Ubiquitous Wireless Computing: Current Research Progress, Challenging, and Future Directions

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Abstract

The aggressive research activities and generous studies focusing on the ubiquitous mobile computing carried-out during the last two decades have gained very tremendous outcomes to apply in broad areas of modern society lives. In the near future, the computing technology application is highly possible to emerge as the dominant method to connect any objects to the global ICT infrastructure, the internet. This talk mainly discusses several R&D achievements performed during the last five years by our researchers group at the Department of Electrical Engineering, Faculty of Engineering, Hasanuddin University, Indonesia. There are a number of attractive studies where the mobile computing concepts have been widely applied. These include wireless environment monitoring exploiting the powerful performance of the sensor networks, object tracking, smart building, smart parking, the intelligent transportation system (ITS), sub-marine environment monitoring, underwater mobile objects control, and biomedical engineering applications. The advanced studies concerning the wireless computing innovation such as the green and smart laboratory, wireless power transmission, high altitude communication systems and wireless digestive sensor network are also currently initiated. In general, most of the wireless computing apparatus constructed optimize the limited communication channels available in the ISM frequency bands. These spread from 433 MHz band, 875 – 925 MHz band, and 2.4 – 2.5 GHz band. The more challenging studies will later utilize the higher frequency bands including the 5 GHz and 10 GHz bands. Some technical and non technical experience existed in the adoption of the traditional methods on the mobile computing devices construction will be analytically compared with the modern design concepts supported by the advanced mobile operating systems (such as Android OS, Windows mobile OS, Tizen OS and iOS platforms). The significant impacts of the rapid development of the mobile computing technologies to the improvement of the curriculum of the telecommunication and informatics engineering study program will be also presented.