



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

19ITT204 – MICROCONTROLLER & EMBEDDED SYSTEMS

III YEAR - V SEM

UNIT 5 – Embedded System Development

Topic- Elevator Control System



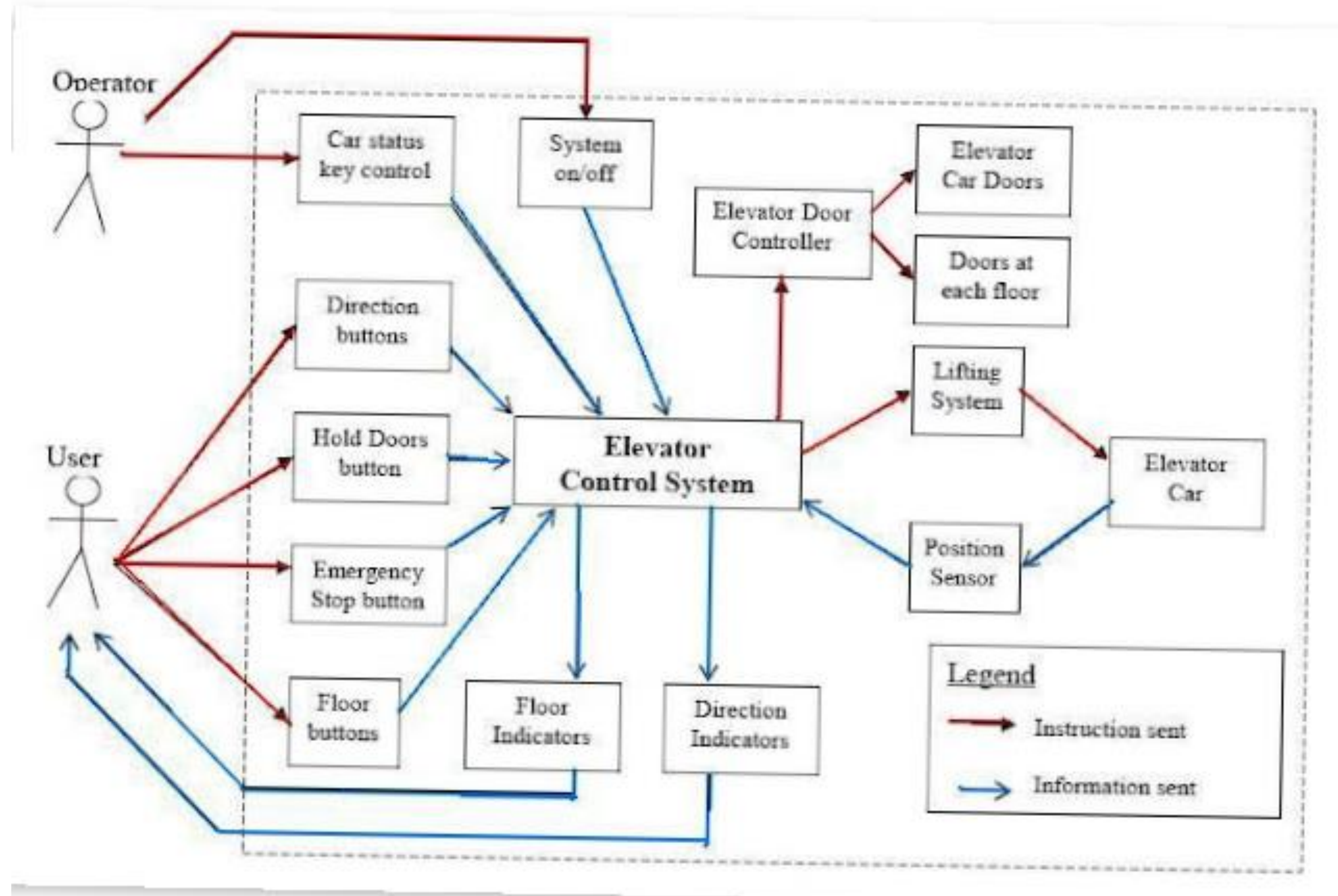
Elevator Control System



- **Elevator Control System** is the system responsible for coordinating all aspects of elevator service such as travel, speed, and accelerating, decelerating, door opening speed and delay, leveling and hall lantern signals.
- It accepts inputs (e.g. button signals) and produces outputs (elevator cars moving, doors opening, etc.).



