



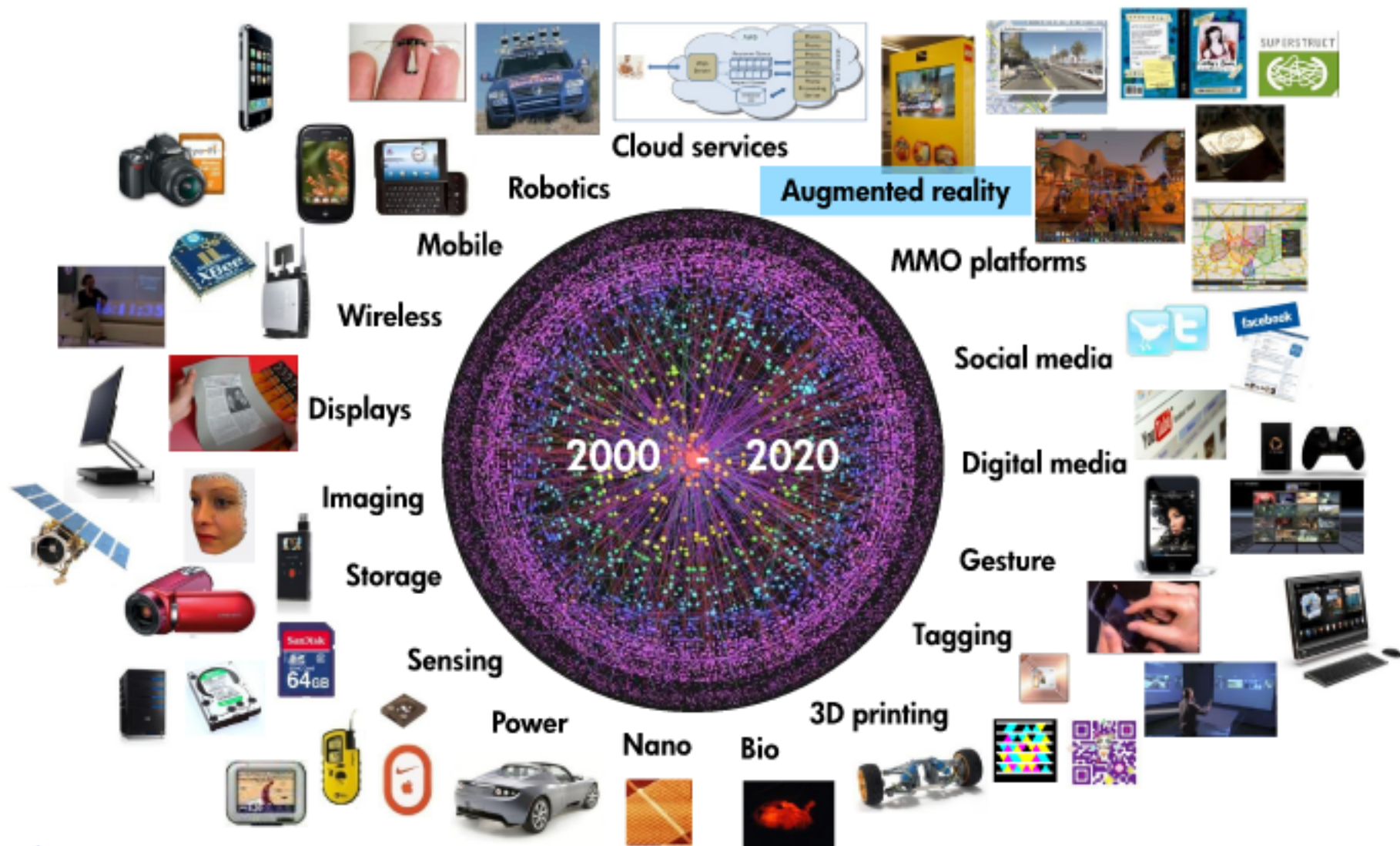
Challenge, Drama & Social Engagement: Designing Mobile Augmented Reality Experiences

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a remarkable confluence of technologies



what is augmented reality?

Augmented reality is...

