



# CONTROLLING BUILDING FIRE AND SMOKE EVACUATION USING IOT

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## ABSTRACT

This paper deals with the impacts of anxiety on route choices and the interaction with other psychological features like responses to guidance and herding. This is achieved by using an optimization framework where the number of planning steps and values of psychological parameters are affected by anxiety. In places where fire accidents occur, people don't think about the impacts of anxiety on large crowds and they start running in unknown directions to save their lives. These are mimicked in FDS+Evac (Fire Dynamic Simulator + Evacuation) with and without effective guidance. Testing results demonstrate that effective guidance helps reduce negative impacts of anxiety on route choices.

**KEYWORDS:** Impacts of anxiety, building fire and smoke evacuation, human factors, virtual reality and interfaces.

## INTRODUCTION:

Fire safety is one of the set of practices intended to reduce the destruction caused by fire. Fire safety measures include those that are intended to prevent the ignition of an uncontrolled fire, and those they are used to limit the development and effects of a fire after it starts.

Fire safety measures include those that are planned during the construction of a building or implemented as in structures that are already standing, and those that they are taught to occupants of the building.

Those who are inspect buildings for violations of the Fire Code and go into schools to educate children on Fire Safety topics are fire department members are known as Fire Prevention Officers.

The Chief Fire Prevention Officer or Chief of Fire Prevention will normally trained newcomers to the Fire Prevention Division and may also to conduct inspections or make presentations.

## CAUSES OF FIRE ACCIDENTS:

- Kitchen fires from cooking, such as frying, broiling, and simmering.
- Electrical systems that are overloaded, resulting in hot wiring or connections.
- Smoking (Cigarettes, cigars, pipes, lighters, etc.).
- Equipment that generates heat and utilizes combustible materials.
- Flammable liquids and aerosols.
- Cooking appliances - stoves, ovens, etc.
- Heating appliances - fireplaces, wood burning stoves, furnaces, boilers, portable heaters.
- Household appliances - clothes dryers, curling irons, hair dryers, refrigerators, freezers.
- Electrical wiring which is in a poor condition.
- Electronic and electrical applications.

## COMMON WAYS OF PREVENTING ACCIDENTS:

- Not exceeding the maximum occupancy within any part of the building.
- Maintaining proper fire exits and proper exit signage (e.g., exit signs pointing to them that can function in a power failure).
- Compliance with electrical codes to prevent overheating and ignition from electrical faults or problems such as poor wire insulation or overloading wiring, conductors, or other



fixtures with more electric current than they are rated for.

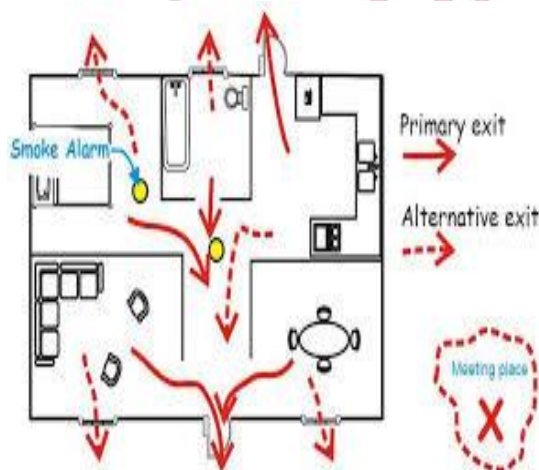
- d) Placing and maintaining the correct type of fire extinguishers in easily accessible places.
- e) Properly storing and using hazardous materials that may be needed inside the building for any storage purpose or operational requirements (such as solvents in spray booths).
- f) Prohibiting flammable materials in certain areas of facility.
- g) Periodically inspecting buildings for violations, potentially, prosecuting or closing buildings that are not in compliance, until the deficiencies are corrected or condemning it in extreme cases.
- h) Maintaining fire alarm systems for detection and providing warning about fire.
- i) Obtaining and maintaining a complete inventory of firestops.

In this paper we have discussed a smart way of evacuating the people from large places in case of fire accidents.

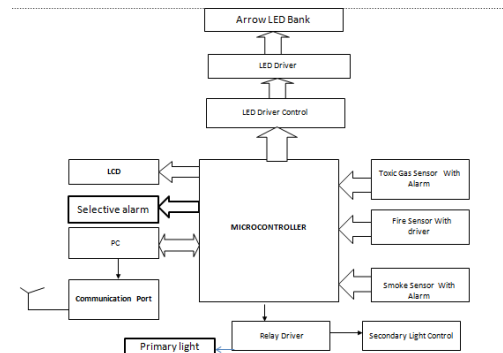
#### OBJECTIVE:

- The main objective of our project is to avoid accidents in various main crowd areas by improving route choices to the public.

#### LAYOUT:



#### BLOCK DIAGRAM:



#### SENSORS:

- A sensor is a device that converts real world analog data into data that a computer can understand with the help of ADC.
- A sensor's sensitivity indicates how much the sensor's output has changed when the input quantity being measured changes.
- A sensor is an object whose purpose is to detect events or changes in its environment and sends the information to the computer which then tells the actuator (output devices) to provide the corresponding output.
- Sensors need to be designed to have a small effect on what they measure; making the sensor smaller often improves this and introduce other advantages.
- Technological progress allows more and more sensors to be manufactured as micro sensors are manufactured using MEMS technology. In most cases, a micro sensor reaches a significantly higher speed and sensitivity compared with macroscopic method of production.

#### FLAME SENSOR:

- A flame sensor is designed to detect and respond to flame or fire.
- Responses to a detected flame depend on the installation, but at the same time it include sounding an alarm, deactivating a fuel line (such as a propane or natural gas line), and activating a fire suppression system.
- When used in applications like industrial furnaces, their role is to provide a proper confirmation that the furnace is properly



- The color of the light is corresponding to the energy of the photon is determined by the energy band gap of the semiconductor.

**ULN2003:**

- High-voltage and current Darlington arrays feature continuous load current ratings to 500 mA for each of the seven drivers.
- It is Ideally suited for interfacing between low-level logic circuitry and multiple peripheral power loads
- Typical loads includes relays, solenoids, stepping motors, magnetic print hammers, multiplexed LED and incandescent displays, and heaters

**PIC16F877A:**

- CIRCUIT DIAGRAM:**



- ## RELAYS:

- A relay is an switch which is electrically operated. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and the switch contacts will be changed.
- The coil current can be on or off so that the relays have two switch positions and they are double throw (changeover) switches.
- Relays allow one circuit to switch a second circuit which should be completely separate from the first.
- For example: A low voltage (LV) battery circuit can use a relay to switch a 230V AC mains circuit.
- There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.

- LED is a two-lead semiconductor light source which resembles a basic pn-junction diode except that an LED also emits light.
- When an LED's anode lead has a voltage that it is more positive than its cathode (k) lead by atleast the LED's forward voltage drop, current flows.
- Electrons are can able to recombine with the holes within the device, releasing energy in the form of photons. This effect is called electroluminescence



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