

Face Tracking & Face Recognition in AR



BY:
**Chris
Grayson**

Engage!

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The State of Augmented Reality Panel, Moderator
Jacob K. Javits Convention Center, New York City

GigantiCo™

<http://GigantiCo.tv>

917-597-4787

chris@chrisgrayson.com

[t](#) [chrisgrayson](#)

humble

Chris Grayson is Director of Digital at Humble.tv

Assoc. Organizer of ARNY - Augmented Reality New York.
Together with Ori Inbar and Tish Shute, he is an Organizer
of Augmented Reality Event (ARE 2011) in Santa Clara, CA.
He is also Organizer of TEDxSiliconAlley, 2011.



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NOTES

Engage!

CONFERENCE & EXPO

Augmented Reality: The State of the Market

NOTES:

Hi I'm Chris Grayson, Director of Digital at Humble.

Humble is a pre-to-post production studio and award winning special effects house.

One definition of Augmented Reality is: Special effects, rendered in real time, over real life. From a content creation perspective, augmented reality is not all that different than what we do for TV special effects.

The Presentation Contains Video
Not Shown In This Slide.



NOTES:

(with video playing) The theme of today's panel is "The State of the AR Market" ... You may recognize the scene from the movie, Minority Report, adapted from the book by Philip K. Dick.

Minority Report is Copyright © Dreamworks SKG & Twentieth Century Fox.

This clip shown in compliance with the generally accepted interpretation of fair use in the United States.
(Learn more about Philip K. Dick and Minority Report in the end notes.)

Face Tracking VS Facial Recognition

NOTES:

Who here knows the difference between Face Tracking and Facial Recognition? Face Tracking involves computer vision that is able to identify a face within its camera view, and can track the face's movement in space. Facial Recognition is when the computer is also able to recognize who that face belongs to.

Face Tracking for Media Analytics

NOTES:

Most AR in advertising is done of the user's side. This implementation is particularly interesting because it runs on the analyst's side.



Analyst's Dashboard

NOTES:

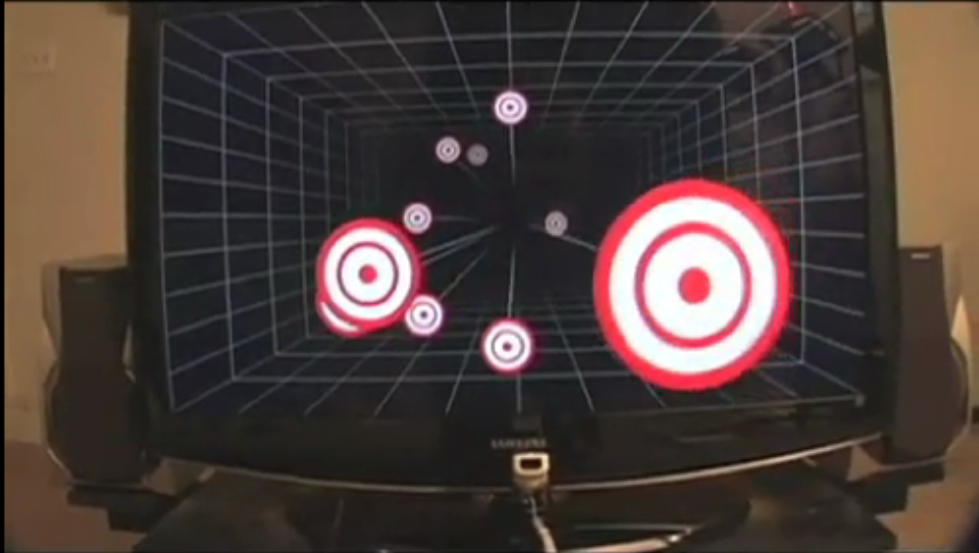
Quividi is a French company that makes analytics software for the Digital Out Of Home (DOOH) market. In this view, the media analyst's dashboard shows the pedestrian traffic passing a digital sign. It tracks media impressions, as people look up at the sign. They claim the software is able to predict gender with 90% accuracy, placing an AR overlay of blue for men or pink for women. It can also estimate age within 10 years, and count each viewer's length of attention.

Face Tracking for 3D Without Glasses

NOTES:

Another unique use for face tracking is 3D video without eyewear.

