USN과 스마트폰 응용 서비스

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Application Services of USN and Smart phones

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● Abstract ●

USN(Ubiquitous Sensor Network) technology is going to enhance important elements in the ubiquitous society including quality of life, industry, productivity, convenience, stability and transparency. Various services using USN and smart phones have been developed and more widely used. This paper discusses various application services.

Keywords: USN, Smart phones, Application services

I. Introduction

USN (Ubiquitous Sensor Network) encompasses technologies and cutting-edge intelligent services which may properly provide data for users (home, hospital, office, logistics, military, transportation, etc.). USN does this by transmitting, collecting, storing and analyzing sensor data through real-time networks after detection of the nearby environmental data (temperature, humidity, impact, pollution, etc.) based on object recognition data from wireless sensors (electronic tags) with telecommunication capabilities attached to every material in our scope of interest[1, 2].

The USN service may rapidly increase transparency and efficiency in logistics and distribution, give safe lives to the old and the disabled and allow people to enjoy stable lives by continuously monitoring the environment in which we live. Also, it will make a society with upgraded quality of life, increased industrial productivity, innovative public services and enhanced transparency. The system controls and prevents fires or overheating due to cooking in the kitchen, takes measures by immediately notifying operators in case of increasing pollution level in water sources or purifying the sources by itself. In the public sector, it may establish a public notification system due to recognizing disasters, including wild fires, stream floods or landslides, in real time. It is possible to track stolen artifacts or artworks by attaching electronic tags and the system may be linked to disaster prevention systems by monitoring roads and underground facilities in real time. USN and smart phones are core parts of the ubiquitous society which will seek to upgrade the quality of life and increase productivity, convenience, stability and transparency in industries as a whole, working as a growth engine for the next generation. This paper focuses on USN and smart phones application services and gives specific examples.

II. Application Services

The USN service uses objects and environmental data sensed by the USN and means a cutting-edge service in the ubiquitous society providing tailor-made intelligent data regardless of time, place and people. The USN service is expected to be provided to users with gradually developed features in the future. In the initial phase, services are provided from the system through networks configured with sensors for supervision and monitoring. The system mainly uses fixed sensors to collect data and establish its management system. In the next phase, it is possible to recognize a specific situation (user, physical, computing system) using active sensors. Various sensors

exchange data with each other, move using networks and perform supervision and monitoring capabilities. In the last phase, sensors may perform data collaboration and situation management while moving and establish autonomous response systems among the sensors. It is similar to communication among people and technologies communicating between people and objects are applied.

This section shows several representative services of USN and smart phones.

1. Environment, Disaster Service

Preventable disasters using ubiquitous sensor networks include natural disasters like tornadoes, el Niño, typhoons, tsunami, yellow storms, floods, earthquakes, volcano eruptions, wildfires, landslides and avalanches, microbe propagations like infectious diseases and pests and calamities in roads, department stores, stadia, warehouses, yards and cargo handling areas with many people.

2. Home Service

Home services which may be provided by ubiquitous sensor networks include from establishing basic relations including identification, internet ID/PW and mobile phone ID/PW to indoor environments like ventilation, light intensity, temperature, humidity, cleanness and oxygen, appliances like boilers, refrigerators, washing machines, microwaves, gas burners, beds, electric mats, toasters, vacuum cleaners, coffee makers, electric cookers, kimchi refrigerators, air conditioners, video recorders, stereos, game consoles, TV sets/radio and satellite set-top boxes and automobiles. The system remotely controls all the devices above and receives and transmits data. The u-Home service is mandatory for health and convenience of all the family members and will gradually have wider use.

3. City Service

A u-City means an innovative city which automatically provides requested services by intelligently recognizing situations, services integrating all the functions and customized services by applying technologies with the concepts of 'always connected', 'broadband' and 'network integrating all the devices' and a future city applying BcN, RFID, USN, IPv6 and other infrastructure technologies to various elements in a city. The u-City intellectually manages and optimizes various situations related to city functions regardless of people, object and space, upgrades quality of life by providing integrated services at any place or time and is going to play a role in creating new industries through combining technologies. That is, the integrated u-City services include assets, management resources, facilities, logistics/distribution, residence, environment, transportation,

education, health and public administration by combining the ubiquitous infrastructure with specific technologies like sensing, recognition and telecommunication.

4. Healthcare Service

This means health management and medical service provided anywhere and anytime by using wired and wireless networks and the u-Healthcare scope includes from the medical instrument industry and services managing diseases to maintaining and upgrading normal people's health[3]. People enjoy healthcare services not only in hospitals but also in houses, schools, workplaces, cinemas, parks, roads, forests and mountains. Expanding such medical services will broaden living spaces for patients, the disabled and the old who live in hospitals or healthcare centers. People may have medical checkups not once a year but year long and minimize damage due to time difference between outbreak and treatment.

5. Transportation Service

The system maximizes efficiency of transportation facilities by collecting and handling real time transportation data through applying cutting-edge transportation, electronics, telecommunication and controlling technologies to transportation elements like roads and vehicles and improving transportation convenience and safety. Also, the system has been expanded to various transportation fields including buses, taxis, subways, railroads, air traffic and ships.

Recently, shipbuilding & marine engineering companies established USN-based integrated fire monitoring by combining cutting-edge ubiquitous IT technologies to meet expectations for safety among ship-owners and actively cope with fire accidents. In addition, some companies tries to build a stepping stone focusing on the concept of ubiquitous and expandability considering future expansion by adding sensors/vessels and ship types. In the future, the system will be rapidly introduced due to the growing tourism industry with cruise ships worldwide.

III. Conclusions

Introducing USN technologies has been our focus due to its advantages including convenience, cost reduction, improving aesthetics and increasing productivity and it provides an optimized environment by obtaining various data regardless of place and time for all industries like crime prevention, disaster prevention, logistics, aerospace, automobile and vessels. The paper introduces application services using USN and smart phones.

Smart phones have largely affected personal lives, as well

as in all industries. Even more, their influence will become larger. It is a new and infinite opportunity for software developers. It is important to understand what people and society want to know what to make and implement. Even more, easier, more convenient and accessible methods shall be considered.

References

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