Elevator Control System





Elevator Control System



Aims of the control system

The main aims of the elevator control system are:

To bring the lift car to the correct floor.

To minimize travel time.

To maximize passenger comfort by providing a smooth ride.

To accelerate, decelerate and travel within safe speed limits.



Elevator Control System



Types of elevator control systems:

there are 3 main types for elevator control systems as follows:

1- Single Automatic operation:

First automated system w/o single call button on each floor and single button for each floor inside car.

Called if no one is using it.

Passenger has exclusive use of the car until trip is complete.

2- Selective collective operation:

Most common, remembers and answers calls in one direction then reverses. When trip complete, programmed to return to a home landing.

3- Group automatic operation:

For large buildings with many elevators which are controlled with programmable microprocessors to respond.



Elevator Control System



Elevator control system components:

The elevator as a control system has a number of components. These can basically be divided into the following:

Inputs.

Outputs.

Controllers.

1- Inputs, which include:

A- Sensors.

B- Buttons.

C- Key controls.

D- System controls.



Elevator Control System



Sensors

Magnetic and/or photo electric:

These pick up signals regarding the location of the car.

This sensor is usually placed on the car itself and reads the position by counting the number of holes in the guide rail as they pass by in the photo-electric sensor or in the case of the magnetic sensor, the number of magnetic pulses

Infrared:

This is used to detect people entering or leaving the elevator.

Weight sensor (OverLoad Device):

This is placed on the car to warn the control system if the design load is exceeded.



Elevator Control System



PVT (primary velocity transducer):

- Velocity of the drive sheave is sensed with this encoder.

B- Buttons

➤ B.1 Hall Buttons:

- These buttons are on a button panel on the outside of the elevator shafts and are used by potential passengers to call an elevator cab to the floor that the pressed summon button is located on.
- The controller interacts with these buttons by receiving press and release signals indicating the requested direction and floor number. It also sends light on/off signals to indicate the status of the buttons.



Elevator Control System



B.2 Floor Request Buttons:

- This particular elevator controller will be controlling elevator cabs that are in a building with 6 floors.
- Consequently, each cab has 6 floor request buttons labeled 1 through 6 that passengers can use to direct the elevator cabs to the floor that they would like to go to.

B.3 Open Door Button:

- This button is on the interior button panel of each cab.
- A passenger can press this button to open the elevator doors or keep pressing it to keep them open, but only when the elevator cab is stopped at a floor



Elevator Control System



➤ B.4 Emergency Stop Button:

- This button is on the interior button panel of each cab.
- A passenger can press this button to stop the elevator no matter where it is in a shaft.
- The controller interacts with this button by receiving a signal from it that indicates that it was pressed, as well as the cab that it came from.

In **destination control systems**, the conventional hall call buttons (Up and Down arrows) located at the elevator lobby are replaced by the registration devices. Passengers register their destination floor through these registration devices at the lobby instead of in the elevator.



Elevator Control System



D- System Controls

System controls are used to turn the elevator system on or off, system controls are only accessible from an elevator control room. They would typically be used quite infrequently – perhaps the system would be turned on early in the morning and turned off late at night, or turned off at the start of holidays and turned on once the next term begins.

2- Outputs, which include:

- A- Actuators.
- B- Bells.
- C- Displays.



Elevator Control System



The primary function of the elevator controller



The primary function of the elevator controller is essentially to receive and process a variety of signals from several different components of a whole elevator system.

➤ It is able to send signals in response to the ones it receives in order to operate all of the other components in the system.

➤ This exchange of signals is how the elevator controller is able to keep the elevators running smoothly on a day-to-day basis.



References

<http://www.electrical-knowhow.com/2012/04/elevator-control-system.html>

<https://slideplayer.com/slide/13530000/>

https://www.engr.colostate.edu/~sudeep/wp-content/uploads/2017/07/eric_shawnHomeSecuritySystem.pdf

Rajkamal, Embedded system, Tata McGraw-Hill Publishers ,2nd edition,2008

Thank You