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ICOIN 2011

The International Conference on Information Networking 2011 (ICOIN 2011)

Conference Program

January 26 (Wed) - 28 (Fri), 2011
Sunway Lagoon Resort Hotel, Kuala Lumpur, Malaysia

Sponsored by

Korean Institute of Information Scientists and Engineers

IEEE

IEEE computer society

January 28, 2011 (Friday)

10:40-12:00 *(Cayman)*

Session 2P

Chair: Yong-Hoon Choi (Kwangwoon University, Korea)

[2P-1] IKE Authentication using Certificateless Signature
Asrul H. Yaacob (Multimedia University, MY), Nazrul M. Ahmad (Multimedia University, MY), Ridza Fauzi (Multimedia University, MY), and M. Shahir A. Majed Shikh (Multimedia University, MY)

[2P-2] A relay selection scheme based on link states for cooperative communication
Inhye Park (Kwangwoon University, KR), Hyungkeun Lee (Kwangwoon University, KR), and Hyukjoon Lee (Kwangwoon University, KR)

[2P-3] Minimal Sensor Density for Small-scale Primary Detection in Cognitive Radio Networks
Keunmo Park (Seoul National University, KR), and Chongkwon Kim (Seoul National University, KR)

[2P-4] A Priority-based Differentiated Streaming Scheme to Guarantee the Media Quality in Mobile WiMAX
Dongchil Kim (University of Kwangwoon, KR), Jahon Koo (University of Kwangwoon, KR), Jinpyo Hong (Hankuk University of Foreign Studies, KR), Seoung-Jun Oh (University of Kwangwoon, KR), and Kwangsue Chung (University of Kwangwoon, KR)

[2P-5] Complex Context Information for Video Streaming Service
Gunwoo Lee (Chungang University, KR), Woongsoo Na (Chungang University, KR), Sungrae Cho (Chungang University, KR), and Eungha Kim (ETRI, KR)

[2P-6] Low-Complexity Two Instruction Set Computer Architecture for Sensor Network using Skipjack Encryption
Jia Hao Kong (University Of Nottingham Malaysia Campus, MY), Li Minn Ang (University Of Nottingham Malaysia Campus, MY), Kah Phooi Seng (University Of Nottingham Malaysia Campus, MY), and Ong Fong Tien(University Of Nottingham Malaysia Campus, MY)

[2P-7] A Bluetooth Adaptor for Interoperability between Bluetooth and Heterogeneous Networks
Hyung-jun Yim (Chungnam National University, KR), Dong-Ho Ryu (Chungnam National University, KR), Hyun-Woo-Lee (Chungnam National University, KR), and Kyu-Chul Lee (Chungnam National University, KR)

[2P-8] Automatic Intelligence Application for Office Environment
Woongsoo Na (Chungang University, KR), Gunwoo Lee (Chungang University, KR), Sungrae Cho (Chungang University, KR), and Youngil Choi (ETRI, KR)

[2P-9] An Efficient Slotted CSMA/CA Algorithm for The IEEE 802.15.4 LR-WPAN
Hyoepgeon Lee (SoongSil University, KR), Kyounghwa Lee (SoongSil University, KR), SeungHak Ryu (SoongSil University, KR), Sang-Hong Lee (KT Corporation, KR), Kwanho Song (SoongSil University, KR), and Yong Tae Shin (SoongSil University, KR)

[2P-10] A Web-based Content Syndication Platform for IPTV
Jinhong Yang (Korea Advanced Institute of Science and Technology, KR), Hyojin Park (Korea Advanced Institute of Science and Technology, KR), and Jun Kyun Choi (Korea Advanced Institute of Science and Technology, KR)

[2P-11] An Evaluation of IEEE 802.11 Community Networks Deployments
German Castignani (Institut Telecom / TELECOM Bretagne, FR), Lucien Loiseau (Institut Telecom / TELECOM Bretagne, FR), and Nicolas Montavont (Institut Telecom / Telecom Bretagne, FR)