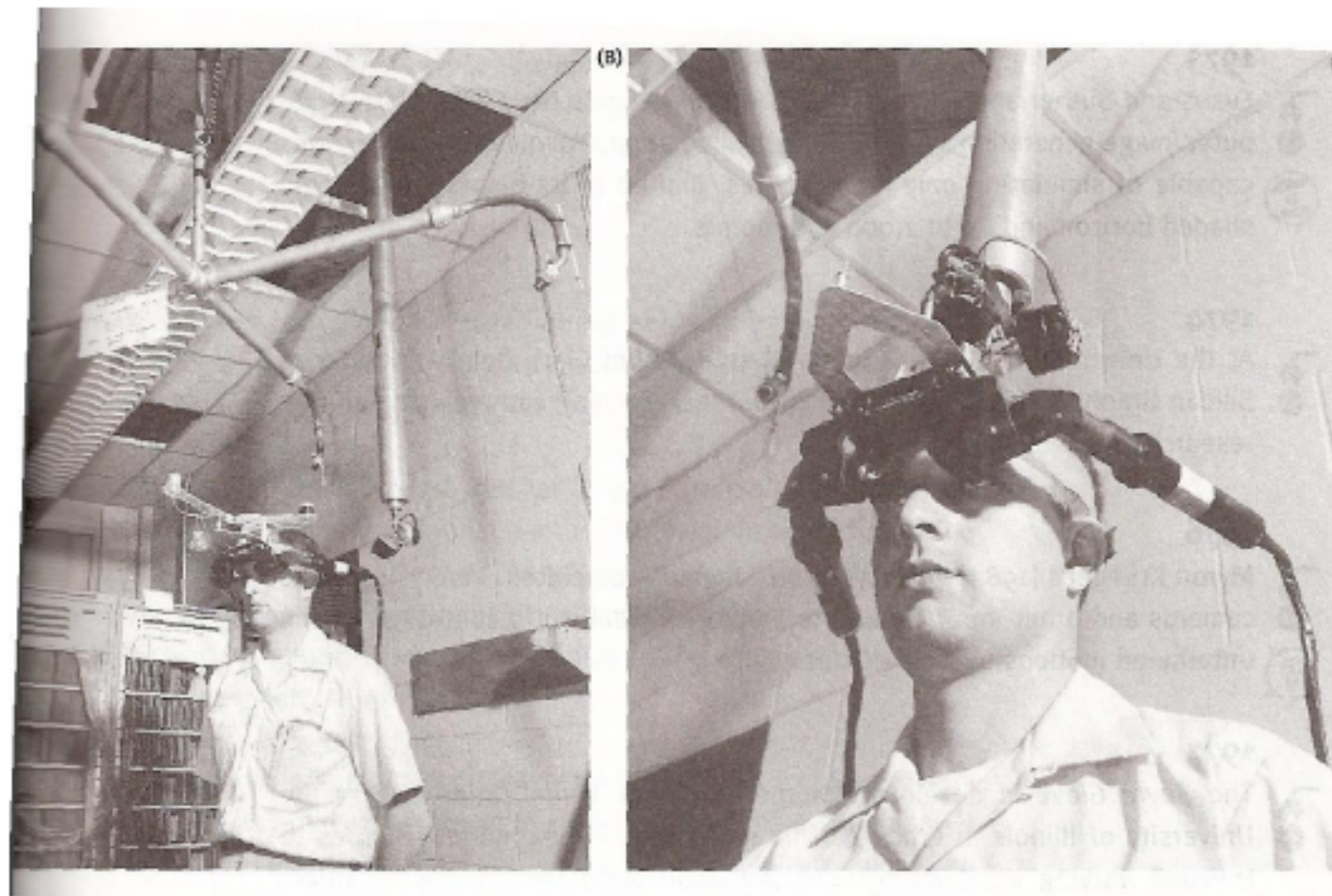
- a technology
- a field of research
- a vision of future computing
- an emerging commercial industry
- a new medium for creative expression

augmented reality is a technology

Augmented reality is the display of computer graphics and media, overlaid and registered on real-world environments, interactively in real time.

AR platforms exist at the intersection of several technical disciplines, including computer graphics, machine vision, sensing and sensor fusion, geographic information systems, mobile systems, ubiquitous computing and the web.

