

Eric Chang
Mike Iludari
Jess Kaneshiro
Jonathan Steiner

Embedded Systems Project Proposal

Our group wanted to create a project that would incorporate lessons from two classes, Embedded Systems E4986:Music Signal Processing which three members of our group are taking. An idea we came up with is a design that would take two microphones and would produce the ability to use a projector to point out the source of the sound. The basic idea for this comes from the Haas Effect, also known as the Precedence Effect. Haas states that from a delay of 0.7ms-50ms, when a person hears two versions of the same sound, the person will localize the sound as coming from the first arrival and will not consciously hear the second sound. That means the person creates a phantom image of point source for where the sound comes from. So, using a projector like the one used in class, we should be able to shine a vertical bar where the sound is coming from.

To do this project, first we would need to set up the EE part of the design. This would involve setting up two microphones attached to a digital oscilloscope to measure the delay between the two heard signals. The microphones would have to be placed a very specific distance from the plane the sound will come from for the calculations to be exact. After, we would need to do some trigonometry to figure out the exact equation for the relationship between delay and position along this plane. Finally, we would program the XESS XSB-300E to take the delay and output a video signal that would display a blank screen everywhere except where the sound is coming from. In that place, a vertical bar would be shown. We cannot localize the point due to complications in determining vertical points which is far beyond our abilities. We can hopefully get all the EE equipment from Prof. Eleftheriadis who teaches E4896.