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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 Kaimuma (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)

Complex Context Information for Video Streaming Service

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***Abstract*—Advances in computer networking combined with powerful home computers and modern operating systems made streaming media practical and affordable for ordinary consumers. We are enjoying different streaming services such as DMB, PMP, smart phone, etc. that have never experienced before. In the future computing environment such as ubiquitous environment, user can be served video streaming service by complex contexts. In the paper, we suggest and simulate the complex context information for multimedia streaming. In this paper, we applied complex context awareness concept to video streaming service and demonstrate our applications.**

Keywords-complex context information video streaming service

I. Introduction

Recently, advances in computer networking combined with powerful home computers and modern operating systems made streaming media practical and affordable for ordinary consumers. We are enjoying different streaming services such as DMB, PMP, smart phone, etc. that have never experienced before. In ubiquitous environment, user can be served video streaming service by complex contexts. The service can be considered by complex context such as user's location and device's performance etc. Fig. 1. shows the video streaming service topology in present. This service topology is very inefficient because each service provider has own streaming server respectively for service. In this reason, we present complex context information for video streaming service through new approach that represents complex contexts. In our approach, video streaming service specifies complex context information for events. We establish the context and model in the form of sets of relations. For example, the context of a device could include one relation listing device specification, another listing all the items brought to the device, and indicating simply the location, time, and meeting duration. Our model is thus simple yet flexible and powerful. In our model, an event is a tuple in a stream that takes the form: (id, time, etc.), where id is an attribute that uniquely identifies the context, time is the time when the context occurred, and other value attributes of the context. Our definition of context is thus broad. Almost any tuple in any stream can be considered an context as long as it takes the form specified above. Each tuple in the table corresponds to one context. The attributes of an event describe its main properties and suffice to uniquely identify the context. In our example, the time, duration, and location suffice to distinguish between different device contexts. Understanding a context, however, can require looking at significantly more information surrounding the context. For example, when user want to playing video content, important information about the device includes the identity, resolution of device, volume, and supported codec. Such extra information provides more details about the contexts. Unlike simple attributes such as context times and locations, such complex context information often cannot be represented as a single tuple.

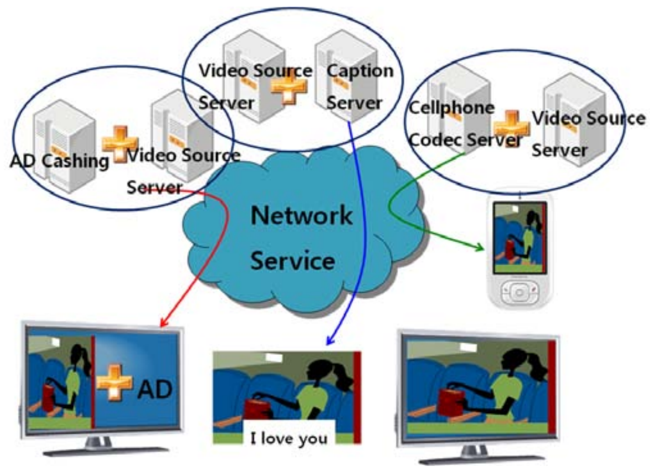

Fig . 1. Video service topology in present

The rest of this paper is organized as follows. The complex context is described in section 2. In section 3, we introduce the modeling scheme. The application for CCIV is described in section 4 and future work is described in section 5. Finally, we draw conclusion in section 6.

II. Complex Context

Complex context is categorized by two parts [11]. The categorization will be required for the wide range of heterogeneous context information. There are two possible categorization contexts as below:

- Conceptual context – who, where, what occurs, when, what can be used, what can be obtained etc.

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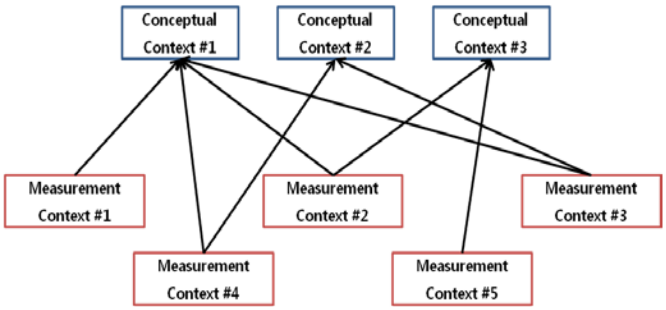

Fig . 2. Structure of measurement context and conceptual context

- Measurement context – what is the room temperature or network bandwidth or network latency etc.