AR research: first HMD - Ivan Sutherland (1966)



The "Sword of Damocles"

FIGURE 1-17 *Ivan Sutherland*

AR research: wearable computing - Steve Mann



1980



1985



1991



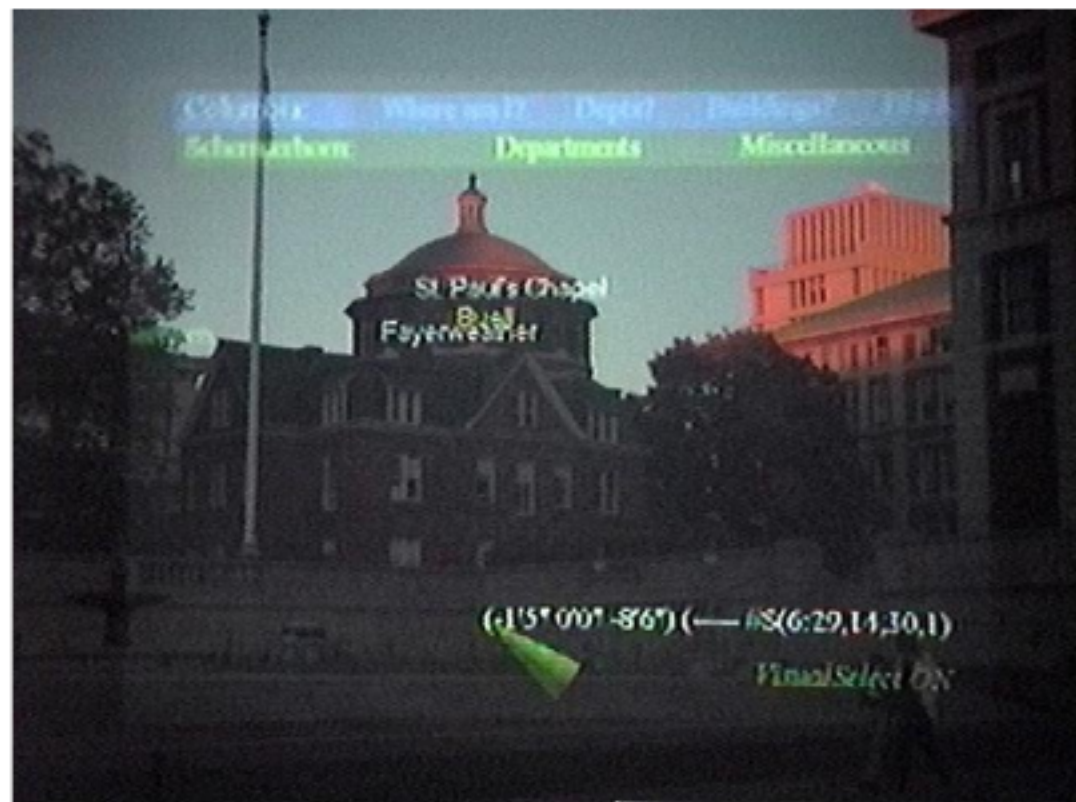
1995



1998

<http://wearcam.org/steve.html>

AR research: first mobile AR system



Feiner et al, Touring Machine (1997), Columbia University

<http://graphics.cs.columbia.edu/projects/mars/mars.html>

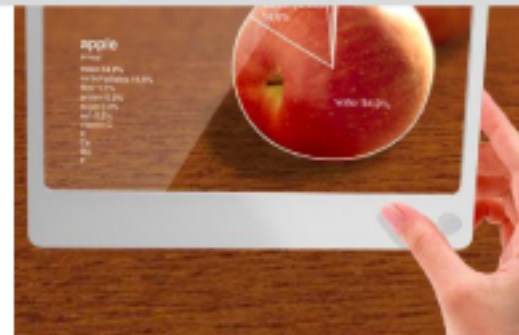
visual search on the physical world

concept design by mac funamizu



querying the natural world

concept design by mac funamizu



computational print media

