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EXHIBITION
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A Real Time Evacuation Model for Commercial Buildings in KSA
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#OmaintecConf
An Initiative by
OMAINTEC
المجلس العربي للتشغيل والصيانة
Arab Operations & Maintenance Council
Organized by
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مجموعة أكزيكون الدولية

Introduction

Visionary Leadership: Crown Prince Mohammed bin Salman's vision for a prosperous and diversified Saudi Arabia.

Economic Diversification: The 2030 Vision focuses on reducing dependence on oil and fostering a dynamic and diversified economy.

Infrastructure Development: population growth due to up scaling current and new cities with Mega projects, such as metro lines and theme parks, are pivotal for the nation's growth.

Impact on Residents: These developments are more than physical changes; they are enhancing the quality of life for all Saudi residents.

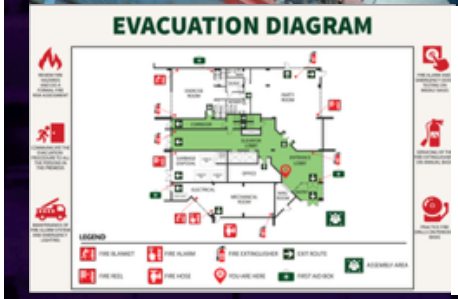
Mega projects: must have a detailed emergency evacuation plan.

When there is a fire, every second counts.

2019 A huge fire at the Haramain railway station in #Jeddah

2022 A huge fire at the Dhahran mall in #Dhahran

Literature Review



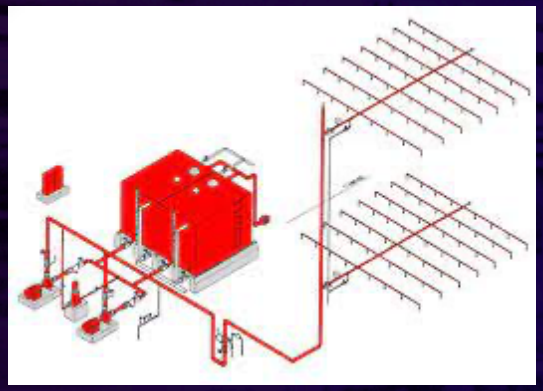
According to Saudi Civil Defense In the year 2019:

- 49,577,167 material losses
- 1809 injuries
- 149 deaths.

A well-designed fire evacuation plan is important to avoid the unnecessary loss of human life and property.

- Building information modeling (BIM) can keep fire emergency evacuation plans up-to-date.
- using BIM, inspections and rescues would be more effective, improve quality, and reduce time, all of which would save lives.

Firefighting system



Traditional Firefighting system

New Trends in Firefighting system

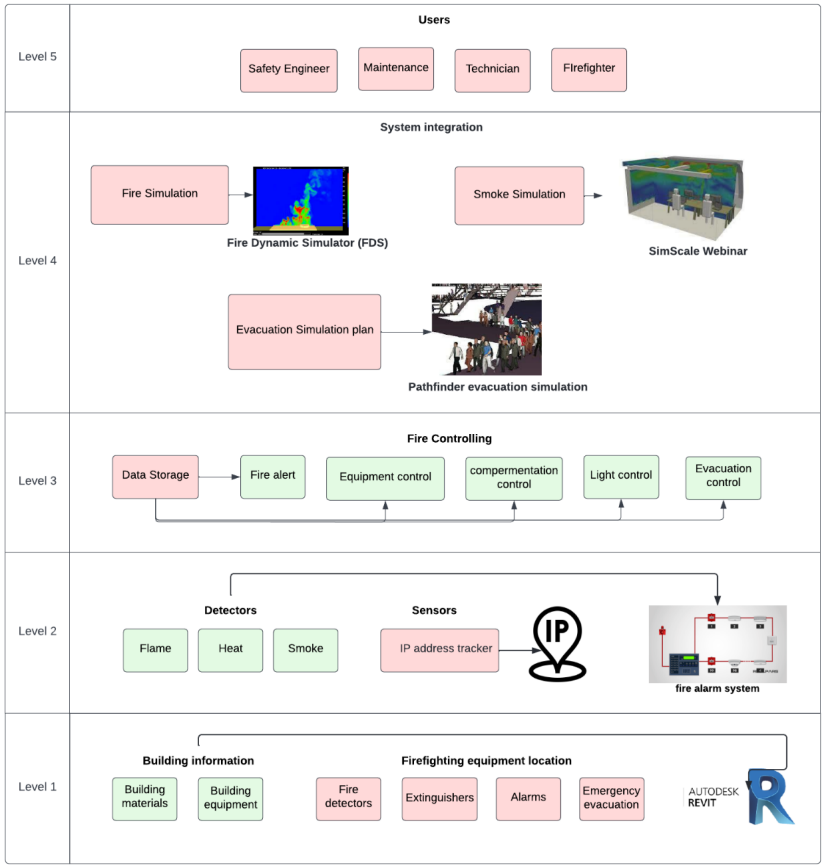
Objectives of the Research

- Develop a comprehensive safety management system
- Utilize IoT and BIM for real-time data analysis
- Enhance fire evacuation strategies