Fig. 2. shows structure of measurement context and conceptual context. The conceptual categorization of context provides a description of the contextual space in terms of the actors, the actions and the relationships between them. Conceptual and measurement contexts could be again classified as static or dynamic contexts. Above categorizations are not exhaustive for future's pervasive computing where context information will exhibit more diverse characteristics but these could be very helpful for application designer and developer in pervasive computing to manipulate context information efficiently.

III. Modeling

By modeling the quality as a class of an attribute, we can define quality values for each measurement and not just a single unique value for all measurements of a sensor. Further, through the context composition, we can define the overall confidence of the sensor by composing the complex context information [2].

A. *Modeling*

User : There are three significant issues in a user's context acquisition. First issue is an immediate change of available sensors and the context analysis method. To acquire a user's activity, the user has to take service with him/her in some ways. However, most of the context analysis and available sensors change according to the position or situation in which complex context information is used. For example, the analysis method to detect standing or sitting by the acceleration; changes whether complex context information is held or waist-mounted. Furthermore, if it uses a ultra range finder to correct analysis results by measuring the distance from the floor, the validity of the sensors also changes. Second issue is the time consuming process in context acquisition, and it is important to the characteristic of sensors and a context analysis method. In the previous example, detecting "sitting" state is easy at five minutes after the "sitting" event occurs. To detect the moment when the user sat, we need to analyze a special wave pattern of sensor values in a few hundred millisecond. This issue should be also discussed about physical conditions and emotion sensing. When retrieving the raw value from physiological sensors, complex context information has to be gripped. However, the validity of data from these sensors in short term

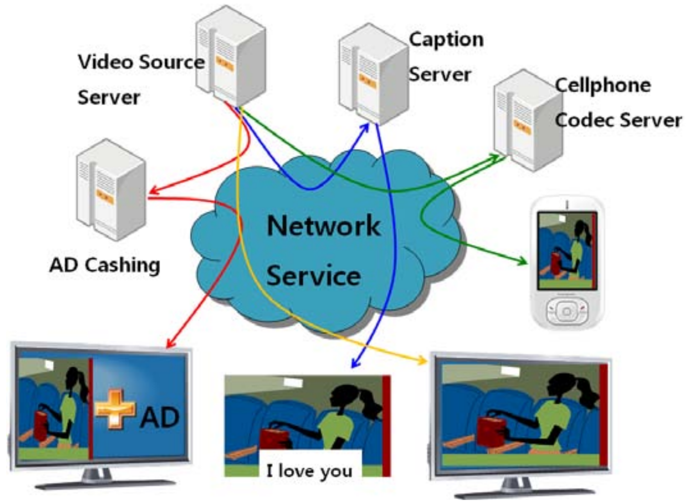

Fig . 3. CCIV service topology

is not sufficient to recognize context information. Because the value from a skin temperature sensor changes very slowly, and one from a pulse sensor changes too rapidly. To generate context, it is necessary to log the average of acquired data and compare them in the span of time.

Last issue is the complexity and ambiguity of context information. The definition of complex context, such as angriness or feeling of hunger, heavily depends on its situation and applications that they are used by. For example, the meaning of loud voice is different in respective situations (e.g. between meeting room and talking with friends). To analyze and classify the sensor value, not only main resources (e.g. microphone) but also other resources (e.g. location, activity) are required.

B. *Context Representation*

As shown in the previous section, complex context is not just the representation of context information. Furthermore, context information is treated as a tuple. Thus, it is required to consider the available context representation format for searching in the read/get method. In the current implementation, context information in multimedia is represented as follows. Measurement context: = {ID, Subject, State, Time, Lag, Interval} the meaning of the context is represented as the combination of a subject, state and time field. For example, the context information, which is written as "A user has PMP with Avatar contents.", is represented as {"DEVICE01", "PMP", 201009120528, 0, 100} and {"CONTENT01", "Avatar", 201009120528, 0, 100} in the tuple format. In this case, the state could be "PMP" or "Avatar". However, a subject is fixed and multimedia device only acquires specified context. The lag and interval field are meta information of the context, which are inherent in its analysis. The analysis of context information requires some time interval. The lag field shows the time lag and applications can handle it by itself. On the other hand, the interval field shows the freshness of the context. The ID field specifies the multimedia device which analyzed the context. Context in multimedia device is updated every its polling interval only by multimedia device specified in the ID field.

