Elevator Control System

Passenger Facing Devices

PFD Version 2.2

Team #10
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Alex Maynes (Project Manager)
Jackie Javier
Momen Katba bader
Ricardo Rangel Valencia

CS 460 Software Engineering

TABLE OF CONTENTS

1 Introduction

This Passenger Facing Devices document (PFD) defines the design, functionality, and software interfaces for all devices that directly interact with passengers in the Elevator Control System. These devices form the user-facing layer of the system and include the Cabin Passenger Panel, the Floor Call Buttons, and the Elevator Floor Displays.

The PFD document serves as both a design reference and a functional specification for integration with the controllers of the overall system. It ensures that all passenger interactions, such as calling an elevator, selecting a destination, and receiving visual or auditory feedback, are handled logically and consistently.

The remainder of this report is organized as follows:

- Section #2: GUI Design. Screenshots and short descriptions of each PFD.
- Section #3: APIs. Lists of each PFD's public methods that provide service to the other components of the Elevator Control System software.
- Section #4: Conclusion.

2 GUI Design

2.1 Cabin Passenger Panel

The Cabin Passenger Panel is located inside each elevator cabin. It allows passengers to select destination floors and view the elevator's current position. It includes floor selection buttons for each floor in the building, a digital floor and direction display, a speaker (produces two sounds: a "ding" to indicate arrival and a "buzz" when the cabin load exceeds the maximum weight), and a fire service key switch accessible only to authorized personnel. Each button includes a built-in light indicator that illuminates when the request is active and remains on until a reset occurs.

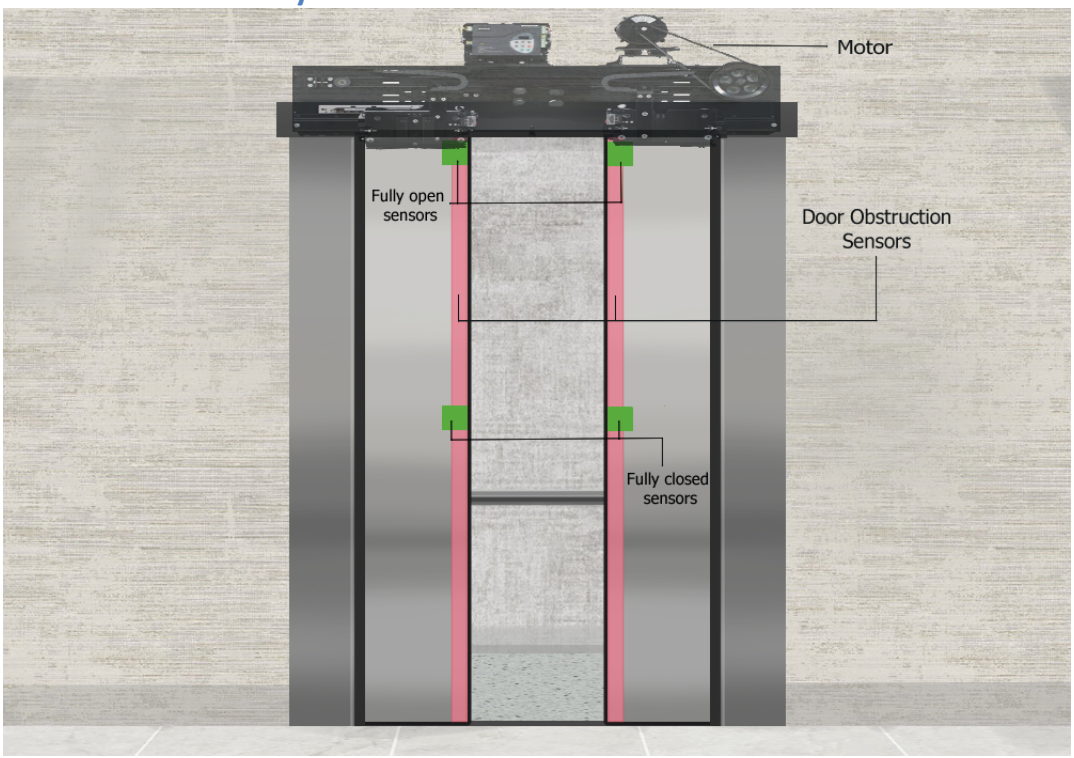
2.2 Floor Call Buttons

The Floor Call Buttons are located beside the elevator doors on each floor landing (one per floor). Each panel includes "Up" and "Down" buttons. Each button includes a built-in light indicator that illuminates when the call is active and remains on until a reset occurs.

2.3 Elevator Floor Display

The Elevator Floor Displays are the visually informative panels above elevator shaft doors on each floor. Each shaft has its own display. The display shows the elevator's current floor and travel direction. Within the display is a speaker that plays two sounds (the same sounds as the Cabin Passenger Panel, at the same time): an arrival ding, and a warning buzz when the cabin's carrying weight exceeds the maximum.

2.4 Elevator Doors Assembly



The Elevator Door Assembly includes both the cabin and floor door mechanisms, as well as the integrated obstruction and position sensors. When the elevator arrives and levels with a floor, the controller commands the doors to open. During closure, if the obstruction sensor detects any object in the doorway, the controller immediately halts and reopens the doors. The door position sensors provide feedback on whether the doors are fully open or fully closed, allowing the controller to verify that conditions are safe before enabling movement.

The positions of the door obstruction sensors are marked with red, while the door position sensors are marked with green. Above the elevator doors is the door operator with the motor used to move the doors.

3 APIs

3.1 Cabin Passenger Panel API

Allows for polling of the panel for any floor selections made since the last check. The panel maintains an internal queue of button press events, ensuring no inputs are missed between polls. When queried, it returns all pending presses, which should then be processed and cleared after service. The panel can also be commanded to update the floor display and play sounds for arrival or overload alerts. The fire service key state can be read directly to manage emergency operations.

- List<Integer> getPressedFloors()
- void clearPressedFloors()

- void resetFloorButton(int floorNumber)
- void setDisplay(int currentFloor, String direction)
- void playCabinArrivalChime()
- void playCabinOverloadWarning()
- boolean isFireKeyActive()

3.2 Floor Call Buttons API

Allows for polling of each floor call panel to check for button presses; query each panel to determine if an “Up” or “Down” call is active, and reset those states after servicing. The top floor should not be polled for “Up” calls, and the bottom floor should not be polled for “Down” calls, as those buttons are disabled on their respective floors.

- boolean isUpCallPressed()
- boolean isDownCallPressed()
- void resetCallButton(String direction)

3.3 Elevator Floor Display API

Provides methods to update displayed information and trigger audio feedback.

- void updateFloorIndicator(int currentFloor, String direction)
- void playArrivalChime()
- void playOverloadWarning()

3.4 Elevator Doors Assembly API

Provides methods to open/close the doors and check the sensors for obstructions or the current state.

- void open()
- void close()
- boolean isObstructed()
- boolean isFullyOpen()
- boolean isFullyClosed()

4 Conclusion

The Passenger Facing Devices defined in this document actualize the complete interaction and safety layer between passengers and the Elevator Control System. Through a polling-based architecture, the system maintains deterministic, action and condition driven communication with all input and display devices.

These interfaces establish a reliable and digestible foundation for elevator operation with human customers, with a proper balance between user accessibility and safety requirements.