Sharing Kansei Information in local communities for safety of Children

A Development of wearable device "Onigiri Machine"

SeungHee Lee †, Masatoshi Hamanaka†, Dahyun Kim ††, Seunggi Hong††

†University of Tsukuba ††Graduate School of Comprehensive Human Sciences, University of Tsukuba

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INTRODUCTION

In increasing crimes or accidents against kids, parents need to consider the way to protect their kids and predict what are going to happen to them to know their habits of daily behaviors or related people around them. In Japan, to protect the children from the crimes, most of the primary school children put security alarm buzzer on their school bags.

Most of the primary schools handbuzzers out to the students as like textbooks. But many of the children do not care about it and no useful function except making noise in surround. It means no more security functions with the alarm buzzer but a simple toy.

In many cities, increasing working mothers' children are being taken care by nurseries or kindergartens on their working days. They spend less than 3-4 hours with their kids before and after working per day. And under 6 year kids they are growing faster physically but sometimes cannot describe their experiences by telling the stories even though those were scary, happy, surprise or sad to their parents. But the responsibility of children's security is on their own parents wherever, whenever or whatever. In this system, we construct a system which can help the parent can confirm their children's behavior or experiences through a small and charm wearable device connected to areal network with local support team. This device can detect heart rates and behavioral movements of kids using heart rates detector and three axis accelerometers. It also has a camera which turns on the power only when the kid got a big change of heart rates or movements such as falling down or jumping down. And the visual information from the device can be browsed at home on a secured program.

DEVELOPMENT of KIDS-FRIENDLY DESIGN

It was very important issue that we proposed a very unique approach to this system such as, designing first and put the advanced technology in a box next. The reason why designing first than the technology is, to make kids wear the device as their own willing being fascinating by attractive form giving and ease to wear. We call it, 'Kids-Friendly Design'.

For 'Kids-Friendly Design', we should first concern the weight and size of the device, and secondly about how and where to wear on kids' body. Concerning preferred graphical design or decoration for kids would
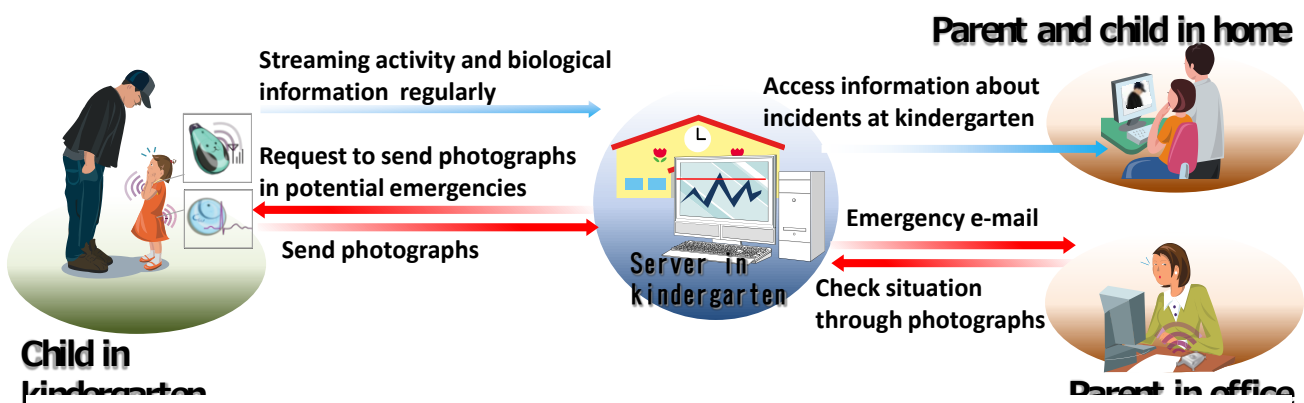

Figure 1. Overview of the system for detecting potential emergencies children may experience at kindergarten

be the last step.

Weight and size of the device

To fix the size of the device, we surveyed children's body scale based on Research institute of Human Engineering for quality life in Japan. They've reported all the sizes of average body scale of ages from 0 to 12 from Japanese kids since 2005 every year. The chest size from the front view for 3 year old kids is 164mm and 5 year is 176mm. Based on the width of chest, the device should not be exceeded 100mm in any direction.

About the weight, we surveyed the toys which can be attached on kid's neck, most of them are between 30 to 50 grams and which can be attached on their waist, are less than 100 grams. And we also surveyed about the weight to mothers in the kindergarten, 75 percent of them answered under 100 grams can be applied to their kids. For references, the alarm buzzer has 45~60 grams and mobile phones for kids have 130~150 grams.

How and where to wear the device

To attach on an appropriate position on kids' body, we should concern that it should not to bother children's active movements and at the same time the camera on the device should be keep well focused even on the movements. Here we show examples of A and B on the figure 2 and 3.

Figure 2: Wearable Device "Onigiri Machine"

DISCUSSION

Weight and size of the device

The goal of designing the devices in this paper, less than 100 grams and 100 mm in every direction for kids between ages of 2-6 was achieved. The model with three corners concluded as the final design for kids in this study. We adapted the sensors, such as heart rates detector, GPS, three axis accelerometers, camera and micro computer in the device and we still have a possibility that it could be lighter if the sensors we adapt will be lighter and smaller. The final prototype has 94 gram with out the belt.

Position of wearing the device

To take heart rates, kids will attach a set of wireless detectors on their left side of chest directly. Then the device should be positioned on the right side of chest on outside. The 'Omusbi' device has three corners to fix on the chest so, it does not bother to get signals each other.

FUTURE STUDY

This study is under going to be linked with local safety network and usability test by kids in the kind ergarten will be continued in the next stage. The design of Omusbi will be upgraded to be lighter an d fancy at anytime better sensors are developed. For user friendly design, various types of devices will be offered to parents. They can choose the functions on and off among the sensors to depends on their kids' condition. Each of them will have different experiences and different feeling on the events around them.

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