Live Action Pong

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We plan to program a pong or tennis-style game that incorporates both the physical and virtual world. Each player will face a monitor, with a green screen on one of their sides and a video camera on the other. They will hold a paddle, which will be marked with bright LEDs so that it will be easily identifiable in image processing. The monitor will display the virtual playing field, displaying a side view of both of the players. The background and paddles will be replaced with sprites. The players will each hit a ball back and forth using their paddle, attempting to get the ball past their opponent. Additionally, they will be able to use buttons on their paddle to launch attacks, which the opponent must try to dodge entirely. The physics of hitting a ball will be simulated using either differences between frames or IMUs to recognize the velocity and angle of the paddle. Sounds and other effects may be added as opportunity permits. A stretch goal would be to allow the user to switch between different types of paddles that have different effects, for instance one shaped like a lacrosse stick that can catch and hold the ball, or one shaped like a golf club for additional velocity.