

WHITE PAPER



Augmented Reality Extending the Value of Print



By
Joseph Marin
Senior Analyst, Digital Technologies

Copyright 2011
Printing Industries of America
All Rights Reserved

Printed in the United States of America

Reproduction in any form by any means without specific written
permission is prohibited.

Product names are mentioned in this report as a matter of
information only and do not imply endorsement by
Printing Industries of America.

Table of Contents

Practical AR Applications	4
Examples of AR with Print	5
Printers: Start Creating AR Now	8
Creating an Engaging AR Experience	9
Summary	9
Appendix 1: Creating a Simple AR Application	11

Augmented Reality: Extending the Value of Print

Marketers are always looking for ways to get more from their print budgets. Historically, printers have responded through the use of customized print, and more recently, quick response (QR) codes. But what if there were a way to actually interact with print using 3-D modeling, video and audio clips, or virtually any kind of multimedia experience you can dream of? The technology exists today and it's called augmented reality.

Augmented reality (AR) overlays real life with relevant, computer-generated information. An example of augmented reality that we are all familiar with is how it is used when watching a football game on television. Current game information (yards to first-down, player information, time remaining, etc.) is superimposed over the actual live gameplay, providing up-to-the-second information. Using this example, we can see how AR is used enhance a person's understanding of what they are currently viewing.

Practical AR Applications

When it comes to AR, there are numerous applications in which the technology can be used. For this white paper, we'll simplify AR by grouping it into two categories: geolocation AR and stationary AR. Geolocation AR is used in conjunction with your smartphone's GPS capabilities and provides information on your smartphone display based on location. A great example of this is the Yelp application that uses the smartphone's GPS and compass to display information for nearby businesses on top of the camera's view (Figure 1).

Stationary AR can be used on either a smartphone or a PC with a webcam,

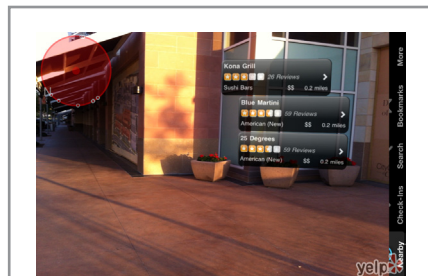


Figure 1: Yelp is an example of an application that uses geolocation-based augmented reality.

but does not use geolocation. Instead, an object is used as the point of reference for the AR scene. The object can be a special kind of printed image, a page in a book, or even a three-dimensional object. In the printing industry, stationary AR is most likely to be used.

When AR is integrated with print, it can link the consumer to online, relevant content or offers. Combining print with an AR scene is typically accomplished by using a *marker*. A marker is a specialized barcode that is mapped and linked to the digital AR scene (Figure 2). The marker is the “trigger” that is placed in front of smart phone camera or webcam where an AR software application is installed. It is this marker that retrieves the data via an application or Internet connection and becomes the reference point for the AR scene that is displayed on the monitor or smartphone (Figure 3). Print can also be mapped to an AR scene without the use of a marker, referred to as *markerless* tracking. Markerless tracking uses the unique shapes of the printed content on a page as the reference point in an AR scene (Figure 4).

Examples of AR with Print

The German publication *Sueddeutsche Zeitung* partnered with Metaio, a company that develops AR software technology, to produce one of the first magazines to incorporate

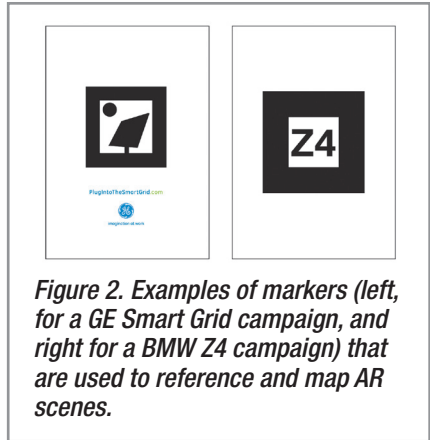


Figure 2. Examples of markers (left, for a GE Smart Grid campaign, and right for a BMW Z4 campaign) that are used to reference and map AR scenes.

