ARC '16

مؤتمر مؤسسة قطر
السنوي للبحوث
QATAR FOUNDATION
ANNUAL RESEARCH
CONFERENCE

Towards World-class
Research and Innovation

Information Communications Technology Pillar

Wireless Car Control Over the Cellular System

Haleema Khamis Al-Shamali, Nizar Barah Zorba, Parisa Yazdjerdi, Sara Talal Hammouda

Qatar University, QA

Email: ha1000968@qu.edu.qa

Nowadays, electric robots play big role in many fields as they can replace humans and decrease the amount of load on humans. There are several types of robots that are present in the daily life, some of them are fully controlled by humans while others are programmed to be self-controlled. In addition there are self-control robots with partial human control. Robots can be classified into three major kinds: industry robots, autonomous robots and mobile robots which will be discussed. One of the main advantages of mobile robots is to provide safety by replacing humans to enter dangerous places like industrial areas, factories, underground rail tunnel, buildings after disasters, etc.

Our objective is to design and develop a mobile robot car that is capable of reaching the needed destination using a camera that will provide a surface monitoring, while being controlled using four directions controller embedded in an Android mobile phone application. It is operated over a cellular communication system (that will provide national and even international (through roaming) coverage for its working area) in parallel with its self-action in presence of obstacle. Its self-action is maintained by an ultrasonic sensors that will be mounted on the car body. This is of crucial importance as disaster areas usually loss their Wi-Fi connections.

Its main role is to provide an insight monitoring for disaster areas, damaged factories with hazard spilled over products and remote anti-terrorist protection. There are many areas where human can't enter due to hazardous and fatal conditions or small dimensions, for instance collapsed buildings, areas after disasters and earthquake, nuclear power plants and so on. For example, the great earthquake that occurred on March 11th 2012 and caused damage to the north part of Japan particularly in Fukushima Daiichi nuclear power plant. The disaster result in disabling the power supply and heat sinks which leads to release of radioactivity in the area surrounding the plant. Such areas and environment are very dangerous to enter by human being, in this case robotic car can be sent in order to search, discover and provide live communication.

The project is divided into three main units: robotic car, cellular communication system and Android application. The body of the robotic car is a plastic magician chassis programmed using an Arduino micro-controller with

QSCIENCE.com
An Initiative of Qatar Foundation

collaboration of sensors, motors and shields to avoid the obstacles and enable the surface monitoring of the car surrounding. The cellular communication system aims to build a cellular communication bridge between the Arduino micro-controller and the user interface controller, which is the third part as a user-friendly application which has been designed using Android Studio software, to control the robot through a smart phone at any place in the World. This project establishes two ways of communications; from the robot to the user showing the video content and status about the scenario. And from the user to the robot indicating the direction, distance and/or offloading demands.

We would like to present the project objectives, challenges and results, as well as a comparison to previous state of the art.