

# MediAlarm: alarm-type interface integrating various media

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**Abstract.** People have various notions regarding the way they like to be woken depending on their life-styles, health and schedules. We propose a novel alarm-clock interface called “MediAlarm” that can wake people using a combination of various media: sound, lighting, vibrations, room temperature, and SNS. People are able to select various alarms based on their desired “wake-up level” – the urgency with which they want to be woken – using simple controls.

**Keywords:** Alarm clock, wake-up, media, SNS, home appliance

## 1 Introduction

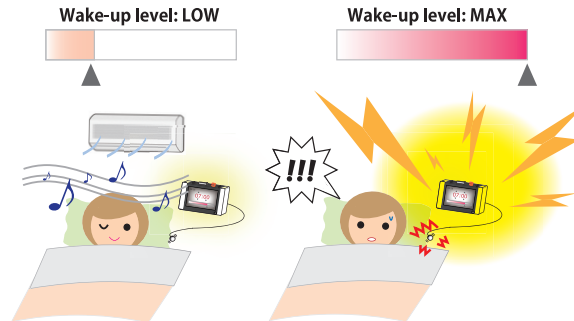
It is, of course, well known that people spend one-third of lives sleeping. People often use alarm clocks for regular wake-up. There are two main types of alarm clock: Many those designed to wake users forcefully using strong stimulus (e.g., loud sounds) [1], and those aimed at waking users in a more kindly manner. Examples of the latter type include the Sunrise Alarm Clock [3], which wakes people by brightening lights gradually like the morning sun, and the Sleeptracker [2], a wristband-type alarm clock that wakes people in a timely manner by detecting sleep cycles. Thus, while there are various alarm clocks with a number of different features, most of them wake users by a single/simple method. Many people, however, seek a different way of being woken depending on their life-styles, health and schedules. Therefore, we propose a novel alarm-clock interface called “MediAlarm” that can wake people using a combination of various media, such as sound, lighting, vibrations, room temperature, and SNS (Social Networking Services) (Fig. 1).

## 2 MediAlarm

The main concepts of the MediAlarm are as follows:

1. Various methods of being woken integrating different media
2. Simple controls suited to daily use
3. Expandability with home appliances and SNS

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**Fig. 1.** The goal of MediAlarm. For users with a low “wake-up level”, the system wakes her/him comfortably with quiet music, lighting, and air conditioning (left). When the wake-up level is high, the system wakes her/him forcefully with loud sounds, flashing lights and strong vibrations (right).

First, MediAlarm provides different methods of being woken that integrate various media: music, lighting, and vibrations. For instance, “noisy” music (e.g., hard rock) and strong vibrations wake the users forcefully; however, these alarms often irritate users at the same time. Conversely, though “quiet” music (e.g., classical music) and ambient light may not annoy users, such alarms might not be reliable in waking users. MediAlarm can match each user’s requirements by integrating various alarm features.

Second, a user can control the method of being woken with simple controls suited to daily use. That is, they can select various alarms by changing the “wake-up level” – the urgency with which they want to be woken – just prior to going to bed. The mapping between the wake-up level and the alarm features can be easily customized.

Third, MediAlarm provides flexible extendibility with home appliances and SNS. For example, MediAlarm can wake users comfortably by adjusting room temperature using an air conditioner. Moreover, communication through SNS (e.g., Twitter<sup>1</sup>) may wake users more reliably than do conventional alarms.

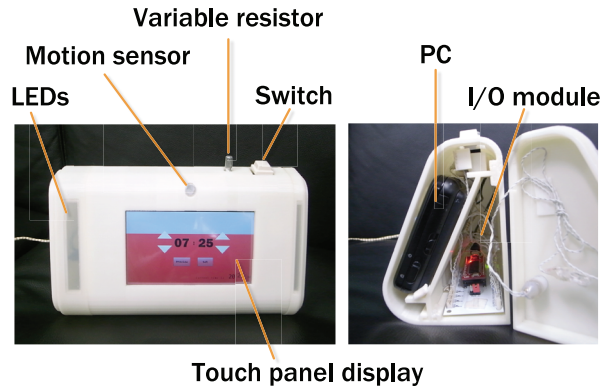
### 3 Implementation

We developed a MediAlarm prototype as shown in Fig.2. MediAlarm basically consists of a compact PC with a touch panel display and a speaker (VilivS5 by BRULE Inc.), several actuators (LEDs and a vibration motor), several input devices (a variable resistor, a switch, and a motion sensor; NaPiOn, Panasonic Electric Works Co., Japan), and a USB I/O module (Gainer mini). We constructed the outer package of the prototype using ABS plastics. As we have integrated all components into the outer package, users can treat the MediAlarm device like a common alarm clock.