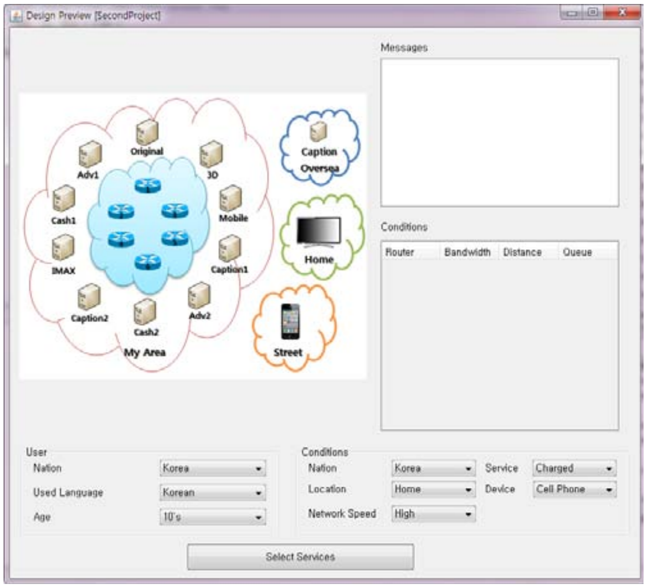

Fig . 4. CCIV application simulator

Therefore, applications can examine its freshness by handling the interval and time field.

IV. APPLICATION

In this section, we proposed application for complex context information for video streaming service (CCIV). Previous streaming service is served by independent difference service provider. Each service provider has own streaming server respectively to service. This policy is very inefficiently as following problems.

- Passive to dynamic user/network context
- Service overhead is very huge due to user transports playing available codec.
- Development cost is very high due to service provider develops independently
- User subordinated to service provider.

To solve these problems, we propose complex context information for video streaming service. Fig. 3. shows concept of CCIV. CCIV platform is calculating the complex context information for video streaming to serve video contents. For instance, if user has PMP and HDTV CCIV calculates weather which device is more adequately to user. In CCIV platform, streaming source server is only one, so service provider reduces cost. In addition, all contents are serving with adaptive transporting data, so user's transporting cost is reduced.

CCIV provides service component selection and construction techniques. CCIV techniques contain following techniques.

- Selection techniques for service component depends on user's needs
- Reconstruction techniques for service component depends on user's context
- Complex context recognizing technique
- Complex context handling technique
- Service routing reconstruction technique for dynamic context environments Mobility

In order to demonstrate our application, we develop the program with a JAVA. Fig .4. is shows simulator screen shot for our application. In the simulator, user can select caption language, user's age, video content's properties and streaming device through drop down bar at screen's bottom. After selecting the condition, the message table at right of simulator screen shows process of complex context information for video streaming service. The network condition (e.g., bandwidth, distance, and queue) is represented at under the message table. Network topology for simulation is represented at left in screen.

V. FUTURE WORK ON THIS APPLICATION

Our complex context information for video streaming service application lacks of contexts. In this reason, we will consider the contexts and more variety activity in video streaming environment are also considered. We also consider a user interfaces, so intelligent reorganization platform for user are developing currently. The recognition platform works perfectly if the user wants to watch the video contents. If the platform is recognized contexts perfectly through modeling scheme and CCIV algorithms, user can enjoy video streaming service more adequately. In addition, to realize CCIV system, the modeling scheme is more considered.

VI. CONCLUSION

Complex context information for video streaming service (CCIV) aim to provide a unified networking concept that can adapt to the variety heterogeneous environment of service condition and network environments. In present, service topology for video streaming is very inefficiency because each service provider has own streaming server respectively to service. To solve these problems, we propose complex context information for video streaming service. One of the important issues in the CCIV is to aware complex contexts in various environments. This complex context is determined by a surrounding environments or variety of situations. To evaluate CCIV, context modeling scheme and representation scheme is very important. To CCIV simulation, we developed simulator based on JAVA. Through CCIV, user can enjoy video streaming service more adequately.

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