[2P-12] A Codec-based QoS Control Mechanism for Voice over IEEE 802.11 WLAN
Ki Jong Koo (ETRI, KR), Dong Yuep Ko (University of Science & Technology, KR), Do Young Kim (ETRI, KR), Byung Sun Lee(ETRI, KR), and Seong Ho Jeong (Hankuk University of Foreign Studies, KR)

[2P-13] A Social P2P Networking Based on Interesting Keywords
Rim Haw (Kyung Hee University, KR), and Choong Seon Hong (Kyung Hee University, KR), and Chul-Hee Kang (Korea University, KR)

[2P-14] Conferencing service interworking between overlays and IMS networks
Jinsub Sim (Soongsil university, KR), tieu Tuan Hao (Soongsil university, KR), and Younghan Kim (Soongsil university, KR)

[2P-15] Server Selection for Equalizing of Performance in Distributed Cooperative System
Shin'ichiro Higashi (Osaka City University, JP), Shingo Ata (Osaka City University, JP), Akihiro Nakao (University of Tokyo, JP), and Ikuo Oka (Osaka City University, JP)

[2P-16] Building NetOpen Networking Services over Open Flow-based Programmable Networks
Namgon Kim (Gwangju Institute of Science and Technology, KR), and JongWon Kim (Gwangju Institute of Science and Technology, KR)

[2P-17] Semantic Service Discovery based on Parametric Dependency Relations
Ho-Young Han (Yonsei University, KR), Yeon-Seok Kim (Yonsei University, KR), and Kyong-Ho Lee (Yonsei University, KR)

[2P-18] Practical Application of ZigBee-based Life Recording and Management System on Mobile WiMAX Network in Azumino City
Kenko Ota (Tokyo University of Science, JP), Hideaki Matsue (Tokyo University of Science, JP), Satoru Miyazawa (Tokyo University of Science, JP), Satoshi Nanamatsu (Tokyo University of Science, JP), Yukihiro Hirata (Tokyo University of Science, JP), Akio Hasui (Azumino City, JP), Masaluro Yamazaki (Azumino City, JP) , Hiroshi Fukui (Commuture Corp., JP) , Mattew Harvey (Commuture Corp., JP) , Hajime Miyajima (Azumino Networks Community, JP), Yoshiaki Yazawa (Tokyo University of Science, JP) , Shunzo Yamashita (Hitachi Ltd., JP), Yoshihiro Kainuma (Tokyo University of Science, JP), and Takuma Yui (Tokyo University of Science, JP)

[2P-19] A New Data Propagation Scheme for WSN Network Reprogramming in a Noise-Full Environments
Sang Eun Ha (Korea Electronics and Technology Institute, KR), Sukwon Choi (Korea Electronics Technology Instituts, KR), Byunghun Song (KETI, KR), and Hyung Lee (Sungkyunkwan University, KR)

Automatic Intelligence Application for Office Environment

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Abstract—**Ambient networks aim to provide a unified networking concept that can adapt to the very heterogeneous environment of different radio technologies and service and network environments. One of the important issues in the ambient network is to aware complex contexts in various environments. This complex context is determined by a surrounding environments or variety of situations. Office is one of the most appropriate environments to apply this ambient network service. In this application, the main product would be central storage controller (CSC), which is able to receive command from employee in the office. The CSC receives information from devices of the network and this information is saved at the CSC. The ambient network can support the CSC to process this command very efficiently. In this paper, we applied ambient network concept to office environment and show our automatic intelligence application.**

Keywords- Ambient Network, Complex context , Automatic Intelligence , office application.

I. INTRODUCTION

Ambient network is a large-scale collaborative project within the European Union's sixth framework program that investigates future communications systems beyond today's fixed and 3rd generation mobile networks [1]. It is part of the wireless world initiative. The project works at a new concept called ambient networking, to provide suitable mobile networking technology for the future mobile and wireless communication environment. Ambient network aims to provide a unified networking concept that can adapt to the very heterogeneous environment of different radio technologies and service and network environments. Special focus is facilitating both competition and cooperation of various market players by defining interfaces, which allow the instant negotiation of agreements. This approach goes clearly beyond interworking of well-defined protocols and is expected to have a long-term effect on the business landscape in the wireless world [1]. Central to the project is the concept of composition of networks, which is an approach to address the dynamic nature of the target environment. The approach is based on an open framework for network control functionality, which can be extended with new capabilities as well as operating over existing connectivity infrastructure.

