

Cuing-up a bright idea

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ARPool uses computer vision – a field that has far more wide reaching and important applications than playing games,” says Prof. Michael Greenspan, who is head of Electrical and Computer Engineering (ECE). Some of these applications include surveillance for security of airports and hospitals, navigation, 3-D mapping, automatic inspection in manufacturing applications, and vision control in space robotics. Still, as Greenspan says, “ARPool is a great tool for building interest and advancing our knowledge of computer vision and for attracting students.”

Judging by the level of enthusiasm for ARPool, Greenspan and his team of students have certainly managed to do just that and at the same time to generate lots of interest in computer vision.

ARPool was recently featured on the British television series *Gadget Man*, which is co-hosted by Stephen Fry, the Emmy-Award winning actor, comedian, author, and self-confessed “gadget fanatic”, Jeremy Clarkson, a fellow high-tech enthusiast, broadcaster, journalist and writer. *Gadget Man* spotlights unique hi-tech gadgets from around the world, and ARPool is certainly one of them.



Gadget Man co-hosts Jeremy Clarkson (left) and Stephen Fry posed for this photo with students Kevin Hughes (second from left) and Salar Awan (right) following taping of the segment of the British television program that featured Prof. Michael Greenspan’s ARPool technology.

Traveling to England, to play pool with celebrities in a pub was a nice perk for ECE grad students Salar Awan, Sc’12, and Kevin Hughes, Sc’11. The pair recently traveled to London to help set up the equipment and explain how the technology works. “Working with Fry and Clarkson was a great

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experience” says Awan. “It reinforced for us the importance of making engineering accessible – of demonstrating real life applications of research.”

Says Hughes, who is equally enthusiastic, “We really enjoyed the opportunity to travel and demonstrate our work. ARPool is such a visual project. You can see and experience improvements immediately, in contrast to a lot of research for which the output is simply an end result, which isn’t as much fun,”

Fry and Clarkson played a game of pool for the cameras. Fry, who used ARPool, still managed to lose to Clarkson who played unaided, causing Fry to quip, “One thing this gadget can’t do is stop your opponent from playing well.”

This was not ARPool’s first venture into the public eye. Besides countless newspaper stories and more than 750,000 YouTube hits, the technology has already traveled extensively, with prior trips to England, France, India, and Toronto – with pending trips back to India, and possibly Spain. ARPool has also been a big hit at engineering conferences and meetings.

The device started as a prototype fourth-year team project in the ELEC 490 undergraduate course. Greenspan and a succession of students, including graduate student Sam Jordan, enhanced and - extended the prototype’s capabilities, building on Greenspan’s previous success with Deep Green – a pool-playing robot that has also attracted significant international media attention.

ARPool uses a camera-projector system to provide real-time feedback to a pool player. Light trajectories that are projected onto the surface of the pool table suggest the best shot to optimize a player’s chances of winning the game. The light trajectories are calculated using artificial intelligence-based algorithms and physics simulations.

Greenspan is working on several other computer-vision applications with various companies, such as Kingston-based Transformix, Ottawa’s GeoDigital, and MDA Space Missions (a unit of MacDonald Dettwiler and Associates), that are doing everything from machine vision to 3-D mapping, to working on the design of the next generation of vision-guided space robots. “Computer vision is interesting - because there’s opportunity for both curiosity-driven and industry-driven research,” says Greenspan, who balances his time between his students, research, teaching, and his role as department head.

“I’m motivated in part by being in such a research-intensive department, and also by working in a research area with almost limitless applications. One of the best things about being at Queen’s is that it’s brilliant to have the opportunity to work with such great students.”

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