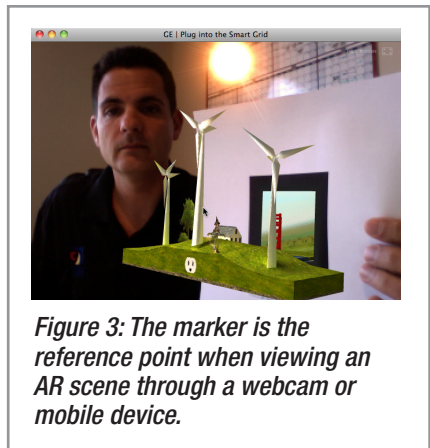


Figure 3: The marker is the reference point when viewing an AR scene through a webcam or mobile device.

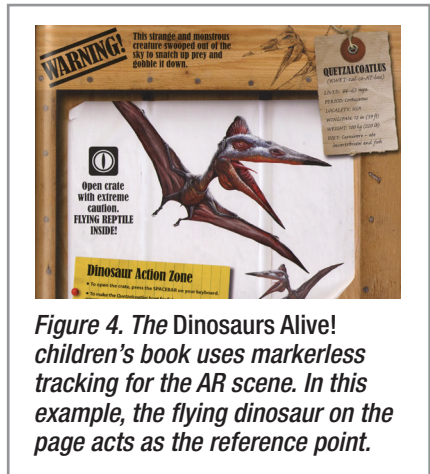


Figure 4. The Dinosaurs Alive! children's book uses markerless tracking for the AR scene. In this example, the flying dinosaur on the page acts as the reference point.

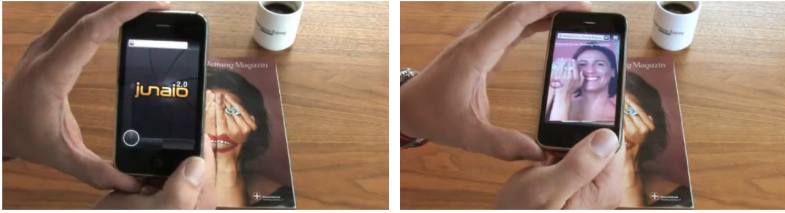


Figure 5. A popular German magazine publication with an AR scene integrated on the cover. The printed cover shows a woman with her eyes covered (left) and the AR scene (right).

many examples of augmented reality. The cover of the magazine contains a picture of a German newscaster covering her face with her hands. When a smartphone (with the Junaio app installed) hovers over the cover, her hands actually uncover her face (Figure 5).

The magazine also included an article about how Germany was lobbying to be the next host country for the Olympics. An interactive AR experience illustrated the concerns of a farmer seeing his land converted into a parking lot for the event (Figure 6).

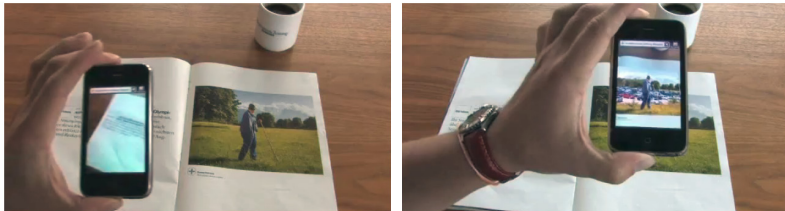


Figure 6. The same German magazine shows a farmer's field in print (left) and what it would look like through the AR scene if his land were converted into a parking lot (right).

Carlton Publishing Group partnered with Total Immersion, an augmented reality solutions provider, to produce a children's book titled *Dinosaurs Alive!* that incorporates AR with a webcam and a PC. The book includes a CD containing a software installer for the AR scenes. As the child reads through the book, there are prompts on various pages to place the book in front of a webcam. The dinosaur on the page "comes to life" in 3-D where the child can interact using the keyboard to make the dinosaurs perform various actions (Figure 7).

