Reactive Disaster Prevention

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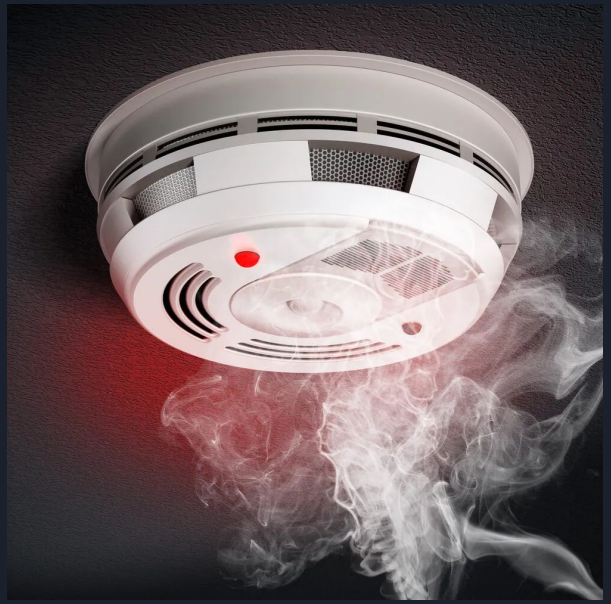
Problem Description and Statement

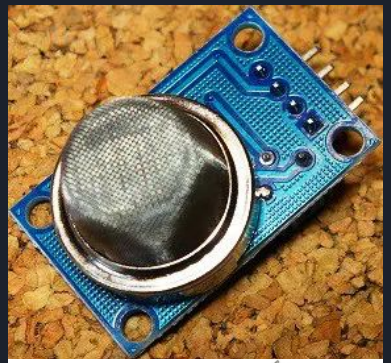
- Design of traditional smoke detectors have not been changed for many years
- The goal of our project is to modernize such detectors
- System consists a smoke and gas detector, a water level detector, and a temperature and humidity sensor
- Detect any abnormal conditions in the house to prevent any disaster or further damage to both the property and the user
- Alert homeowners of any potentially harmful events even when they are out of the house
- Such a system could prevent any disaster caused by appliances such as water boilers, furnaces, stoves and from unexpected situations such as a short circuit, water pipe leakage, etc.

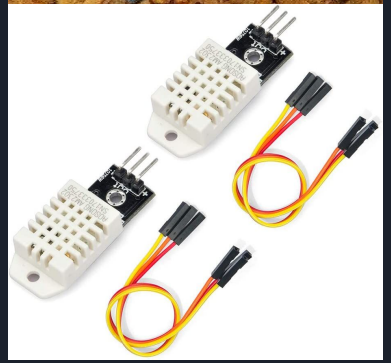


Objective

Detectors

- Smoke: Detect any type of gasses.
  - Uses low voltage when not detecting and high in presence of smoke.
- Water: Detect if there's a water flooding or leaking
- Temperature/Humidity: Detect rise and fall of room temperature





Requirements

Requirement ID	Requirement Type	Requirement Description
REQ 1	Functional	System should detect various household flammable gases
REQ 2	Functional	System should detect if there's a water flooding or leaking
REQ 3	Functional	System should detect if the temperature rises above 50 degrees
REQ 4	Functional	System should notify the resident/landlord of the event origination
REQ 5	Functional	System should notify the user what type of event was triggered
REQ 6	Functional	System should measure humidity
REQ 7	Functional	System should detect temperature drops below 10 degrees
REQ 8	Non-Functional	System should be able work with both wifi and bluetooth
REQ 9	Non-Functional	The system MQTT broker should be able to connect no less than 20 clients
REQ 10	Non-Functional	The system will utilize MQTT protocol for stable low bandwidth event streams

Use cases

Use Case	Description
UC-1: Smoke and Gas Detection	The gas sensor of the system detects smoke or flammable gas
UC-2: Flood Detection	The system will monitor the level of liquid in the environment it is deployed in. These environments can be in the basement or kitchen
UC-3: Temperature and Humidity Detection	This use case describes temperature and humidity sensor of the system detects humidity and temperature