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Implementation of Network System for Bio-physical signal Communication

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Abstract

This network system for home care realized communication by the bio-physical signal, to convey physical rhythm. Four function of displacement had point of a Vision, Somatosensory, Vestibular and CNS. Bio-physical signal was decided to design a maximum points and minimum points with 0.01unit in reference level. Bio-physical signal was checked to compound physical condition of body posture for sensory organ. There detected a measurement of Vision, Somatosensory, Vestibular, CNS and BMI. The service of network system of home can be used to support a health care system for health assistant in health care center. It will expect to manage a physical parameter for network communication.

Keywords: *Data acquisition system, Network communication, Network system, Bio-physical signal*

1. Introduction

Home networking has become widely ubiquitous in recent years. A home network is composed of computers having network interfaces capable of accessing the Internet, termed as the External Interfaces, and network interfaces to communicate with each other, termed as the Internal interfaces [1]. A multi-homed computer has multiple network interfaces to access networks. Generally, the multi-homed computer communicates with a destination host through merely one of the network interfaces but has the other network interfaces idle. The multi- homed computer does not use more than one network interface to communicate with the destination host because the transport- layer protocol identifies a connection with a pair of addresses/ ports associated with the network interfaces of communication correspondent [2-5]. Several biological structures found in living organisms can be considered as physical system. Most of physical system can be found in body. Physical system in body include: biosensors, bio-actuators, biological data storing and control units[6]. Expected features of future physical system are already present in a moving body, which can be defined as a self-replicating collection of physical system [7]. Maintaining and controlling posture balance in static state requires correctly detecting the condition through peripheral sensory system, that is used the information provided by the vestibular system [8]. The afferent information must be processed and interpreted correctly by the central nervous system(CNS) through spinal and brainstem reflexes and higher order structures[9, 10]. This paper was used to establish the stability for the evaluation, prevention and treatment of the biophysical information and to control data processing system.

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2. System Descriptions

2.1 Network system of Bio-physical signal

The architecture of the proposed system was depicted in Fig 1. System architecture of a bio-physical system presented physical signal for moving state by the exercise platform. Data sheets acquired a data control system signal processing. The equipment was designed as data acquisition system and signal processing system. Signal processing was used computer analysis from acquiring signal.

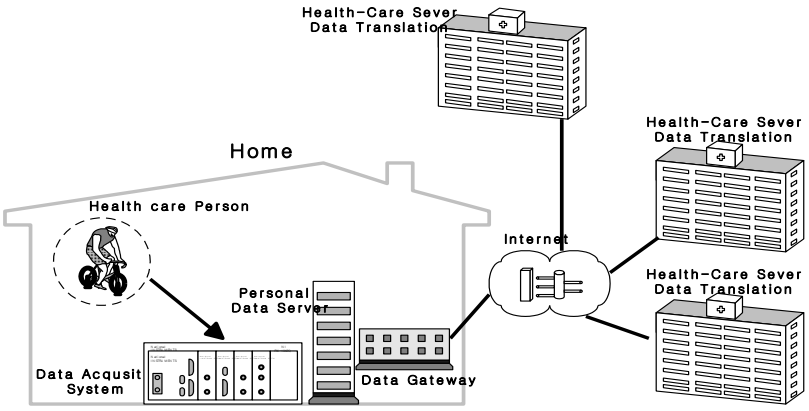

Figure 1. System architecture of Network system of Bio-physical signal for communication

3. Algorithm of signal flow for Methodology

3.1 Displacement of reference & difference axial value

The architecture of the displacement of different value was depicted in Fig 2. System architecture of reference & difference axial value showed to flow axial signal at signal input.

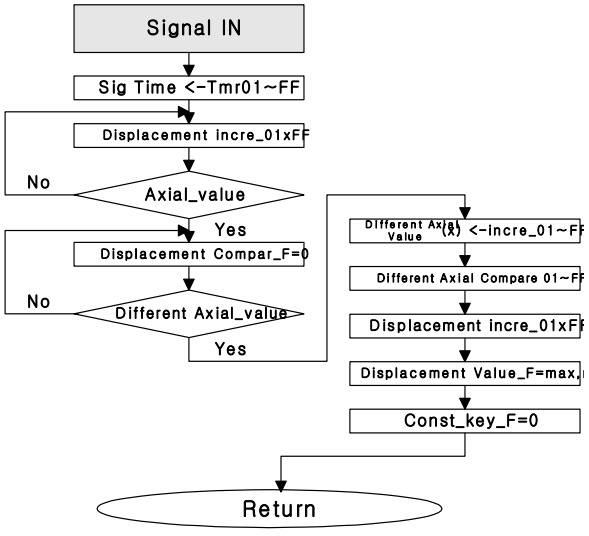

Figure 2. Displacement of Reference Axial and Different Axial value

3.2 Displacement of Point value & Reference value

The architecture of the displacement of point value was depicted in Fig 3. System architecture of point value & reference value showed to flow distance signal at signal start.