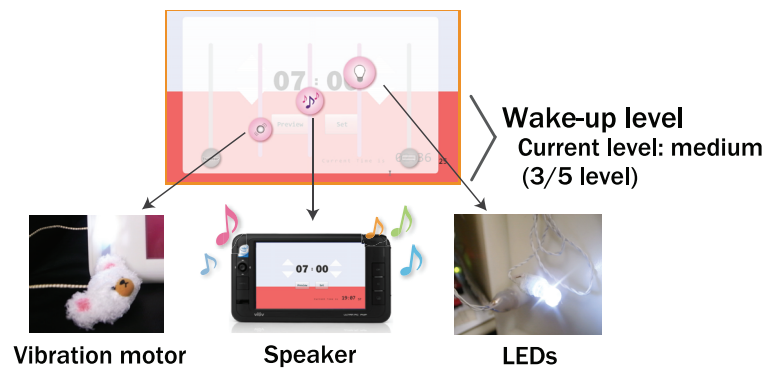
The basic functions of the MediAlarm are as follow. First, a user sets the wake-up time using the touch panel, and the wake-up level by rotating the knob (variable resistor) before going to bed. The current wake-up level is shown in the display in red.

<sup>1</sup> <http://twitter.com>

When the arranged wake-up time arrives, the MediAlarm generates various alarms using LED lights, a speaker, and a vibration motor according to the selected wake-up level.



**Fig. 2.** The prototype MediAlarm.



**Fig. 3.** An example of mapping between the alarm combinations and wake-up level.

The user can stop the alarm temporarily by pressing the switch on top of the device like a common alarm clock. In addition, MediAlarm activates the alarm continuously as long as the built-in motion sensor detects the user in bed. When the user finally gets out of bed for more than several minutes, the alarm stops completely.

Moreover, a user can easily customize the mapping between the alarm media and wake-up level using the touch panel and GUI (Fig. 3). The strength of each alarm can be set by changing the value of each slider displayed on the MediAlarm screen. For example, a low value on the music slider provides quiet music (e.g., classical music), and a high value provides noisy music (e.g., hard rock). Similarly, a low value on the vibration slider results in weak vibrations, and a high value elicits strong vibrations. The system architecture of the MediAlarm is shown in Figure 4.

In addition, the MediAlarm device can work with external services through a wireless network. We implemented (1) a control function for home appliances and (2) a communication function via Twitter.

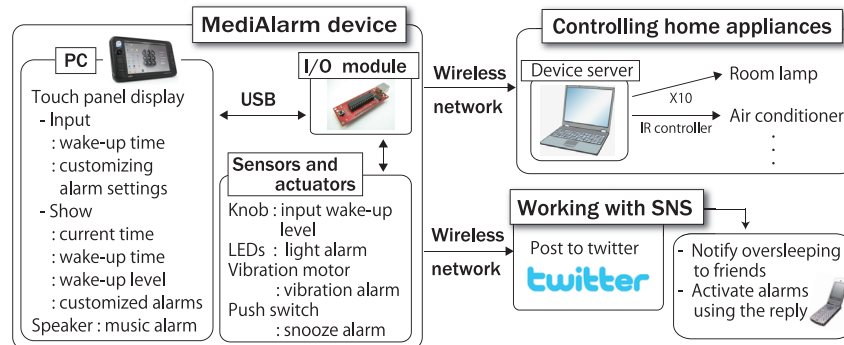


Fig. 4. MediAlarm system architecture.

Regarding the former, we have already developed several examples including the adjusting of room temperature prior to the set wake-up time by turning on an air-conditioner via a USB IR remote controller (PC-OP-RS1 by Buffalo), and controlling room brightness by turning on a room lamp via an X10 system.

Using the latter function, we applied several communication systems via Twitter. For example, the MediAlarm can detect the physical status of a user (e.g., going to bed, waking up and oversleeping) using the motion sensor mentioned above, and submits them to Twitter. Briefly, when a user has overslept, her/his friends receive messages on Twitter, and wake her/him by calling. In this way, the user becomes aware that her/his oversleeping is automatically submitted to Twitter, and takes care not to oversleep next time.



Fig. 5. Using the MediAlarm. Left: Installing the MediAlarm device into the home environment. Right: Examples of messages submitted at wake-up time and bedtime using Twitter.

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