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VR Display (with head tracking)

CarnegieMellon

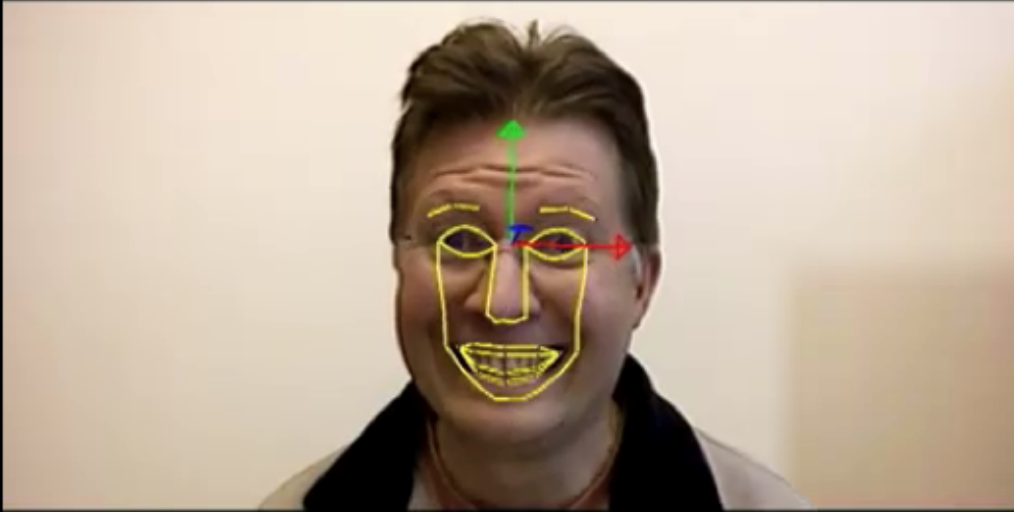
NOTES:

Show here is the work of Johnny Chung Lee of Carnegie Mellon. He's hacked a Wii controller, but he's using it in reverse. Note the Wii placed underneath the video screen. What you don't see in this video is a Johnny, with the infra-red receiver attached to the bill of his baseball cap. With this, the Wii controlled knows what direction the user is looking from and adjusts the perspective based on the direction of their gaze. The obvious drawback is that it is only effective or 3D with a single user, as it cannot display for different perspectives at the same time. Expect to see this technique implemented in single user scenarios like handheld video games and mobile interfaces, very soon.

Face Tracking with Feature Tracking

NOTES:

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NOTES:

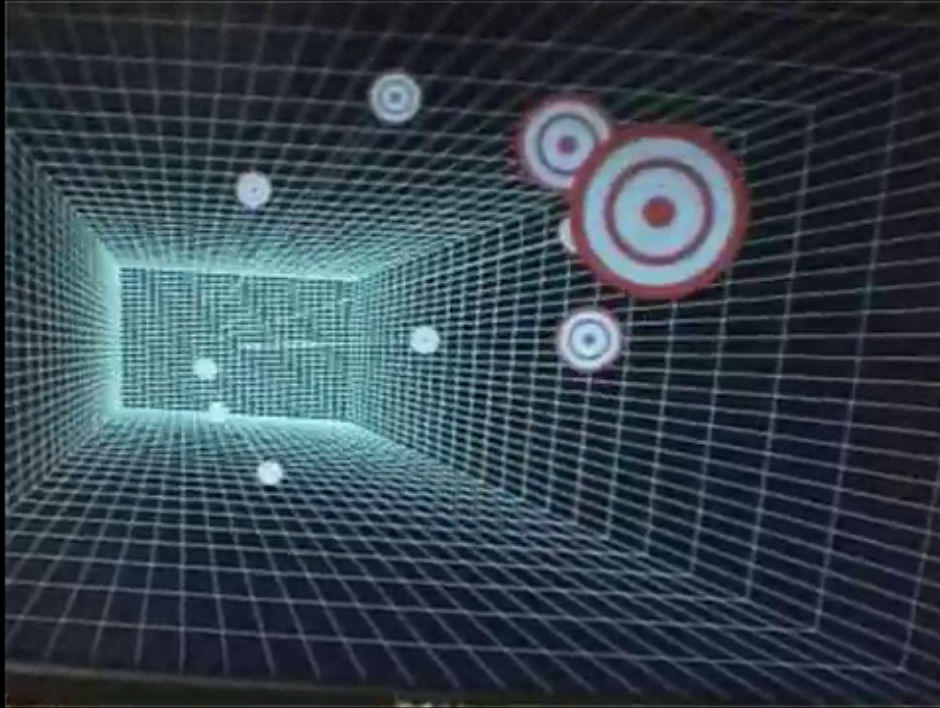
Seeing Machines is an Australian company that makes a software application called FaceAPI that, combined with a high-speed camera, tracks facial features very tightly. Their primary clientele is the automotive industry, who use the technology to measure alertness in drivers by tracking their facial expressions.