This work was supported by the IT R&D program of MKE/KEIT. [10035146, Research and development of composite context based adaptive service path configuration technology]

This highly dynamic, nested networking environment provides a set of generic value added functions over a wide range of wireless and fixed network technologies. Also ambient networks offer the user an easy to manage, cost efficient, adaptable and permanent connectivity in the best possible manner and the service providers a set of interfaces which ease deployment of new services in a co-operative manner between the service provider, network operator and user domain.

One of the important issues in the ambient network is to aware complex contexts in various environments. The complex context is determined by a surrounding environments or variety of situations. For instance, when we use the microphone, the sound volume is decided by the size of a room and a number of audiences, surrounding noise, interior material, etc. By these multiple situations are combined, the optimized sound volume can be selected. The complex context is mixed contexts which takes surrounding situation into account. Figure 1 shows a composition of the complex contexts. It is very an important concept in the ambient network architecture because all of the relevant situations or contexts must be considered in the ambient network.

A complex context event service then provides a mechanism for asynchronous communication, which disseminates contextual events and context information to context users. A contextual event represents a change of certain context information. The event service adopts a publish-subscribe paradigm and offers a specialized API to handle subscriptions for contextual events. It also maintains a trigger repository for notifying consumers about events that have occurred. [12]

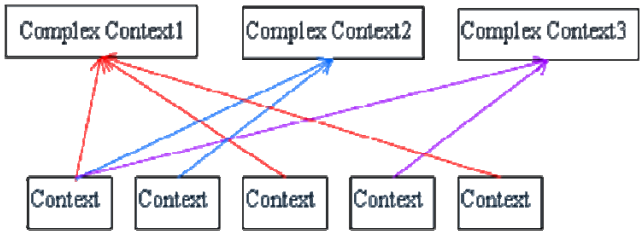

Figure 1. Composition of Complex Context

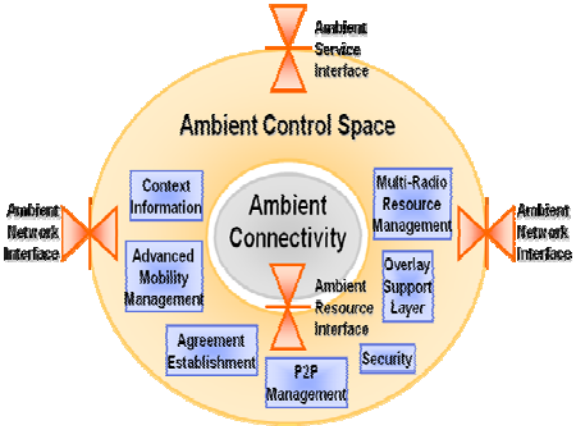

Figure 2. Architecture of Ambient network

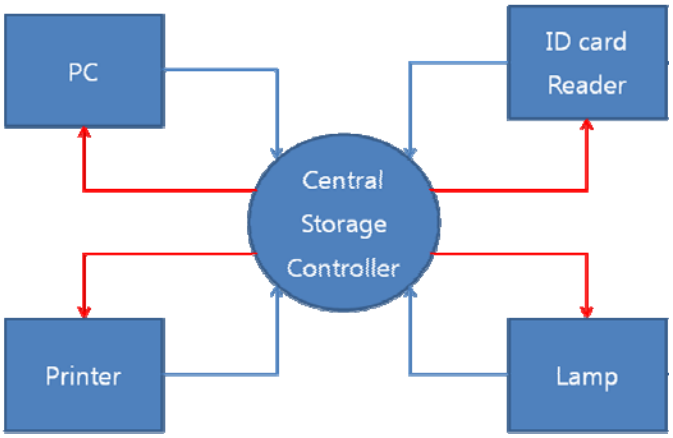

Figure 3. Example of CSC's processing

Office is one of the most appropriate environments to apply this ambient network service. In the office environment, employees will face with situation such that they have to select the best resource for their work. If contexts which are can happen many things are cognized, a core can provide service in the best possible manner. In this application the most relevant activities in a office (the light's brightness control , printer control , automatic storage etc.) are implemented by several new services that are controlled by employee's activities.