concept design by mac funamizu

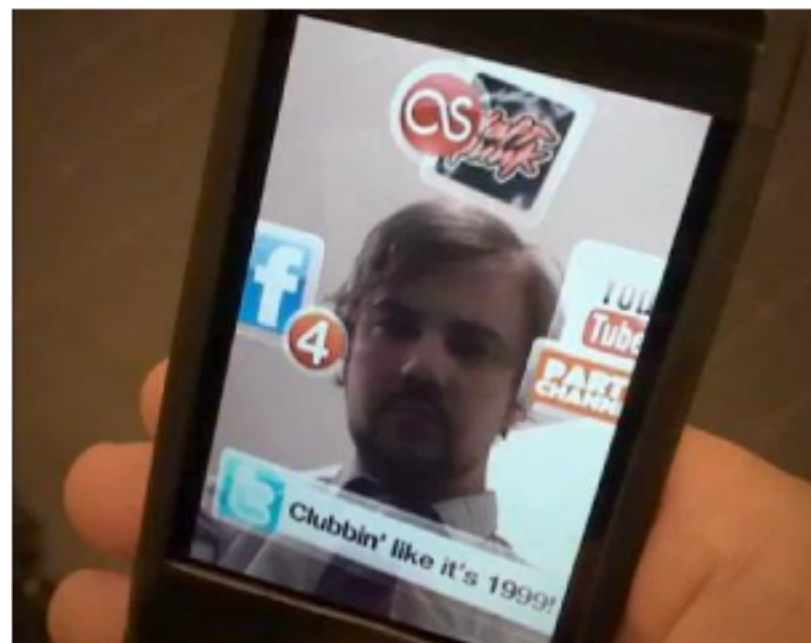
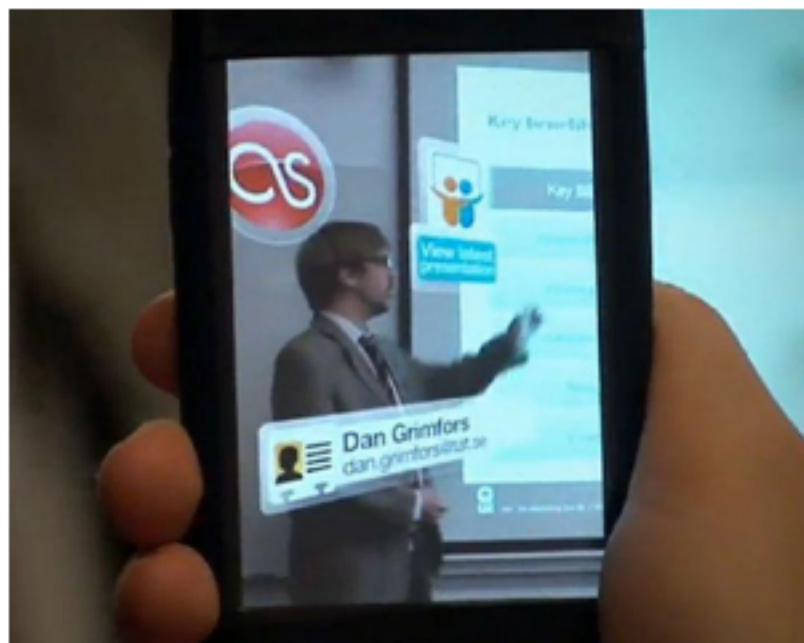


seeing through space and time concept design by mac funamizu



the end of personal privacy? concept by TAT

Augmented reality is the collapse of social nuance and the end of personal privacy.



social augmented reality concept sketches by matthew buckland



Future of Social Networking with Augmented Reality

Concept investigation by Matthew Buckland (matthewbuckland.com) and Philip Langley (@royalalien) of 20fourlabs.com



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Source: <http://www.matthewbuckland.com/?p=1041>

