

Recursive Augmented Reality

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In our project, we will implement an augmented reality system that can overlay a digital image on video of a real world environment. We begin by reading NTSC video from a video camera and storing it in FPGA BRAM, or if more memory is required for computation, in ZBT SRAM. A picture frame with colored markers on the corners is held in front of the camera. We then perform chroma-based object recognition to recognize the corners in the video, and extract the co-ordinates that the overlayed image should be projected to. Using these co-ordinates, we apply appropriate translation, scaling, rotation, possibly skew and anti-aliasing FIR filters to an image. We then output VGA video of the original captured image, with the processed image overlayed on top of the frame. The overlayed image (the “augmentation”) can be arbitrary. When this image is the frame of video that was previously displayed, we call the system “recursive”, as we obtain the same image within itself. Depending on the precision of our image transformations, we could add many layers to this recursion.