



Humanitarian Technology: Science, Systems and Global Impact 2015, HumTech2015

## Low Cost Wireless Sensor Network Based Intelligent Retina Controlled Computer

Usman Munawar\*\*, Muhammad Saqib Jamil, Anam Mazhar\*\*, Abdullah Ahmed, Ahsan Ikram, Syed Adil Abrar, Sahar Atif

*University of South Florida, Tampa, 33613, United States of America*

*\*\*Islamia University of Bahawalpur, Bahawalpur, 63100, Pakistan*

*\*Al-Khwarzmi Institute of Computer Sciences, University of Engg. & Tech., Lahore, 54670, Pakistan*

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### Abstract

A very serious problem has been identified for past many years that paralyzed human beings became isolated from the society for not having a proper existence and due to their reluctances of doing normal life works. Therefore, we have researched on the Human Machine Interaction using Physical Human Body Gestures and came up to proposed solution of the said issue as Low Cost Retina Controlled Computer Using Head mount and Wrist Tilt for Persons who are Paralyzed and cannot be able to move their hands and even they can't able to walk. Conventionally, we named it as simple as Retina Controlled Computer, is based on Google Glass vision using motion recognition, Zigbee Wireless Technology, Retina Controlled Device that allows human beings with paralysis resulting from Paralysis to do everything on computer even controlling the personal mobile phone using only their Eye and Head movements. This whole project will be based mainly on the new technology of Low Cost Wireless Zigbee Sensors, Arduino Microcontrollers, and motion and retina recognition using Accelerometer. Arduino Microcontroller consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. Therefore, making an Intelligent Low Cost Eye Controlled Computer, based on new technologies will play a vital role in revolutionizing the field of Biomedical engineering and opening the new horizons of research.

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Peer-review under responsibility of the Organizing Committee of HumTech2015

*Keywords:* Zigbee Wireless Sensors; Arduino Microcontroller; Accelerometer;

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### 1. Introduction

Advancements in the computer technology, have led to unprecedented new techniques in science and engineering. As the world is tending towards providing technical solutions to the real world problems scientists are researching

extensively for the technical solutions to the real world problems that can help humanity in every way. Human Machine interaction or Human Computer Interaction is one of the major relation in technology that is helping the humanity in every way. Human- Computer Interaction have become one of the most important areas for research and development. Humanitarian technology is the branch of engineering in which technology is working for the benefit of humanity through the direct interaction of the human and machines for solving the real world problems. Humanitarian technologies have now a great impact on the world because of its advancements in the fields of energy, communication, controlling and biomedical systems. Human machine interaction studies the communication between a computer and a human so it takes knowledge from the human side as well as the computer and uses the combine knowledge to benefit humans. The HMI's goal is to improve the interaction between humans and computers by exploring the everyday problems of humans and trying to make machines that can benefit the humans and fix their problems.

### *1.1. Humanitarian Technology*

The Humanitarian technologies are increasing by the time with the specific skills and training that is being required to overcome the problems. The volunteering passion to change the world into a healthy, sustainable and more secure for the living populations has increased the need of the new technologies that help the humanity directly. For that reason, emerging technologies and new techniques and ideas have been implemented including solar powered, biomedical devices, low cost solutions for communications in disaster situations and many other fields. The projects based on Humanitarian technologies have their specific objectives such as helping the person or the community. These are sub divided in three kinds of humanitarian solutions as Disaster, recovery and redevelopment. In this project we have worked on the redevelopment sector of the humanitarian technology and solved the problem of the people who are paralyzed by the attack of Paralysis or Amyotrophic lateral sclerosis (ALS) and make the human body with the only movement of head. Therefore, we have researched over this problem in the initiate stage and then worked on providing them with the solution that is in the range of every person who has been somehow been accidentally comes in the range of paralyzed people.

### *1.2. Problem Description*

It has been seen for the past many years that people have been suffered from Amyotrophic Lateral Sclerosis (ALS) or Paralysis that have become one of the rapid increasing fatal disease that is been noticed as the correct figure of 12000 persons per 100000 in US caught this disease and around 5000 per year are diagnosed with that disease. In Pakistan, almost 18000 patients diagnosed as ALS patients, which is itself a huge number of patients. As a result, many persons get out of the community of the normal persons that made them useless in the community, which is a bitter reality. In this disease, the human body muscles become weaker as the time passes and hence the last stages makes the person not even able to lift himself from the bed. There are many causes having major paralysis and temporary paralysis as well, few of them are describe as it is caused by the damage in nervous system, especially in spinal cord, stroke is another cause of paralysis and it is one of the major causes, other causes are trauma with nerve injury, cerebral palsy, peripheral neuropathy, poliomyelitis Parkinson's disease, ALS, botulism, spina bifida, multiple sclerosis, and Guillain-Barre syndrome, during REM sleep, temporary paralysis occurs and deregulation of this, it can lead to episodes of waking paralysis and curare is a drug, that interface with nerve function also cause paralysis. As a result they make themselves away from the community and their life. This problem which we felt as being one of the problems that we can resolve through technology and giving them the life they want to live for themselves. By our proposed technical solution they can not only able to work with the computer but also they can work and earn for their family. Our proposed solution of innovative intelligent wireless human body movements' computer controlling device can make them able to be part of the community again. This device will make a revolution among the humanitarian technologies. They can do everything while able to control the computer through their head movements. This intelligent device will not only solve the problems of ALS but also help the other people who have been advised to bed rest for long durations.

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