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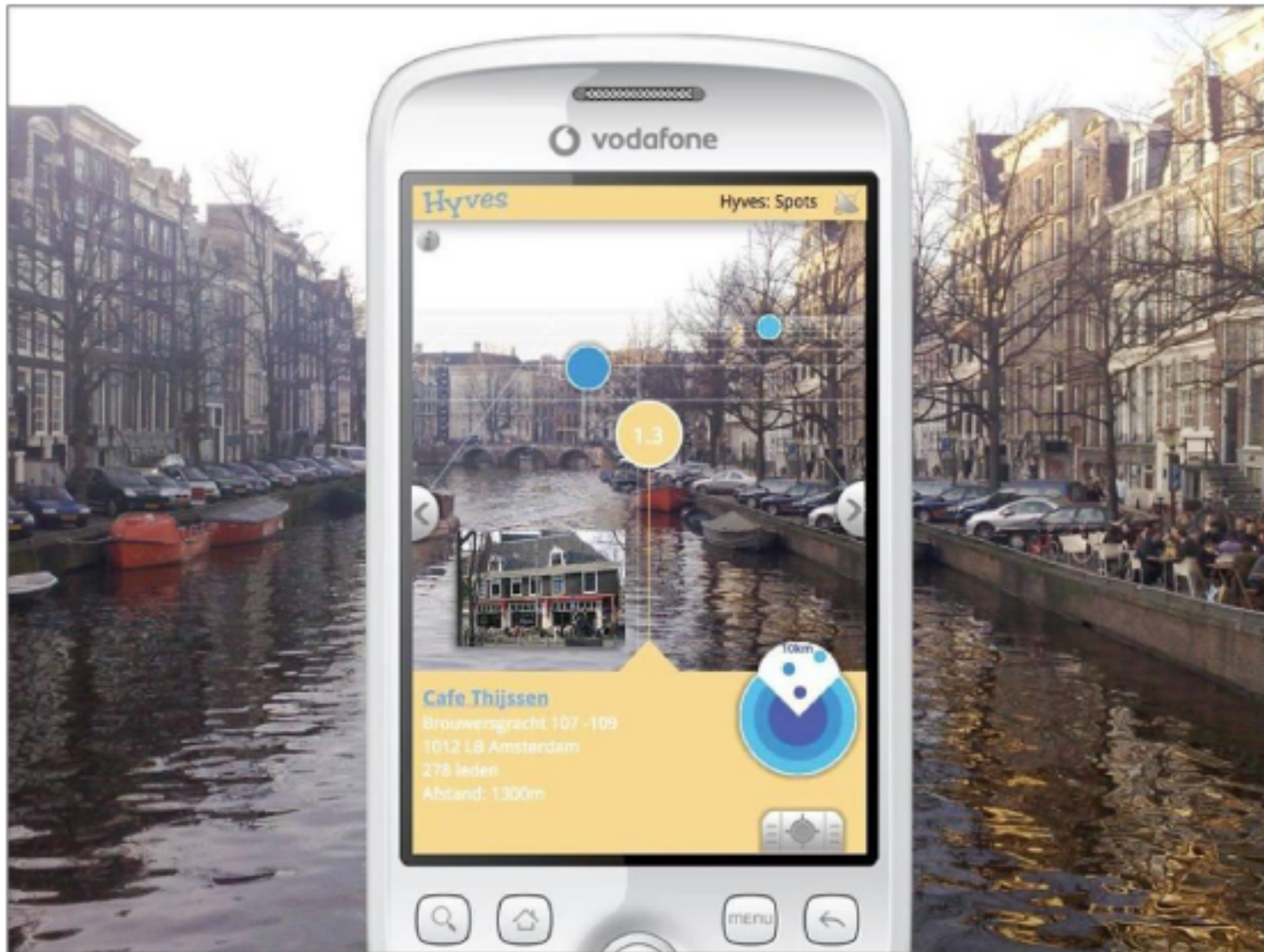
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and just wait 'til the glasses get here concept design by mac funamizu



