In this project we implemented a human motion tracking system using triaxial inertial accelerometers. We receive voltage values from the accelerometers for the three axes which are corrected for noise and processed for yielding kinematical parameters of acceleration, velocity, displacement and angular movements. These results are then simulated graphically through a GUI. The project has wide applications in defense, medicine, video games to animate in-game characters, film making (also wide application in animated movies), this can be useful for training simulations, visual perception tests(in sports), or performing a virtual walk-throughs in a 3D environment and Human Computer Interaction. The prototype costs less than 50$ which can be further reduced with mass production and uses widely available commonplace components (an ATMEGA-32 microcontroller, any available triaxial inertial accelerometer. The results obtained show superior performance in comparison to similar projects based on computer vision techniques. The prototype is also more mobile and robust to changes in the usage environment. The instrument is easily expendable to use multiple accelerometers and integrating gyroscopes for enhanced tracking.

Our instrument is mobile and robust to changes in the usage environment. Most of the work done in field of motion tracking is based on vision techniques, but these are very sensitive to usage environment changes. Our instrument can be used anywhere doesn’t need any setup. Vision techniques for motion tracking have a lot of limitation associated with them especially in 3d movements. In certain tasks where robotic arms are used for complex operations, there this instrument could provide adequate and easy human control on those robotic arms. In short we could implement this technique in robots for performing tasks in inaccessible conditions and/or locations for humans.

We have developed a basic module of motion tracking system which reproduces motion made by human arm, using animated 3d object of human arm.

1) According to the human arm motion, analog voltage signals are generated by the accelerometer for 3axis.Different voltage signals (analog) are sent to micro controller (atmega-32) where they are converted to digital signals and stored in form of data

packages.

2) Stored data is processed to remove errors and noise, through different digital signal processing techniques. Calculation of geometrical (angles)and kinematical(acceleration,

Velocity and displacement) parameters with the help of processed data string obtained after sampling and filtering.

3) A 3d object is developed in powerful 3d modeling application software 3d-max.

4) Developed a control system for 3d arm object, in visual studio environment, as per data received. Instructing the 3d arm to motion according to the angles and displacement parameters of 3 axes (x,y,z) received.

We started the work in july'09 till now we are capable of reproducing the human arm motion with help animated human arm in GUI, but still in order to increase accuracy we are now planning to integrate gyroscopes along with accelerometer for enhanced tracking. In further stage we would like to design it for complete human body.

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