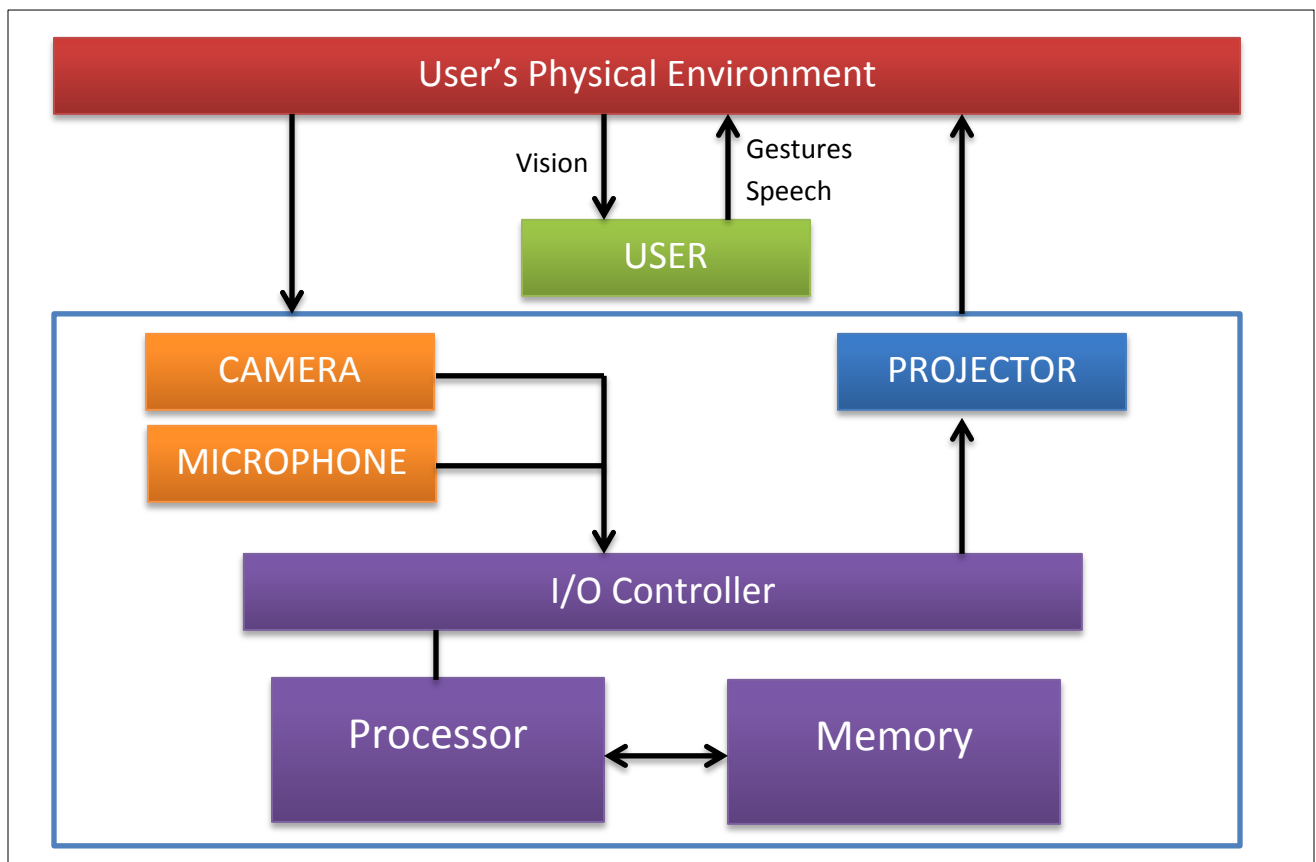# ConnecTied

ConnecTied is an ultra-portable spatial augmented reality device that would project digital information onto the user's physical world which can further be controlled using human gestures, objects and environment. Thus, allowing users to interact and control the computing world without any interface barrier of traditional I/O Devices. The simplest implementation would be the user using the wall in front of him/her as a screen, the desk as the keyboard (with keys projected on it), supplemented by voice and gestures to interact with the computing world powered by a wearable processor. The project idea is inspired by Sixth Sense technology developed at MIT Media Labs.

Basic "Initial" Features/Applications:

- Detection of common physical environment objects.
- Human Gesture and Speech Recognition.
- Real time information processing for the recognized objects.
- Projection of digital graphics on the objects.
- Ability to interact with:
    - Projected graphics
    - Other Digital Devices
    - Other ConnecTied Devices
    - People

Block Level Schematic

Executive Summary

In the current scenario, to access a computing device, one has to interact with a range of I/O peripherals which are typically not quite in the "human" domain. In other words, the user has to adapt to the limitations of the computing devices in terms of their integration with the everyday objects he/she interacts with. This project aims at bridging the gap between the two domains by replacing the traditional ways of interacting with the computer with a more human centric one wherein the user's environment itself becomes the output medium and user's speech and gestures becomes the input for the computer.

One of the major drawbacks of using the traditional I/O peripherals is that they limit the user movement and device portability. The proposed device would be a great way to tackle this problem. ConnecTied would be an amalgamation of a mobile computing device, a projector, a motion sensing camera and a microphone packaged into two separate modules combined together on a wearable belt across the shoulder. It would create an augmented reality scenario, but in the "real" world achieved by projecting the dynamic images/ information virtually on any physical medium in the user's surrounding. The mobile computing module would go on the back of the belt connected to the interface module containing the projector, microphone and the camera in the front. Microsoft's Kinect would be an excellent alternative to the camera provided it could be modeled into a wearable. The interface module would basically substitute for the I/O functionality while the computing module would provide power and computation using a low power ARM processor. The wired connection will ensure super-fast communication and real time processing.

Engineering the software for the device will be a very crucial task. The low level device drivers would typically be provided by the device manufacturers for the camera/Kinect, microphone and projector but these would have to be tailored to the processor architecture. On the high level end of the software, implementing computer vision mechanisms such as gesture recognition and speech recognition would the most demanding to work with. Further, the augmented graphical user interface would be a big challenge in itself. As a whole system, the device would run on a real time operating system optimized towards high performance and balanced power usage.

The concerns raised during the survey stresses towards overall cost, battery life and functionality of the end product. These definitely are major problems that would need to be tacked in the design phase of the project as it would significantly impact the commercial viability and usability for the product. The current expected cost of the system is about $600 which is within the average price a user would like to pay for such a product based on the short survey.

The applications for this device are truly endless. From completely revolutionizing the way we work, play and interact with computers, to the ability to communicate with other similar devices, this product would add a totally new dimension to the ultimate integration of the physical and computing domains. Thus, it might even prevent us from becoming machines sitting in front of other machines.