, (geospatial) location. *Information Today, 27*(7), 1-46. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=502995267&site=ehost-live

Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, Texas: The New Media Consortium. Retrieved from http://www.nmc.org/pdf/2014-nmc-horizon-report-he-EN.pdf

LaCounte, S. (2012). *Going mobile: developing apps for your library using basic HTML programming*. Chicago: American Library Association. Retrieved from http://libaccess.sjlibrary.org/login?url=http://site.ebrary.com/lib/sjsu/Doc?id=10504848

Lankes, R.D., Silverstein, J. & Nicholson, S. (2012). Participatory networks: The library as conversation [Ebook]. *Smashwords*. Retrieved from http://www.smashwords.com/extreader/read/164561/1/participatory-networks-the-library-as-conversation

Lopez, M.H., Gonzaelez-Barrera, A. & Patten, E. (2013, March 7). Closing the digital divide: Latinos and technology adoption. *Pew Research Hispanic Trends Project*. Retrieved from http://www.pewhispanic.org/2013/03/07/closing-the-digital-divide-latinos-and-technology-adoption/

Lyons, C. (2009). Hyperlocal libraries. *Library Journal, 134* (12). Retrieved from http://discover.sjlibrary.org:50080/ebsco-w-a/ehost/detail?sid=6b12c856-13a9-4b57-89e8-e97d71427d12%40sessionmgr4005&vid=2&hid=4212&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=ofm&AN=502981187

Mathews, B. (2013, October 13). Libraries and GLASS: 7 things to think about as wearable computing emerges [Web log post]. *The Ubiquitous Librarian.* Retrieved from http://chronicle.com/blognetwork/theubiquitouslibrarian/2013/10/10/libraries-and-glass-7-things-to-think-about-as-wearable-computing-emerges/

Morville, P. (2013). *Architects of Learning* [Slideshare presentation]. *SlideShare*. Retrieved from: http://www.slideshare.net/morville/architects-of-learning

Mulch, B. E. (2014). Library orientation transformation. *Knowledge Quest, 42*(4), 50-53. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=94845354&site=ehost-live

Russell, B. (2013, March 7). App of the week: Google's Field Trip will help you discover your city's hidden gems. [Web log post]. *Technobuffalo.* Retrieved from: http://www.technobuffalo.com/2013/03/07/google-field-trip-ios/

Sierra, T. and Casden, J. (2011). Mobile enhanced access to archives and special collections [Slideshare presentation]. *LYRASIS Technology Ideas and Insights Series*, Elon, NC, August 4, 2011. Retrieved from http://www.slideshare.net/tsierra/mobile-enhanced-access-to-archives-and-special-collections

Stewart, S. (2011, August 12). Scan Jose bridges new technology with historical information [Web log post]. *SJPL.org*. Retrieved from http://www.sjpl.org/blog/scan-jose-bridges-new-technology-historical-information

Stinson, K. (2013, November 26). Native mobile apps for libraries vs. mobile responsive websites [Web log post]. *Boopsie blog*. Retrieved from http://www.boopsie.com/native-mobile-apps-for-libraries-mobile-responsive-websites-for-libraries/#.U2E1MVeXbsk

Vecchione, A. & Mellinger, M. (2012). Using geolocation apps for academic library outreach and instruction. *Reference Librarian, 53*(4), 415-423. doi:10.1080/02763877.2012.704589

West, J. (2010a). Geolocation @Your library. *Computers in Libraries, 30*(8), 40-41. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=503001005&site=ehost-live

West, J. (2010b). Location @ your library. *Computers in Libraries, 30*(10), 38-39. Retrieved from http://search.ebscohost.com.libaccess.sjlibrary.org/login.aspx?direct=true&db=llf&AN=503005883&site=ehost-live