Feature Tracking combined with 3D Without Glasses

NOTES:

In an experiment, Seeing Machines took their FaceAPI software and paired it together with Johnny Chung Lee's face tracking 3D technique ...

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CarnegieMellon

NOTES:

... but were able to eliminate accessories all together, by tracking the user's perspective by seeing the position of their eyes.

Face Tracking with Augmented Reality Registration

NOTES:

These next two are pretty straight forward applications of augmented reality, using face tracking for registration.

The Presentation Contains Video
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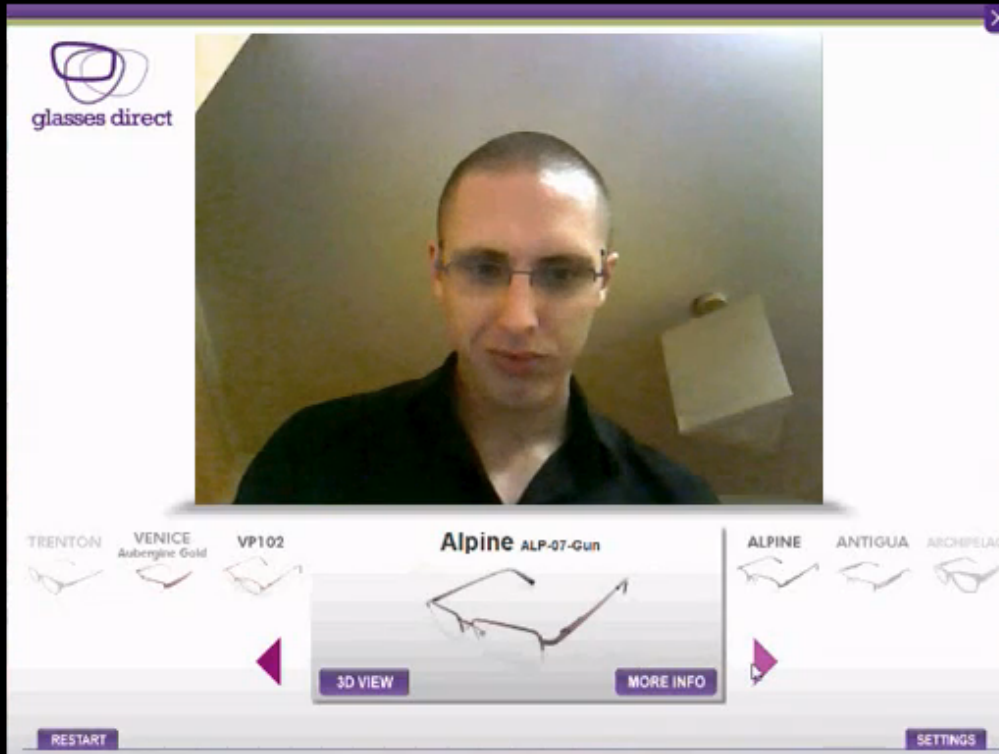
seac02



NOTES:

In this example the South Korean company, Hanul Neotech, builds on the augmented reality platform of Italian software company, Seac02. A new hairstyle is placed on the man's head. The registration is tight and tracks his head movements rather convincingly.

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FittingBox

NOTES:

And here the French software company, Fitting Box, license's their technology to eyewear companies, in this case Glasses Direct. The face tracking software keeps the glasses in convincing registration on the viewers face, allowing them to see how different pairs may look on their face. This is a very practical application where AR is able to add real value for the user in a retail ecommerce context.

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NOTES:

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(Learn more about Philip K. Dick and Minority Report in the end notes.)