Packaging printers are not left out as there are also some terrific examples of how AR can be integrated to create a very engaging experience. LEGO also partnered with Metaio to create a box that, when held up to a kiosk at LEGO stores, combines 3-D animation with a live video feed. The result for the customer is an animated, finished toy displayed on top of the box the person is holding. The box can be rotated to show the finished LEGO toy from all angles (Figure 8).

For the publishing market, AR can also be used in advertisements. If you consider the investment in a magazine advertisement, it can be fairly substantial. BMW launched a campaign to market the new Z4 Roadster with an AR experience where a car is controlled using a marker (output on a desktop printer), a webcam, and a PC. The car, “steered” by moving your mouse on a desk, runs through paint and creates artwork that can be posted on FaceBook (Figure 9).

The advantage for publishers in selling the ad space is that with AR, marketers can get more product information “on the page.” AR encourages consumers to visit the site where marketers can show so much more while measuring the return. The printing and photography cost of the ad is the same, but there will be development costs associated with the AR.



Figure 7. The Dinosaurs Alive! children's book integrates interactive examples of 3-D dinosaurs.



Figure 8. At LEGO stores, customers can hold boxes in front of special kiosks where they can see the finished product in 3D.



Figure 9. BMW used AR to promote the new Z4 Roadster.

Visit www.integratewithprint.com to see the augmented reality examples discussed in this white paper.

Printers: Start Creating AR Now

A complex augmented reality experience like the ones mentioned above can be a big-ticket item. It would not take long to invest tens of thousands of dollars in an AR project. However, there are applications available for the masses—ones that allow printers to create AR projects for their customers—without spending a lot of money.

One example of affordable AR development is from the company Inglobe Technologies (www.inglobetechnologies.com) and their AR-media Plugin for Google SketchUp. This plugin (Mac OS X and Windows compatible) is free to try, and around \$400 for the professional version.

SketchUp (<http://sketchup.google.com>) is a free, very intuitive drawing system that allows you to create 3-D models from scratch (Figure 10). Learning SketchUp for prepress professionals will be fairly straightforward as many of the tools are similar to those found in Adobe Illustrator and Photoshop. A series of video tutorials is available for Google SketchUp and is recommended for all first-time users.



Figure 10: Google SketchUp is a drawing application used to create 3-D models.

The AR-media Plugin from Inglobe Technologies is an add-on for SketchUp that exports the 3-D model created as an AR application. The free version of the plugin allows for full testing of the software. The Professional version adds the ability to create custom markers and export the AR scene for viewing on other computers using the free AR-media Player (<http://prnt.in/Zoh>). A step-by-step guide to creating an augmented reality scene using these tools can be found in Appendix 1.

A more advanced tool for creating AR scenes is Unifeye Viewer from Metaio (www.metaio.com). Unifeye Viewer (\$4,300) is a plugin for Adobe Flash Builder (<http://www.adobe.com/products/flashbuilder/>) and is used to create

augmented reality scenes that are deployed via the Web using Adobe Flash technology. The final AR scene that is created using these tools only requires a browser with the ubiquitous Flash plugin, so no additional application installation is necessary for the end user.

Creating an Engaging AR Experience

There are a few key points to creating an AR campaign that is successful. First, the AR experience must be easy to use. Not just from an interactive standpoint, but also from a technology standpoint. AR generally requires an additional software application or plug-in. If it's not easy to find and install, it won't get used.

Second, the experience has to be stimulating. This is the “wow” factor associated with AR. Both visually and physically, AR is an opportunity to connect deeply with the emotions of the consumer. It's the connection that helps sell the product or service.

Finally, an AR experience should have a social aspect. This is where the users can share the experience with others easily. The BMW campaign mentioned earlier is a terrific example in that it allows consumers to share the result of the AR experience by expressing their artwork on a social networking website.