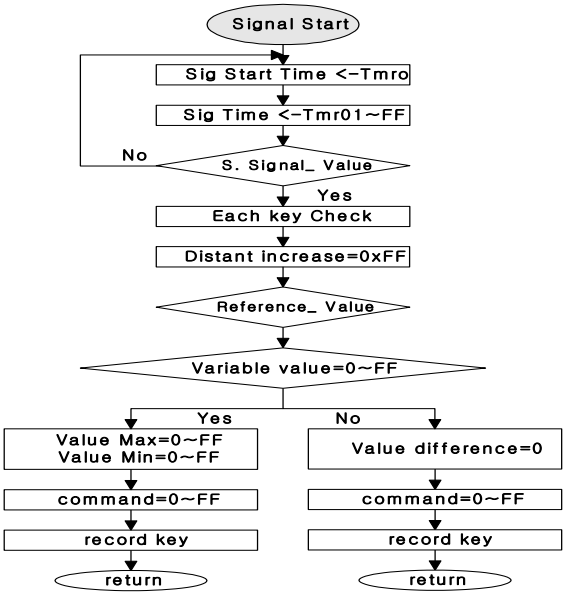

Figure 3. Displacement of Point value and Reference value

3.3 Displacement of % Range variable value

The architecture of the % range variable value was depicted in Fig 4. System architecture of % range value & reference displacement value showed to check a signal time.

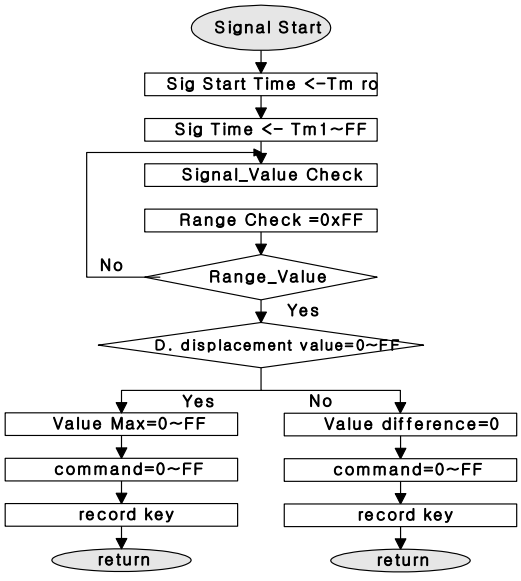

Figure 4. Displacement of % range variable value

4. Simulation Results and Analysis

4.1 Comparison of BMI Index & Weight Distribution

The subsection gives an analysis for BMI Index and weight distribution, these parameters and condition are dependent on each other. Several data are performed and results are explained as follows. The comparison of the differences value between BMI Index and weight distribution observed with body moving (Figure 5). The many differences of the physical parameter confirmed the sway on the standing.

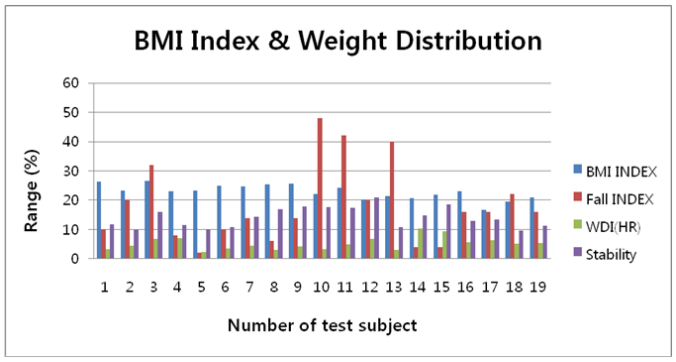

Figure 5. Signal data of the BMI Index and Weight Distribution

4.2 Comparison of Physical signal & Fall Index

The subsection gives an analysis for physical signal and Fall Index, these parameters and condition are dependent on each other. Several data are performed and results are explained as follows. The comparison of the differences value between physical signal and Fall Index observed with body moving (Figure 6). The many differences of the physical parameter confirmed the sway on the standing.

