

ANDROID LIFT CONTROLLER

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Abstract—The Lift Industry lies as an essential part of life with the advancement of the building. The lift industry has a long history and has created a various and heterogeneous environment of lift. These situations make difficulties to the convergence in the lift and information technique. Currently, in a variety of fields, the elevator system has built with own brand and machinery and operate the system for management and control individually. People have to wait to use the lift service, the only way to call the lift to their position is to press the Call button manually, to see its Status they have to see the LCD display. To solve this problem, we propose the monitoring and control system for the various lift models. Our aim is to minimize the waiting time to use the lift service by providing an Android Application, which can be used to control and monitor the lift which allows the user to remotely interact with the elevator, Using the Android interface the user will be able to call the lift to desired floor also to use other Services. This provides a more efficient and stable service environment.

Keywords—Genymotion emulator, Wampserver, Android SDK, Microcontroller, Bluetooth module, LCD.

I. INTRODUCTION

Most elevators are built to provide about 20 years of service, as long as service intervals specified and periodic maintenance/inspections by the manufacturer are followed. As the elevator ages and equipment become increasingly difficult to find or replace, along with code changes and deteriorating ride performance, the operation which takes place is very slow, a complete overhaul of the elevator may be suggested to the building owners.

A typical modernization consists of controller equipment, electrical wiring and buttons, position indicators and direction arrows, hoist machines and motors (including door operators), and sometimes door hanger tracks. Rarely are car slings, rails, or other heavy structures changed. The cost of an elevator modernization can range greatly depending on which type of equipment is to be installed. Modernization can greatly improve operational reliability by replacing mechanical relays and contacts with solid-state electronics.

The convergence technologies in the IT industry have applied quickly to the elevator industry. Today's world has seen rapid and lucent spread of Android Devices. Any system, thus, developed which has support of the ubiquitous Android enabled devices will be much appreciated. Our project is based on this idea along with the much-needed Remote Control System interfaced with the Android Systems. We have harnessed the easy-to-understand Android GUI to a constructive work. The core of the convergence technologies may be the effective control and maintenance of the machine. In this project, we propose the integration monitoring and control system for the various lift models. We use the monitoring and control system based on the Android framework that is rapidly expanding technology in the embedded environment, and It can be adopted to any kind of working environment with less cost to control the lift devices also it can provide a more efficient and easy service environment.

II. SYSTEM DESIGN

System design is the process of defining the architecture, components, modules, interfaces and data for system to satisfy specified requirements. System design could see it as application of systems theory to product development.

A. ARCHITECTURE

Architectural design is the process of decomposing a large complex system into small subsystem. These subsystems are mount for providing some related services in this Architecture design, we can see that user will send his current position to call the lift to that particular floor. The communication takes place via Wi-Fi or Bluetooth signal. The user can also set the floor he wants to go once the lift is available for his service. Usage statistics will be monitored by the Admin and he is able to block the user or take the necessary action in case of invalid use of the Application. All users must create an Account in order to use the application which provides security for the System.

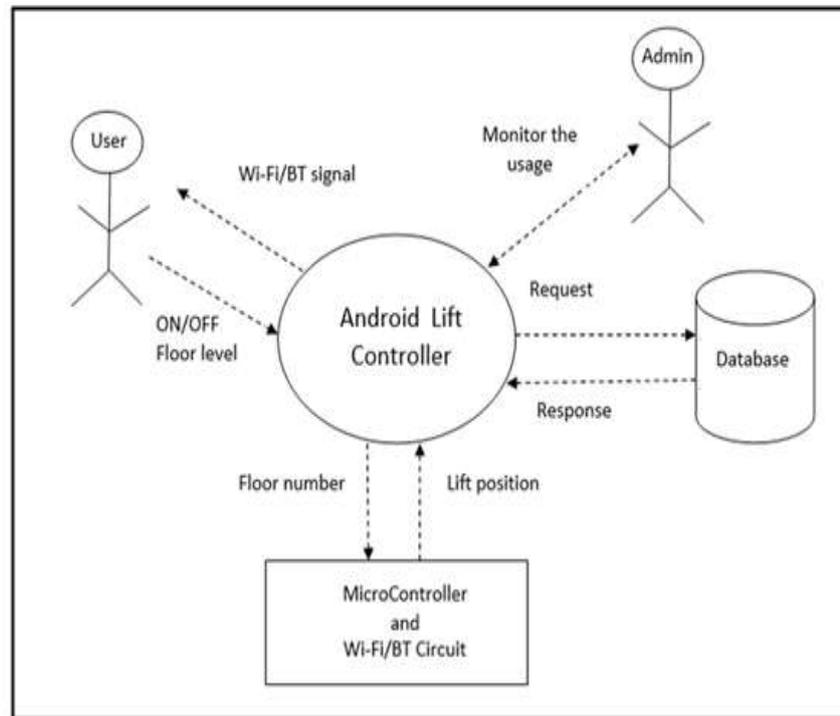


Figure 1. Architecture diagram for android lift controller

B. MODULES OF THE SYSTEM

The application consists of the following modules.

- Module 1: Registration- All the Users Must Register and create an account in order to use the app. The account allows the Admin to keep track on the App Usage.
- Module 2: Login- Login Activity is Allow the user to sign in with Name and Unique Password. The user can stay signed in for faster access of the service next time.
- Module 3: Enter Current Floor Number- This Involves in Entering the Current Floor number (Current Position) of the user so that the Lift will Move to that position.
- Module 4: Monitor Lift Status- The Lift status is also important aspect to be considered which allow the users to monitor the Lift Position in real Time.
- Module 5: Use the lift Service- Once the Lift is available for the Service, the user will be notified with the Notification (Vibration).
- Module 6: Emergency Options- This activity involves providing Emergency options for the user such as Contact details of the Security staffs, Police and Fire Station .it also features such as Emergency Stop and Bell to Indicate the Problem.
- Module 7: Monitor the Usage- The admin is allowed to monitor the app usage data in order to prevent invalid or misuse of the application. Admin can take necessary action on Such type of behavior. Modules of ALC is shown below.

