Augmented Reality Projects at IBM

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IBM has recently been working with a number of partners to explore augmented reality (AR) technology, in order to understand how AR can enable new innovative solutions for the future. For example, IBM has developed Android based mobile applications for enhancing the way fans experience sports events. It's also conducting research into AR with a view to enhancing the way we can collaborate remotely. IBM research has a strong background in image recognition and computer vision technologies, and are interested in how this can be bought to bear upon AR technology and solutions.

With support from IBM Research and Nokia Research Center, the VTT Technical Research Centre of Finland created an experimental system that enables people in multiple locations to interact and collaborate with avatars and objects in a single, virtual meeting. Objects and avatars are located in a "virtual" space that mirrors the corresponding physical room.

Sensors, cameras and microphones located on both ends of the conversation allow voices, head and hand gestures and movements to change in concert with the behavior of participants, enabling participants to sense the vital visual cues of body language. In this proof-of-concept, participants in physical rooms wear video see through glasses that depict three-dimensional images of their online counterparts as they stand, walk, talk or demonstrate and manipulate virtual objects shared between the spaces.

The system, called ACME, which stands for Augmented Collaboration in Mixed Environments, was assembled using an open source viewer from Linden Lab's Second Life virtual world, as well as from open source ARToolkit and OpenCV libraries. The use of open source components lowers the costs associated with the project as it matures, and encourages the participation of more computer programmers and developers.

The technology provides a more affordable and eco-friendly alternative to physical meetings. It is also more interactive than telephone conferences, video conferences - and even on-screen meetings held exclusively in virtual spaces.

"ACME is a compelling example of the kind of R&D now being conducted that will enable the business community to work more intelligently, in a more productive, efficient, convenient and immersive fashion," said Neil Katz, an IBM Distinguished Engineer in the company's CIO Office, and liaison with the ACME project. "It's easy to imagine that this technology, especially when it becomes somewhat more mature, will give people a promising new option for collaborating more interactively with colleagues in an increasingly decentralized world."

The research towards this new level of meeting experience was supported by the Finnish Funding Agency for Technology and Innovation (TEKES). IBM Research, together with Nokia

Research Center, provided additional funding and contributed to the technical direction. To view a clip showing ACME in action, please visit http://www.youtube.com/watch?v=DNB0_c-5TSk.

At Wimbledon 2009, the All England Lawn Tennis Club and IBM unveiled smart mobile applications designed to transform how fans access information and keep up with the action at Wimbledon 2009. Since 1990 IBM has worked with the Wimbledon team to send the captured score and statistical data around the world in an instant, keeping on-site broadcasters, media and tennis fans up to date with all the latest scores and statistics.

The Seer Android version features location-aware visualisation technology developed for the G1. The augmented reality application acts as a real-time guide and interactive map of the 2009 tournament allowing selected users to see what others can't, as well as providing up to the second scores.

The Seer Android is an innovative application that was trialled at Wimbledon 2009 that takes a live video feed from the handset's camera, and superimposes content and data associated with various points of interest into that video stream.

From tennis to food courts, points of interest throughout the Wimbledon grounds have been plotted using GPS. By making use of the G1's digital compass and precise GPS coordinates, the application offers a 'heads up display' to show the user what they are looking at. It augments this with other live data from the scoring systems and IBM scouts reporting from around the grounds, to give the user a comprehensive and dynamic insight into their surroundings. For instance, pointing the camera lens towards a court will not only identify the court number, but also display details about the current and subsequent matches.

Seer Android users were also able to use the phones' Map view, which pinpoints their location on a detailed map of the grounds, and can be used as a way finder. The Timeline view is an aggregation of news feeds and updates from IBM scouts, and allows users to see in real-time what is happening around the site. And a handy 'Radar' function indicates the user's current position and nearby points of interest within range.

As a result of the demonstration at Wimbledon, IBM has engaged with a number of clients who wanted to explore how it could be used in their business.