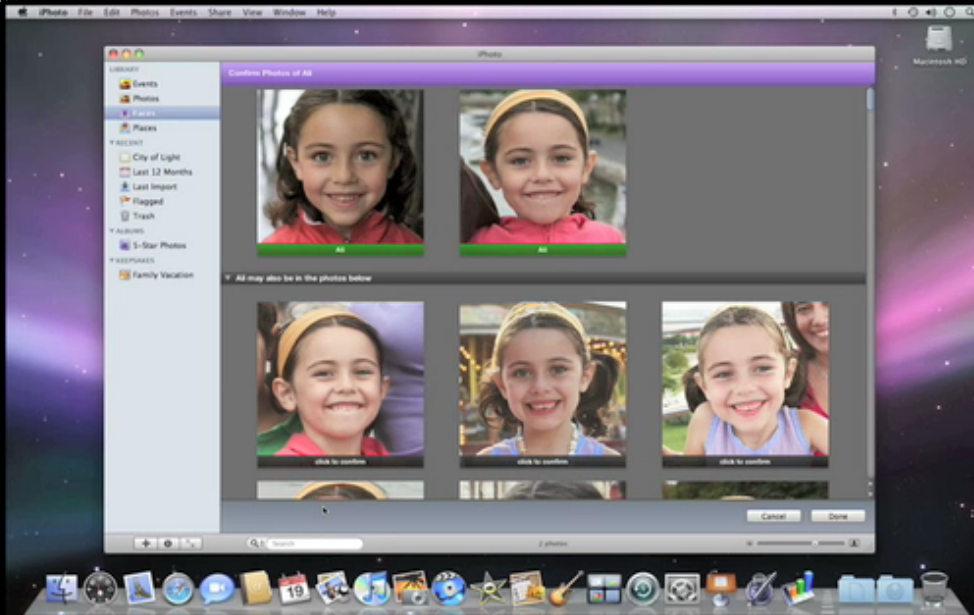
Facial Recognition

NOTES:

... and now for Facial Recognition.

Facial Recognition

The Presentation Contains Video
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NOTES:

You may be familiar with the auto-naming feature in Apple's iPhoto or perhaps the similar feature in Google's Picas. Technology that, less than a decade ago, was exclusively the domain of Government security services, is now so accessible grandmothers use it to catalogue the photos of their grandchildren.

Facial Recognition



MOBILE.
WORLD CONGRESS

NOTES:

As we meet here today at Engage!, there is another event going on across the pond in Barcelona. This week is Mobile World Congress. At last year's MWC there were facial recognition proof-of-concept applications demoed last year by two different teams.

Facial Recognition

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COMVERSE

face.com
is that you?

GSMA

MOBILE.
WORLD CONGRESS

NOTES:

Comverse teamed with Face.com to demo a facial recognition app running on an iPhone.

Facial Recognition

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NOTES:

And The Astonishing Tribe (TAT) partnered with Polar Rose to demo their app, Recognizr. In a little bit of trivia, TAT and Polar Rose had announced their debut well in advance of the event. So knowing the timing, the previous team launched theirs unannounced the day before, also at MWC, stealing a lot of the thunder from the TAT and Polar Rose demonstration.

Facial Recognition

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NOTES:

At this year's Mobile World Congress, another player entered the field. Viewdle, launched in Kiev, Ukraine, demoed their technology early this week at this year's MWC. This video is from a similar demonstration that gave last month at the Consumer Electronics Show (CES) in Las Vegas. Unique to their technology is that it all runs client side, without the need to reference server-side image databases.

Facial Recognition?



NOTES:

You may be familiar with Google Goggles — Google's mobile image recognition software for Android. Now, technically Google Goggles doesn't do facial recognition, but ... this is only because Google has disabled the ability. Those on the Google Goggles team profess that this is actually something the app does best, but out of concern for privacy issues, have chosen to disable that feature ... for now.

Facial Recognition?



`&imgtype=face`

NOTES:

Here's something to check out: There is a hidden feature in Google Image search. If you add the character string: "&imgtype=face" to the end of the URL of any Google Image search, it will return only results that include pictures of faces.

Acquisitions

NOTES:

While it hasn't made it onto the radar of the mass media, this technology — consumer facial recognition on mobile — is moving fast. By last fall many of the companies in this space had been snatched up in acquisitions.

Яндекс



NOTES:

May 10, 2010: An investment group, led by Russian search engine Яндекс (Yandex), takes a US\$4.3M stake in Israeli face recognition software company, Face.com.



Polar Rose 

NOTES:

September 20, 2010: Polar Rose was acquired by Apple (price rumored to be US\$29M).