commercial mobile AR example: Layar



commercial webcam AR example: Metaio



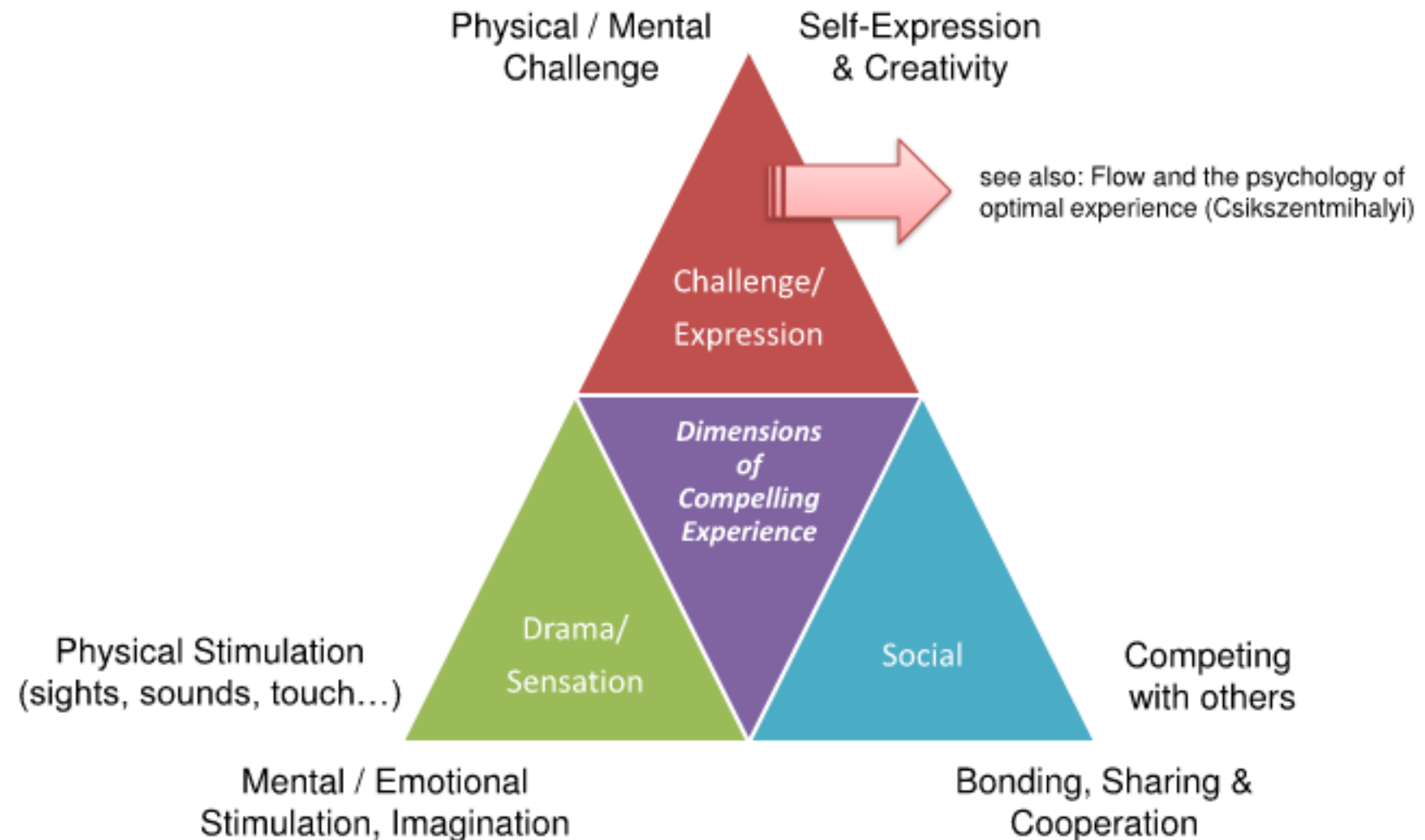
augmented reality is a new medium

Augmented reality is a new medium of creative expression that expands human experience

AR combines the web, images, sound, movies, games, search engines, databases, advertising, social media...and explodes them across the physical world of people, places and things, revealing the invisible stories that are everywhere around us.

But we have a lot of work to do.

what makes a compelling experience?



the reality of AR experiences today



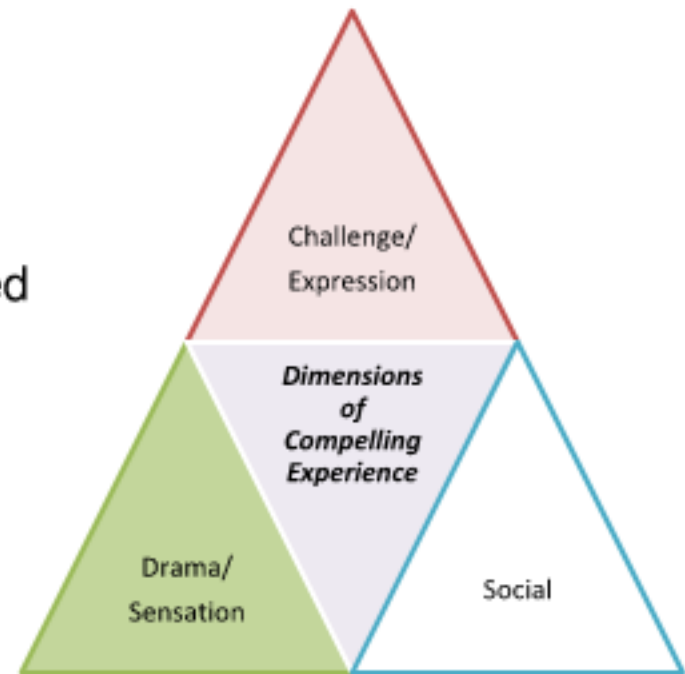
What works:

- * Physical engagement
- * Visually captivating
- * Emotional “wow” factor
- * Invisible stories, revealed



What doesn't:

- * Awkward use models
- * No flow opportunities
- * No social dimension
- * Point experiences only



mobile AR issues & limitations

Technical limitations

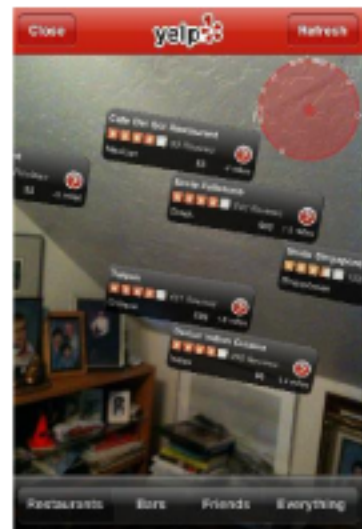
- Sensor accuracy (GPS, compass etc)
- Indoor positioning
- Line of sight
- Device constraints (display, form factor, weight, battery, processor, network)
- Lack of interoperable standards e.g. for location (lat/long/alt, CRS, orientation)
- Relative positioning
- Object recognition & tracking
- Graphics issues (lighting, transparency, occlusion)