II. AMBIENT NETWORK

The Ambient Networks project [1] seeks to study ambient networks taking into consideration aspects like multi-radio interfaces, mobility management, security issues, composition of ANs, context management and service delivery [2]. In ambient network have a following requirement:

- Heterogeneous networks
- Mobility
- Composition
- Security and Privacy
- Backward Compatibility and Migration
- Network Robustness and Fault Tolerance
- Quality of Service
- Multi-Domain Support
- Accountability
- Context Communications
- Extensibility of the Network Services Provided
- Application Innovation and Usability

The entity that gathers all the information and links them is called the Ambient Control Space (ACS). It can be seen as a control framework that manages all characteristics of ambient networks, provides abstraction of the resources and enables the service delivery for ambient networks. A service interface, the Ambient Service Interface (ASI) has been defined as an "upper layer" interface of the ACS that is accessible to applications to define their requirements and specify how the service should be delivered (in terms of QoS, security, connectivity). The management of this request is performed by the Overlay Management (OM) FE [4][5]. The OM FE will then create and maintain a service-specific overlay network to fulfill the service provider requirements and to manage the service delivery to end-users while adapting to user and network context. The Service Context (SC) FE [3] is also very important in this work since this application should adapt automatically to context. Fig 2 shows the ambient network idea.

III. APPLICATION

In this application, the main product is Central Storage Controller (CSC), which is able to receive command from worker in the office. The CSC receives the information from device of the network and this information is saved the CSC. Fig 2 show that example of CSC and how to working in the office place. In the Fig 3, the blue arrow means process which get the resources information and red arrow means the CSC command to resources after all contexts are considered. If one user commands for something in the office, this information also transfers to CSC and then the CSC process this command as intelligent as possible automatically. In order to achieve a demonstrator of this automatic intelligence application, we develop the simple program and will show in the last section. In this section, we explain how application is designed and provided services.

A. Application design

In the office environment, a variety of tasks exist. So we define the kind of tasks and to be expected context. Following simple examples are expected situations in the office environment.

- When a employee arrive the office, employee check the ID card and must go to a his seat.
- If a employee arrive his seat, he may turn on the lamp on the desk and then start to work.

- If a employee want to use a shared resources in the office (printer , server , PC etc,.) , he must check the state of resources whether using or not from another person.
- When employee exits his seat, he must turn off the resources and check the ID card.

We also consider a some infrastructure and devices to design a automatic intelligence application. The infrastructure and devices involved in the application are following:

- In the employee's seat, sensor is attached on the desk to sense a person.
- Each resource is connected to Central Storage Controller (CSC) through wire networks and information of state for resources is stored at CSC.
- A common ID card, which has a RFID antenna and a reader able to read his individual information. These information also transfer to CSC and CSC can aware of employee's exist or not in the office.
- Each floor also is connected to CSC through wire networks to cover the entire office area. So all of the office area and context are considered before start the some activity.

B. Central Storage Controller (CSC)

In the ambient network, the entity that gathers all the information and links them is called the Ambient Control Space (ACS). In our application, CSC is similar to the ACS. All of the information is connected to office transfer to this system. So CSC manages this information and command to another system. The kind of can be transfer information is as follows:

- The information of employee's state.
- Lamp's light brightness and turn on/off.
- Printer's waited queue.
- A personal computer's using rate of CPU.
- A personal computer's hard disk capability.
- In order to store this information, The CSC has a table. Table 1, show that a composition of table.

