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Cyber Assistance for Situtated Human Information Processing (overview of the invited talk)

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We will establish the Cyber Assist research center for development of situated information-processing methodology and wearable devices for human-centered, seamless, information assistance environment.

1 Main Objective

The target is the development of human-centered information-processing assistance systems, or intelligence boosters, which can be used anywhere, anytime, and by anyone without any special knowledge or training. This can be achieved by designing a wearable information assistant which can talk to the Internet through the communication infrastructure available in the city. The main objective is the integration of information processing technology and the real physical world through situated communication.

2 Outline of Research

Intelligent Support

The main idea is to ground information processing to the physical world. The primary interface is location-based communication to the internet. The full capability of the Internet is available to backup the intelligence of wearable PC's.

Intelligent contents on the internet are structured with many semantic tags, which include information on locations and situations. Those structured contents and situated interface give situated human information-processing assistance.

The Keyboard is not practical as an input device. For this reason, speech recognition and vision are required. Speech synthesis is also an important

interface, and situated dialog must be implemented as well.

Situated Communication Technology

Location-based communication protocol is developed. It is essential for two reasons: (1) The location (information on both absolute position and surrounding environment) must be used to understand the user's needs and provide proper service; (2) Location-based communication can be established without releasing the identity of the user.

Location-based protocol is integrated with the next generation Internet protocol, IPv6, to provide new methodology to protect the privacy (anonymity) of users. Mechanism for the proper balancing/compensation between privacy and security is also developed.

GPS and PHS are practically used for outdoor positioning. Indoor positioning systems must be seamlessly connected to the outdoor positioning and communication systems. For this purpose, new infrastructure with sensors and tags are needed.

Portable ultra-small PC's are developed. Full-system-on-tip technology is used. Since the low or no energy consumption is crucial for the device to be practical, means to transfer energy from outside must be developed.

3 Application Images

"My-button", or digital amulet (in-town version of the universal remote commander for home electrical appliances), to communicate with many machines in the city, such as ticket machines at railway stations. Internet information, such as train time-table or restaurant guide, is also made available. "My-button" must be equipped with voice recognition and vision for better user-interface.

"Space reminder" to remind the user of preset locations when she happen to pass by. For example, it reminds her to buy milk when she passes in front of a super market, or to post a letter when she passes by a mail post.

All application are designed to be dual-use for normal situations and emergency or natural disaster situations. For example, a location-based communication device allows the rescue team to quickly locate its user.