Summary

All of this discussion begs the question: Will augmented reality continue to gain momentum? With real-life applications, it absolutely will. This is already a reality (no pun intended) with our smartphones. Applications such as Yelp superimpose digital information using GPS markers to display reviews and help us find restaurant establishments in the area, for example.

Will it gain momentum in print? With some markets, it probably will. There are limitations with practicality of the technology. You wouldn't hold a magazine up to a webcam for very long periods of time, unless it's a nifty advertisement.

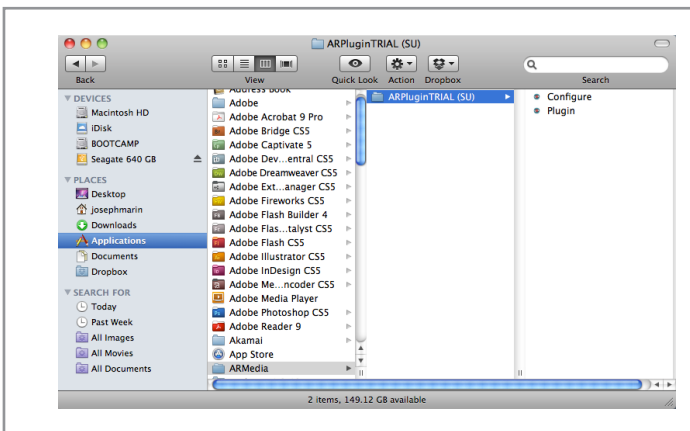
Just as with QR codes, the key to augmented reality growth is the smartphone. We always have them with us or nearby. Using them with printed material to create an experience is where AR is useful and really extends the value of the printed page. And for marketers and publishers, it's a real bonus if they can get potential customers to participate in the advertisements or purchase a product or service.

Appendix 1: Creating a Simple Augmented Reality Application

The purpose of this exercise is to show how to create an augmented reality application using the free Google SketchUp application and the trial version of Inglobe Technologies AR-media Plugin. The software requirements for both applications are compatible with Windows XP/Vista/7 and Mac OS X (10.5+). All screen shots below were taken in Mac OS X; Windows installation may vary slightly. Additional installation information and the quick start guide can be found at <http://prnt.in/ZoL>.

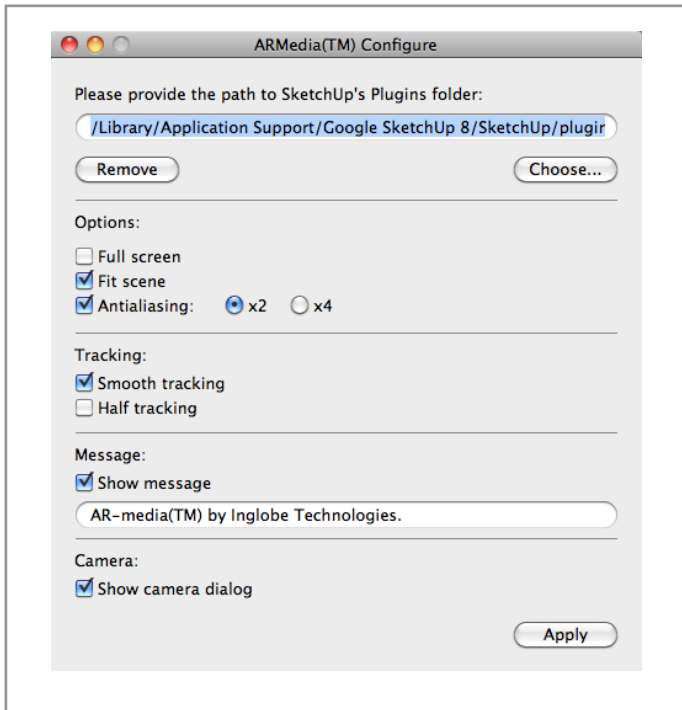
Step 1: Download and install Google SketchUp at <http://sketchup.google.com>.

