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Flexible Network System for Ubiquitous Computing Using Fabric Material

Masashi TODA † Junichi AKITA ‡ Kunio IWATA †

† Future University-Hakodate ‡ Kanazawa University

E-mail: {toda, iwata}@fun.ac.jp akita@is.t.kanazawa-u.ac.jp

Abstract In order for an individual to enjoy a ubiquitous system freely according to his life style, a base system which realizes the flexible installation of each wearable or ubiquitous device is required. In this research, we propose a new computer-sensor-actuator network architecture, which is named “TextileNet”. TextileNet uses the surface and back of cloth as a couple of electrodes, and it provides electric power supply and data communication way using these electrodes. TextileNet has two technological topics, electrical conductive cloth and data communication unit. We developed a prototype system as a wear, and evaluated their operation of our system. TextileNet system is not specified for a certain application, and can be employed the wide applications of the wearable or ubiquitous computing system as an infrastructure.

1. Introduction

We propose the new computer-sensor-actuator connection architecture, which is named “TextileNet” for both the ubiquitous and wearable computing system. It provides both the power supply and communication methodology for all the devices installed as well as the installation and change freedom of their layout. The TextileNet is regarded as the infrastructure for both the ubiquitous and the wearable computing system that provides the flexible installation of each devices, which is required for an individual to enjoy the ubiquitous and the wearable computing system freely according to each life style in welcoming ubiquitous or wearable age.

2. Implementation of TextileNet

2.1. Electrical Conductive Cloth and Wear

As a base environment of TextileNet, we notice the electromagnetic shield cloth whose surface resistance is about 0.5Ω/sq, and make a jacket using this cloth.

2.2. Data Communication Unit

We made an original data communication unit which can provide electrical power supply and data communication methodology for all the wearable devices. Figure 1 shows data communication unit which we made.

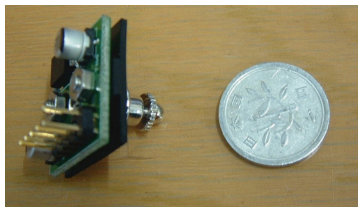

Figure 1　Data communication unit.

3. Experiment

We carried out the evaluation experiment for the developed TextileNet system,. We prepared the five devices, and they are installed on the developed conductive wear as shown in Figure 2.

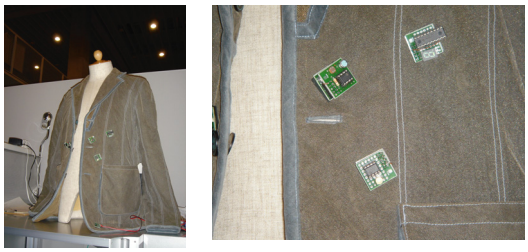

Figure 2　TextileNet system.

4. Conclusion

We proposed and described a new network architecture which is named TextileNet.

References

[1] Mark Weiser, “The computer for the 21st century”, Scientific American, Vol.265, No.30, pp.94-104, 1991.