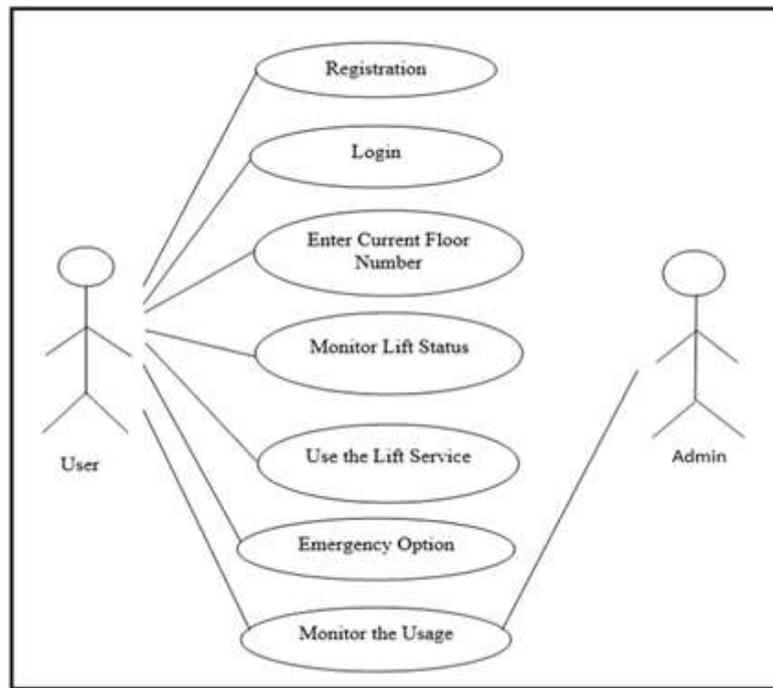


Figure 2. Modules of android lift controller

III. IMPLEMENTATION METHODOLOGY

A. HARDWARE REQUIREMENT

- **AT89S52 MICROCONTROLLER (8051):** 8051 is the name of a big family of Microcontrollers. The device which we use in our project is 'AT89S52' which is a typical 8051 Microcontroller manufactured by Atmel. A simpler architecture can be represented as below. The 89S52 has 4 different ports, each one having 8 Input/output lines providing a total of 32 I/O lines. Those ports can be used to output DATA and orders do other devices, or to read the state of a sensor, or a switch. Most of the ports of the 89S52 have 'dual function' meaning that they can be used for two different functions. The first one is to perform input/output operations and the second one is used to implement special features of the Microcontroller like counting external pulses, interrupting the execution of the program according to external events, performing serial data transfer or connecting the chip to a computer to update the software. Each port has 8 pins, and will be treated from the software point of view as an 8-bit variable called 'register', each bit being connected to a different Input/output pin
- **BLUETOOTH MODULE HC-05:** HC- 05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12. 7mmx27mm.It can work with Low Power 1.8V Operation, 3.3 to 5 V I/O and has Typical - 80dBm sensitivity.
- **LIQUID CRYSTAL DISPLAY (LCD 16 X 2):** LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can

display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.



Figure 3. Circuit setup of model lift

B. SOFTWARE REQUIREMENTS

- **ANDROID STUDIO:** It is the official integrated development environment (IDE) for the Android platform. It was announced on May 16, 2013 at the Google I/O conference. Android Studio was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. Based on Jet Brains' IntelliJ IDEA software, Android Studio is designed specifically for Android development. It is available for download on Windows macOS and Linux, and replaced Eclipse Android Development Tools (ADT) as Google's primary IDE for native Android application development.
- **ANDROID SDK:** The software development kit that enables developers to create applications for the Android platform. The Android SDK includes sample projects with source code, development tools, an emulator and required libraries to build Android applications. Applications are written using the Java programming language and run on Dalvik, a custom virtual machine designed for embedded use which runs on top of a Linux kernel.
- **GENYMOTION EMULATOR:** GenyMotion is a fast third-party emulator that can be used instead of the default Android emulator. In some cases, it's as good as or better than developing on actual devices. easy-to-use Android emulator that has been designed to help app developers test their products within a safe, virtual environment. The developers provide support for various different versions of the Android operating system.
- **WAMP SERVER:** It is a windows web development environment. It allows you to create web applications with Apache2, PHP and a MySQL database. It also comes with PHPMyAdmin and SQLite Manager to easily manage your databases. WampServer installs automatically (installer), and its usage is very intuitive.

IV.RESULTS



Figure 4. Application user interface



Figure 5. Working lift model

V. ADVANTAGES

- Provides easy interface to use lift services
- Time saving by reduces waiting time.
- User can call the lift remotely.
- Enables the user to monitor the lift status.
- Can be configured to work via Internet/Bluetooth or Wi-Fi.

VI. FUTURE SCOPE

- Adding artificial intelligence to this project makes it better. Device will automatically detect the location and movement towards lift to place the call.
- Detecting the most commonly used floor location can improve the accuracy of the application.
- Using fire and movement sensors in the elevator which is connected to Android application to detect the problem and perform the necessary actions automatically.
- Making this app to monitor the status of two or more elevators and programming it use the lift which available or nearest to the user.
- The same technology can be used to control other types of transportation devices remotely, which can turn them more efficient.

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