Use model issues

- Unnatural physical position
- Ambiguous social signals
- Cognitive model

Authoring limitations

- Platform specific
- Low level tools, complex workflow
- Focus on point interactions; no support for stories or interesting interactivity

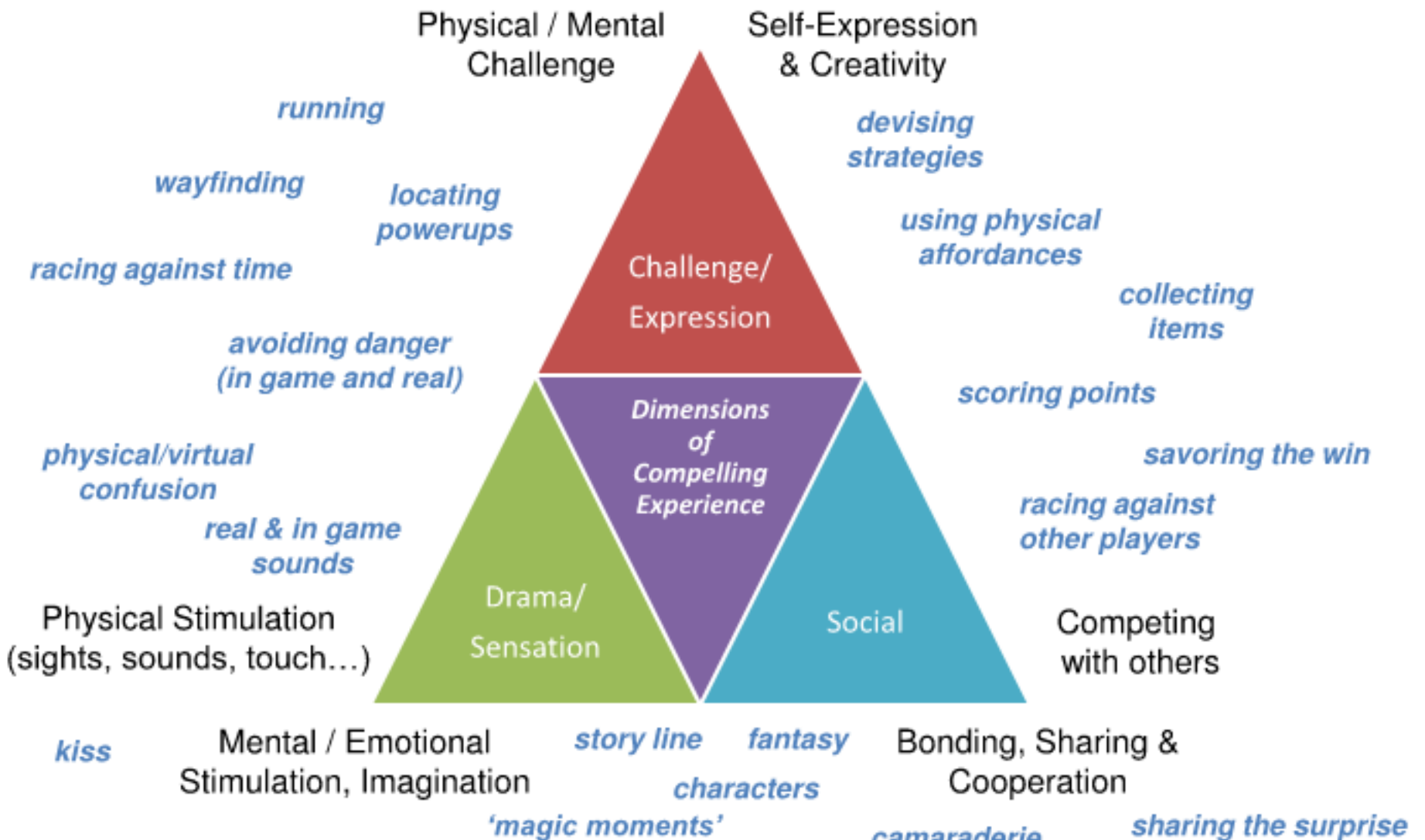


visionary example: AR gaming HP concept video



HP vision video Roku's Reward: http://www.youtube.com/watch?v=vCCyfkGKL_w

what makes a compelling AR experience?