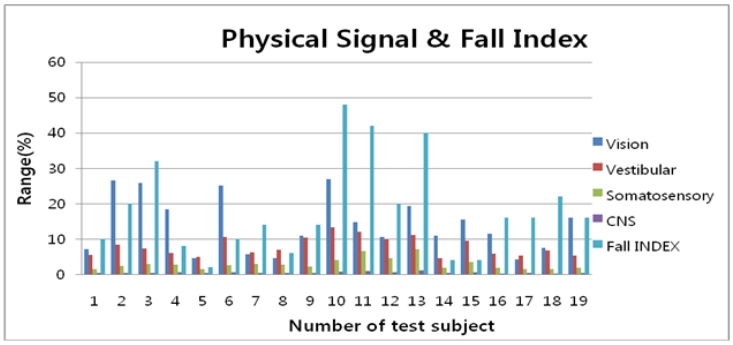

Figure 6. Signal data of the Physical signal and Fall Index

4.3 Comparison of WDI & Stability

The subsection gives an analysis for WDI and Stability, these parameters and condition are dependent on each other. Several data are performed and results are explained as follows. The comparison of the differences value between WDI and Stability observed with body moving (Figure 7). The many differences of the physical parameter confirmed the sway on the standing.

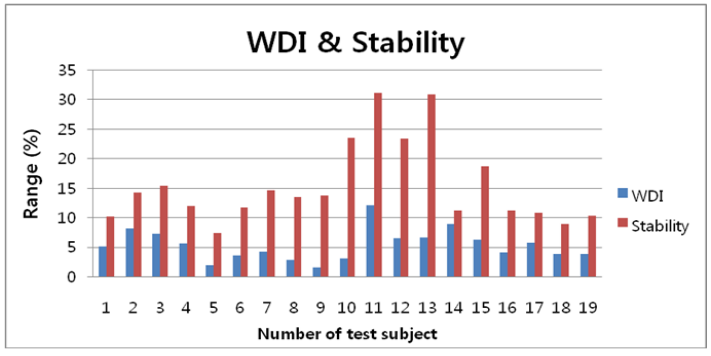

Figure 7. Signal data of the WDI and Stability

5. Conclusion

This network system was to care for the communication at home by the bio-physical signal, to convey physical rhythm. There was four function of displacement that was take point of a Vision, Somatosensory, Vestibular and CNS. There was to design bio-physical signal that was decided a maximum points and minimum points with 0.01unit in reference level. Bio-physical signal was checked to compound physical condition of body posture for sensory organ. There detected a measurement of Vision, Somatosensory, Vestibular, CNS and BMI. The service of network system of home can be used to support a health care system for health assistant in health care center. It will expect to manage a physical parameter for network communication.

References

[1] Tzu-Chi Huang , Sherali Zeadally, Naveen Chilamkurti , Ce-Kuen Shieh, Design, mplementation, and evaluation of a Programmable Bandwidth Aggregation System for home networks, Journal of Network and Computer Applications, pp.743-759, 32, 2009.

[2] Argyriou A, Madisetti V. Bandwidth aggregation with SCTP. In: Proceedings of IEEE global telecommunications conference, December 2003, San Francisco, USA, pp. 3716–21,2003.

[3] Hari A, Varghese G, Parulkar G. An architecture for packet-striping protocols. ACM Trans Comput Syst (TOCS), 17(4):249–87,1999.

[4] Hsieh H, Sivakumar R. A transport layer approach for achieving aggregate bandwidths on multi-homed mobile hosts. In: Proceedings of the 8th annual international conference on mobile computing and networking, September 2002, Atlanta, Georgia, USA, pp. 83–94,2002.

[5] Kim KH, Zhu Y, Sivakumar R, Hsieh HY. A receiver-centric transport protocol for mobile hosts with heterogeneous wireless interfaces. Wireless Networks, 11(4),pp.363–82,2005.

[6] E. Drexler, C. Peterson, G. Pergami, Unbounding the future: The nanotechnology revolution, Foresight Institute, Technical Report, 1991.

[7] G.M. Whitesides, The once and future nanomachine, Scientific, American (September), pp.78–83,2001.

[8] Massion J. Movement, posture and equilibrium: interation and coordination. Prog Neurobiol, 38, pp.35-56, 1992.

[9] Winter D.A., Patla A.E., Rietdyk S., Ishac M.G., Ankle muscle stiffness in the control of balance during quit standing. J Neurophysiol, 85, pp.2630-3,2001.

[10] Beloozerova I.N., Sirota M.G., Orlovsky G.N., Deliagina T.G., Activity of pyramidal tract neurons in the cat during postural correction. J Neurophysiol, 93, pp.1831-44, 2005.