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## Google Glass Premieres in Virtual Surgery



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A surgical team at the University of Alabama at Birmingham has conducted the first surgery using a virtual augmented reality technology called VIPAAR in conjunction with Google Glass, a wearable computer with an optical head-mounted display. Combining these two technologies could be a significant step toward the development of practical and useful telemedicine.

VIPAAR stands for Virtual Interactive Presence in Augmented Reality, and is a UAB-developed technology able to provide interactive real time, two-way video conferencing and it was used last September in a shoulder replacement surgery conducted by orthopedic surgeon Brent Ponce, M.D. at UAB Highlands Hospital in Birmingham.

Watching and interacting with Ponce via VIPAAR was Phani Danturuli, M.D., from his office in Atlanta, who received the image of the surgical field transmitted onto his computer monitor via the built-in camera of the Google Glass worn by Dr Ponce.

VIPAAR technology allowed Danturuli to introduce his hands into the virtual surgical field, and subsequently, Ponce saw Danturuli's hands as a ghostly image in his heads-up display.

Dr Ponce compares the method to a line marking added by a television broadcast to the screen while televising a football game, and explains: "You see the line, although it's not really on the field. Using VIPAAR, a remote surgeon is able to put his or her hands into the surgical field and provide collaboration and assistance."

The two surgeons were able to discuss the procedure in a truly interactive way, with Danturuli observing Ponce's surgery performance and even bringing his hands into his colleague's view as if they were in the same room. According to Dr Ponce this technology is goes beyond Skype or video conference calls which, though allowing for a dialogue, are not really interactive, "it's real time, real life, right there".

The potential in this kind of technology, originally devised by UAB neurosurgeon Dr Barton Guthrie a decade ago, lies in the significant enhancement of patient care, as it enables veteran surgeons to remotely provide valuable expertise to less experienced peers.

He cites the example of a surgeon in a small, regional hospital who has skills and training, lacking only experience, and is looking for guidance on a difficult procedure. Dr Guthrie suggests it would be majorly advantageous to the patient if technology allowed the virtual introduction of hands and instruments into the field of a surgeon. He believes that the VIPAAR technology would allow for remote expertise and experience to be brought to the physician on the front line, providing an invaluable tool for teaching residents and helping surgeons first learning a new procedure.

In 2003, Guthrie approached the Enabling Technology Laboratory in UAB's Mechanical Engineering Department, sharing his idea of using two-way video to enhance surgery. The department was already working on virtual, interactive technologies and the outcome was VIPAAR, which is now a start-up company at Innovation Depot, a technology business incubator partnered with UAB.

Drew Deaton, CEO of VIPAAR, explains that VIPAAR uses video on mobile devices to allow experts or collaborators to connect in real time and to reach in, using tools or just their hands, and demonstrate as if they stood side by side.

Deaton sees the technology's potential applications go beyond medicine and surgery, and he believes it can be beneficial to field service, where in case of a mechanical breakdown it can help field service engineers solve issues and get their customers up to speed as fast as possible.

Judging the results of their first interactive collaboration Ponce and Danturuli were pleased. They consider adjustments will be needed to fine tune the cooperation between VIPAAR and Google Glass, however they can already see useful, practical telemedicine at the horizon.

Just as every phone has picture or video taking capabilities today, Deaton believes that in five years' time, when trying to solve a problem, a smart phone user will be able to connect to an expert who can reach in and demonstrate the solution. He calls it one more step on the technology evolutionary ladder, concluding that "technology is advancing rapidly and we're bringing this technology to market today."

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