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## Utilizing a Bluetooth remote lock system for a smartphone



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### ABSTRACT

With the advent of mobile devices and the convergence of wireless technologies and the Internet, both the content and the quality of research in this field are subject to regular change. A variety of state-of-the-art computing devices that are compatible with each other have been produced. These devices have the ability to interact with people. This is also known as pervasive computing. Particularly, as smartphones have recently become one of the most popular devices worldwide, various convenient applications are being released. Smartphones available today not only provide the ordinary internal processes such as dialing or receiving phone calls, sending text messages, and doing mobile banking, but also increasingly control various other devices that are part of our daily lives. In effect, this means that through smartphone applications, we can remotely control a variety of external devices such as televisions, projectors for presentations, computers, and even cars. The research in this paper is based on the evolving technological possibilities of using smartphone applications to control external devices. This paper presents the design and implementation of a remote lock system using wireless communication on a smartphone. In this context, remote lock system refers to a lock system that can be controlled remotely by a dedicated Android application. Every smartphone is equipped with Bluetooth which makes this technology possible. The application proposed in this paper uses the existing Bluetooth function on Android smartphones to open and manage locks. The users' lock information can be stored and managed in real time in the database via a server that is built and managed by a server manager. Even if users forget the password of the lock, our proposed lock system can guide them to retrieve it easily, and a user manual is included to help users navigate the system. This system also provides a variety of management functions such as adding, deleting, modifying, and purchasing the user's own locks.

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### 1. Introduction

With the advent of mobile devices, such as PDAs, smartphones and MP3 players, and the convergence of wireless technologies and the Internet, both the content and the quality of research are subject to regular change. A variety of state-of-the-art computing devices that are compatible with each other have been produced. These devices have the ability to interact with people. This is also known as pervasive computing [1]. Especially, the number of mobile device users, including smartphone users, has rapidly been increasing in the world, and various convenient and useful smartphone applications have been developed. The latest smartphones have not only basic internal functions such as making and receiving calls, text messaging

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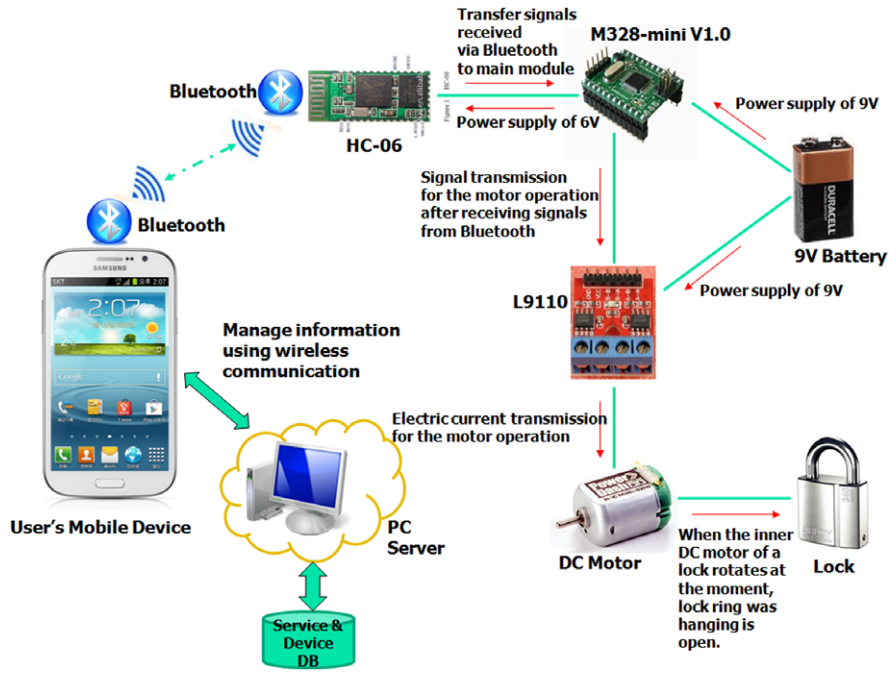


Fig. 1. Whole system architecture for the remote lock system.

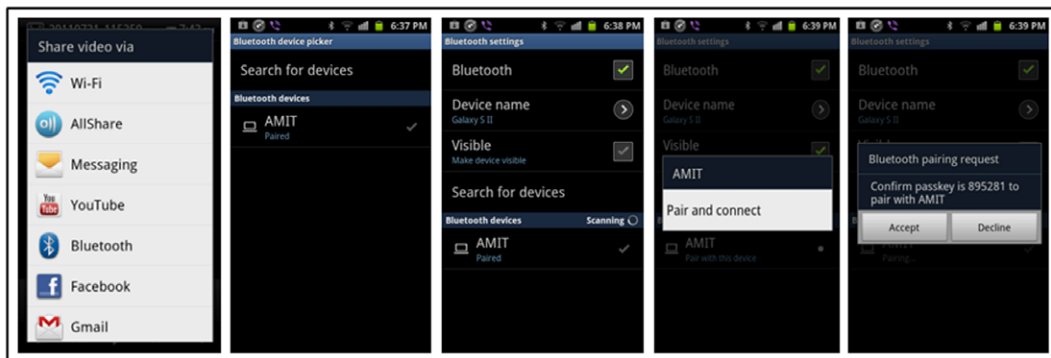
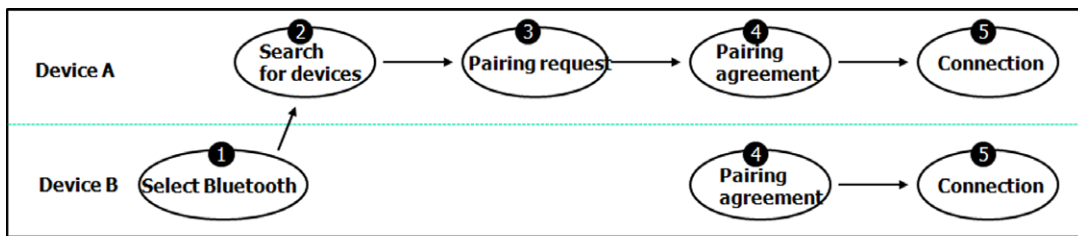


Fig. 2. Bluetooth connection procedure [15].

and mobile banking, but are also increasingly able to control various external devices used in homes and businesses. This includes a variety of external devices such as televisions, projectors for presentations, computers, and even cars.

People normally use mechanical locks with keys or locks with passwords. However, these locks have a few shortcomings, mostly due to human error, such as misplacing keys or an inability to recall passwords. In this paper, we propose a new remote lock system using wireless communication. Few products of this kind exist and this research is based on the notion that there exists a market for this kind of product [2,3].

Our proposed remote lock system using wireless communication eliminates the problems caused by traditional locks. Using the user's smartphone, the remote lock can be easily managed. Furthermore, the proposed system can be extensively

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