Through refer to this table, The CSC decide to appropriate command to entity. For example, a one person arrive his office check the ID Card , and then this information transfer to CSC and then The CSC aware of employee's arrival and command to his lamp that turn on the lamp automatically. In other example, printer which is shared are used by a many employee, so when a person using a printer, the another person can try to use a printer. These information also transfer to CSC and CSC manage the these information allocate the sequence of print processing.

Table 1. Composition of CSC Table

Entity	The Central Storage Controller Table		
	Floor	***State***	***Update Date***
Printer	1st	Printing the PC ID 32 tasks	2010/1/4 12:03
Emplyee	1st	Working in the partition ID 44	2010/1/4 12:42
Bulb	3st	Brightness : 4 W Turn on	2010/1/4 1: 51
PC	2st	Place : partition ID 44 Using rate of CPU : 33% Remain of hard disk : 30GB	2010/1/4 1: 3
PC	4st	Place : partition ID 33 Using rate of CPU : 80% Remain of hard disk : 10GB	2010/1/3 07:34

C. Automatic Inteligence Application

In order to demonstrate our application, we develop the program with a JAVA. Fig 4 shows that a program screens. Each office dived with tab and our program process without floor and office. In our application, when a click the button that employee enter, a worker enter a office and go to a his seat. All of the resources which is light , printer , PC etc., are shows the program likes a CSC tables. Without enter a employee, all of the resources are used automatically.

IV. FUTURE WORK ON THIS APPLICATION

Our automatic intelligence application lacks of contents. So we will consider the another contexts and more variety activity in office environment are also consider. We also consider a user interfaces, so voice recognition system are developing currently. The voice recognition system works perfectly if the voice arrives isolated from external noise. Every user who is worked in office has a wireless microphone in his shirt's pocket. This microphone captures his voice and all the sounds around him and sends them to an equalizer, which filters the voice frequency range from other sounds.

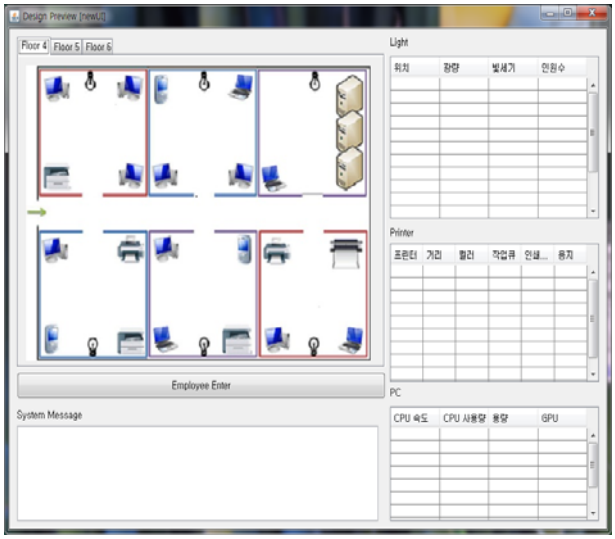

Figure 4. Automatic Intelligence Application

From here the voice recognition system understands the pronounced complete sentence and processes it. A quite extended number of sentences, called grammar, make up the possible dialogue between the person and the whole system. The user can address the whole system in different ways using a lot of expressions, talking naturally and spontaneously and dialoguing to the office. The defined grammar is so extended that almost the total speaker independence has been achieved. This has been proved by several speakers talking to the system without previous training.

V. CONCLUSION

Ambient networks aim to provide a unified networking concept that can adapt to the very heterogeneous environment of different radio technologies and service and network environments. One of the important issues in the ambient network is to aware complex contexts in various environments. This complex context is determined by a surrounding environments or variety of situations. Office is one of the most appropriate environments to apply this ambient network service. In the office environment, employees will face with situation such that they have to select the best resource for their work. Our methodology includes providing a central storage controller (CSC), which is able to receive command from employee in the office. The CSC receives information from employee devices of the network and this information is saved at the CSC. The ambient network can support the CSC to process this command very efficiently. Through the ambient network concept, various resources in office environment such as printer, server, lighting, etc have been tested and controlled.

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