mobile AR experience design practices

1. Understand limitations and design around them
2. Design for challenge, expression and flow
3. Design for physical sensation & emotional drama
4. Design for social bonding, sharing, competition
5. Bring an interdisciplinary media production mindset

mobile AR experience design practices

1. Understand current limitations and design around them

- Use augments with appropriate requirements for precision & realism
- Emphasize audio for immersion, continuity, story
- Use 'magic lens' position sparingly
- Fail gracefully & transparently

mobile AR experience design practices

2. Design for challenge, expression and flow

- Make the experience the focus, not the technology
- Set clear goals, expectations and rules
- Design goals to balance between ability level and challenge (neither too easy nor too difficult).
- Encourage focus and concentration, limit distractions and gratuitous interactions
- Provide direct and immediate feedback so the user can adjust their actions.
- Give users a sense of personal control over the situation or activity.
- Make activities intrinsically rewarding, so there is an effortlessness of action.



mobile AR experience design practices

3. Design for physical sensation & emotional drama

- Scout the location, know the environment & context deeply – sights, sounds, smells, textures, weather, rhythms, moods
- Design for 'magic moments' – mental immersion, physical/virtual coincidence, synaesthetic confusion
- Emphasize sound design for immersion, continuity, story
- Develop a cross-media story universe



mobile AR experience design practices



4. Design for social bonding, sharing, competition

- Game mechanics drive competitive engagement – explicit multiplayer competition, implicit scoring & leveling systems
- Social media integration to share broadly / vicariously
- Tight and loose multi-person activities encourage bonding and shared experience

mobile AR experience design practices

5. Bring an interdisciplinary media production mindset

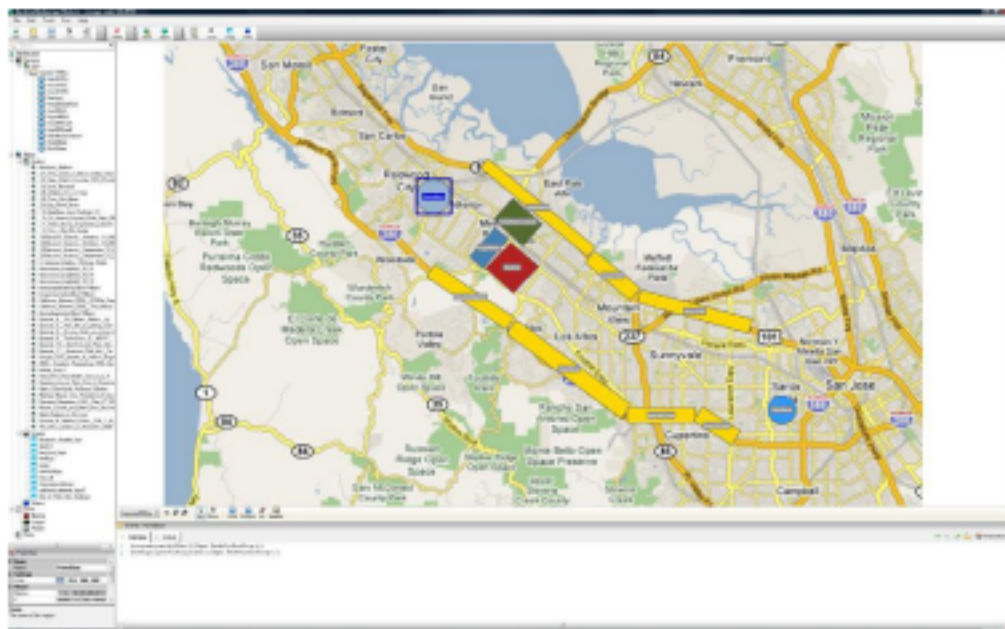
Creating mobile AR experiences draws on skills from a broad range of creative disciplines including...

- Scriptwriting
- Direction
- Casting
- Art direction
- Sound design
- Special effects
- Interaction design
- Location scouting
- Production management
- Software development
- Systems management
- Testing & QA
- Gamerunning
- Tech support



mobile AR authoring demo

- a large scale driving experience overlaid on the Bay Area
- primarily **audio** AR
- scriptable behaviors on geographic regions
- context-aware behaviors
- authored on PC, experienced on mobile





Questions?

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***Lightning Laboratories** provides Research and Consulting in augmented reality, ubiquitous computing, social media and the Internet of Things*