NOTES:

October 5, 2010: A Qualcomm led group of investors take a US\$10M stake in Viewdle, moving their headquarters from the Ukraine to Silicon Valley, and opening outpost offices in Paris and New York.



NOTES:

December 10, 2010: TAT (The Astonishing Tribe) was acquired by RIM (Research In Motion, maker of the BlackBerry). Though technically not a face recognition company, they were Polar Rose's partner in developing Recognizr.

The Facebook logo, consisting of the word "facebook" in white lowercase letters on a blue rectangular background.

NOTES:

January 31, 2011: Face.com rebuffs an acquisition offer by Facebook, widely rumored to be in the “tens of millions.”



Eric Schmidt, chief executive, said a series of public disputes over privacy issues had caused the management team to review its procedures and the launch of new technologies. According to Google executives, facial recognition is one of the key topics of internal debate.

Mr Schmidt said: "Facial recognition is a good example" ... However, he would not rule out any eventual roll-out, saying: "It is important that we continue to innovate."

NOTES:

In a 2010 interview with the Financial Times, Google CEO, Eric Schmidt, explained that their facial recognition technology has been deliberately held back, due to privacy concerns, but that Google must continue to innovate.

In short, facial recognition technology is coming to the consumer mobile space in 2011 and will be a huge opportunity for marketers. It will also pose serious privacy concerns for society, beyond the scope of this presentation.

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<http://GigantiCo.tv>



**Chris
Grayson**

917-597-4787

chris@chrisgrayson.com

 [chrisgrayson](https://twitter.com/chrisgrayson)



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NOTES:

For Engage!, this presentation was edited from a longer version I've been giving to clients of Humble. The longer version contains additional slides on motion tracking and the impact of open source development for the Microsoft Xbox 360 Kinect controller. These slides here were also changed slightly from the presentation. The acquisition slides were put in chronological order.

Chris Grayson is available to speak on augmented reality and emerging platforms.

END NOTES:

This presentation was given on February 16, 2011, 1:00pm at Jacob K. Javits Convention Center for the occasion of Engage! Expo, on the panel for Augmented Reality: The State of the Market:
<http://EngageExpo.com>

Chris Grayson is Director of Digital at Humble:
<http://Humble.tv>

Read his blog, GigantiCo at:
<http://GigantiCo.tv>

Companies mentioned in this presentation include:

http://Quividi.com	http://Google.com
http://SeeingMachines.com	http://Yandex.com
http://English.ARhunt.com	http://Qualcomm.com
http://Seac02.it	http://RIM.com
http://FittingBox.com	http://Facebook.com
http://Apple.com	
http://Comverse.com	
http://Face.com	
http://TAT.se	
http://PolarRose.com	
http://Viewdle.com	

Other related links:

Read more about Johnny Chung Lee’s research at Carnegie Mellon, at:
<http://JohnnyLee.net>

Mobile World Congress is held annually in Barcelona, Spain:
<http://MobileWorldCongress.com>

The Financial Times article referenced in the presentation can be read at:
<http://TinyURL.com/FT-Google>

Clips from the movie, *Minority Report*, were used to construct the social narrative of this presentation. The movie, directed by Steven Spielberg and starring Tom Cruise, was an adaptation of the book, “The Minority Report,” by Philip K. Dick. Minority Report is Copyright © Dreamworks SKG & Twentieth Century Fox. The clips within the presentation have been shown in compliance with the generally accepted interpretation of fair use in the United States, as described in the Copyright Act of 1976, 17 U.S.C. § 107.

Other books by Philip K. Dick with movie adaptations:
The book “We Can Remember It for You Wholesale,” was made into the movie, *Total Recall*, directed by Paul Verhoeven and starring Arnold Schwarzenegger & Sharon Stone. The book “Do Androids Dream of Electric Sheep,” was made into the movie, *Blade Runner*, directed by Ridley Scott and starring Harrison Ford & Rutger Hauer. The book “A Scanner Darkly,” was made into the movie, *A Scanner Darkly*, directed by Richard Linklater and starring Keanu Reeves & Winona Ryder.

Amazon affiliate links to the books and movies described above:

Minority Report	Total Recall	Blade Runner	A Scanner Darkly	The Minority Report	We Can Remember It for You Wholesale	Do Androids Dream of Electric Sheep	A Scanner Darkly
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