

Augmented Reality Opportunities and Challenges

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For AR to happen there is a need for some consensus building or even industry collaboration in a few areas. There is the caveat here that consensus and collaboration sometimes take too long and are often an impossible goal, so perhaps other methods should be looked at first. These days new propositions that reach critical mass rapidly are often the outcome of a compelling user need accompanied with availability of content and a commercial model for revenue generation for genuine value-added stakeholders. Creating this type of ecosystem is the route to rapid adoption of AR applications (IMHO).

Some candidates for collaborative discussion:

- Mobile phones need a universal input methodology. This could be wired (as with USB on computers) or preferably wireless (Bluetooth?). This is because the accessories worn or carried to trigger the augmentation of reality need to be able to work with the applications on the phone. Device independence is also key (as with USB and PC) The maker of an accessory shouldn't have to target specific devices or manufacturers
- All phones need a standard video out port. This is much more the case these days and over 120 mobile phone models have a TV or Video Out feature. It is plagued however with all sorts of physical cable types that make it very difficult to make universal for third parties wanting to develop apps. Again, wireless would be best.
- Video eyewear must be an integral part of the equation and become unnoticeable by others, comfortable and natural to wear and the info overlaid on eyesight must be relevant, concise and not visually distracting. Pocket projectors also have a role to play for shared visuals, augmenting scenes, objects and creating gesture and button maps.
- Cameras, sensors, sniffers, etc. in many cases will need to be separate from the mobile device itself. The camera must be pointing in the same direction as the eyes! Holding mobile phones out in front at arm's length and swinging around wildly hitting objects and other people is not a long term approach! For the mobile phone to become the AR hub, it must take on not just applications, but also connectivity to the hardware needed by those applications.
- As mentioned above, databases exist and are being enriched to feed all sorts of broad and niche AR info types, but there needs to be some consistency in how these are accessed and searched to be effective. These databases and new ones are being created for today's interactive web experiences, but are the value proposition of AR moving forward. An incredible asset.
- We have several years' worth of hardware technology on the shelf to deploy into applications development. Connectivity, packaging and end to end solutions are the challenge. This is an area where industry collaboration could produce results in the near term.
- Processor architecture and performance is a potential bottleneck for AR to move past the "point and squirt" stage. The Google goggles initiative is underway, but will the mobile devices our industry produces be up to the task?

There's so much to discuss in the world of AR from PC to mobile and beyond. AR is a technology that is fast moving into the consumer space. The content, mobile applications, info databases and other elements are really developing in that sector first and then moving to the enterprise sphere instead of the other way around. These applications, databases and software platforms that are developing now will be exploited more and more in business. The market will have difficulty developing beyond the embryonic stages however without some common understanding of the benefits, the challenges and a correctly coordinated approach to developing the opportunity.

AR has been present in industrial and a few very specialised enterprise applications over the past dozen years or so, often with awkward technology and apparatus, but no widespread use has appeared so far. The Military also has had some high cost devices and systems in place for years, and some of these technologies can be exploited in the consumer space. Much of this technology has now been greatly miniaturised and the bottom line is that technology is not the barrier any more. Understanding the value propositions and delivering user friendly solutions is now priority number one. "Pull AR" (user turns on the AR app) is the first stop on the journey, and that is happening now.

But to succeed in any sector, the user experience must be totally natural and intuitive. The right information presented exactly the right way and totally in context. This will hasten the move from “Pull AR” to “Push AR” over the next ten+ years.

Right now the best AR demonstrations are on the PC and laptops, but mobile is the final destination in my opinion. So why PC's in the first place? Well, right now most mobile phones simply aren't equipped with enough horsepower to do some of the image and scene recognition tasks and on the PC, not only is the camera already there (embedded or added as a web cam), but fully at the disposal of the applications that are loaded. Most phones don't enable or even allow this. That's why almost all the apps are simply location and direction based and the camera and display basically used as a backdrop for the info, rather than the input for selecting it.

But reality happens all around people, not just at their desk where the computer is. So reality must be in a position to be augmented anytime, anyplace. It must also end up in the eyes of the beholder (the real final destination!) without being distracting or noticeable to others and be triggered not just by location and direction pointing, but by many factors, stimuli and contexts. Adjunct sensors, sniffers and peepers exist that could trigger valuable augmentation of the reality of everything from everyday life to special social, medical, safety or job related applications. Wearable or specially purposed devices could be carried when appropriate to the environment expected. This all changes our relationship with technology and the good news is that there are really no technology barriers! But as mentioned above, most newer mobile phones can support basic AR, but don't facilitate proper sensor and visual I/O!

The next area which is developing rapidly in parallel at the consumer level is personal viewing of rich content (video, games, etc.) stored on or streamed to their mobile phones. This has created both delight and frustration with the small screens. It has also fuelled a market for personal displays - what I call the 'Virtually Large, Actually Small technologies. This is also another area where technology is ready to be deployed. Some of the VLAS technologies such as video eyewear (screens integral to the glasses) and Pico projectors (see www.microvision.com) are now available and being bought in large numbers and are enablers of all this personal viewing of rich content to happen in a very user centric way.

Mobile phones and other devices suffer from a 'too small screen' problem for AR too. Futurists predict that contact lenses that act as a visual overlay or immersive displays will appear in 10 to 20 years. But until then normal looking video eyewear glasses available now (e.g. see: www.vuzix.co.uk) will fill the bill nicely and I am quite aware of technology waiting in the wings to enable normal looking fully see-through AR glasses in the next year or so. Video eyewear which creates a virtual large screen experience has the added advantage of potentially being stereo 3D capable as well – effectively 3D glasses which do not need a physical screen. What could be more mobile than that! (see www.3d4me.tv for some thoughts on the future of 3D in mobile)

There are no conclusions to this position paper which is offered simply to facilitate discussion.

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