Step 2: Download and install Inglobe Technologies AR-media Plugin at <http://prnt.in/ZoL>. After the installation, an ARMedia folder is located in your Applications folder.



Step 3: Once installed, navigate to Applications/ARMedia/ARPluginTRAIL (SU) folder and double-click the Configure application. The Configure application must point to the plugin folder for SketchUp.

For Mac OS X, the plugin folder for SketchUp is located in /Library/Application Support/Google SketchUp 8/SketchUp/plugins. Click Apply.

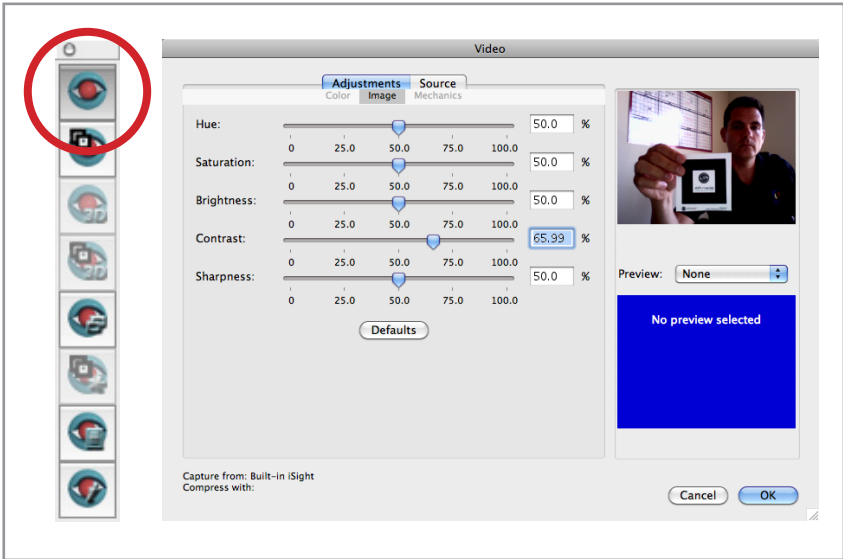


Step 4: Connect a webcam to your PC.

Step 5: Launch SketchUp and create a simple 3-D object. If you're new to SketchUp, it is recommended to view the *New to Google SketchUp* tutorials to become familiar with the interface. The tutorials can be found at <http://prnt.in/Zob>.

Step 6: Now you're ready to test the 3-D object you've created in augmented reality. To do this, you need to download and print out the sample marker at <http://prnt.in/ZoE>. Trim the marker using the crop marks provided on the printout.

Step 7: After you complete your simple 3-D design, click the Quick View tool in the AR media tool palette. The Video adjustment dialog box appears. Hold the marker (that you printed in step 6) up to the webcam and increase the contrast until you see dark blacks and clean whites. Click OK.



Step 8: Hold the marker up to your webcam to view your 3-D object as an AR scene.



Augmented Reality: Extending the Value of Print explores how augmented reality can be effectively integrated with print and drive it to an online experience. As marketers continue to look for ways to get the most value from print, it's important for printers to understand the capabilities of augmented reality. Augmented reality is a very powerful tool because it has the ability to extend the value of the printed page and link the consumer to online, relevant content or offers. This white paper examines augmented reality and how it is used to integrate print more closely to the Internet.

The Digital Printing Council (DPC) is a select program open to all Printing Industries of America members. The DPC provides its members and the printing industry with informative tools and publications that are designed to help firms be more productive, efficient, and generate more sales with new digital technologies. All members of Printing Industries of America and its affiliates are automatically DPC Core members.

The DPC offers the most up-to-date information on:

- * Digital printing and its new technologies
- * Business implications
- * Digital printing applications
- * Industry trends

The Digital Printing Council gratefully appreciates and acknowledges the generosity of our sponsors: Canon, Finch Paper, Kodak, Konica Minolta, Ricoh, and Xerox.