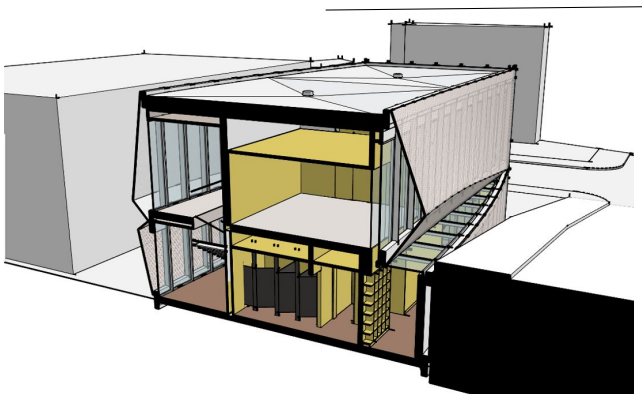
Proposed BIM-Based Framework

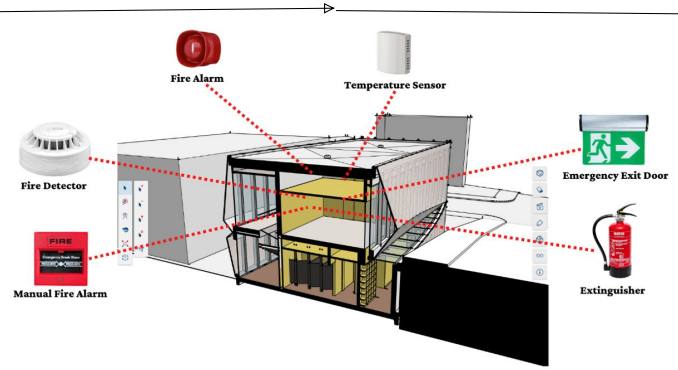
The research methodology in four stages:

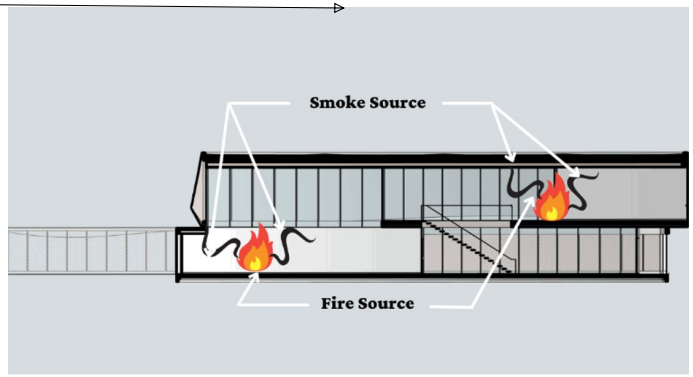
1. **Building a 3D model using Revit® software.**
2. **Implementing a smart fire detection system.**
3. **Data processing and analysis.**
4. **Fire and smoke simulation using FDS, SimSchale, and Pathfinder.**



Proposed prototype - Office Building







- Display the results of fire scenarios simulated in the office building.
- Emphasize the system's ability to predict fire locations and severity.
- Discuss how evacuation paths are determined in real-time based on simulation data.

Using BIM for Evacuation Management

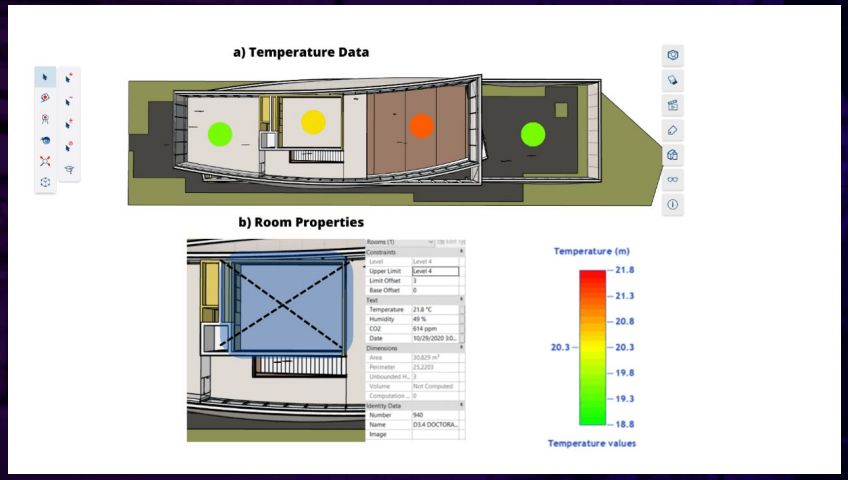


illustration of temperature values in the BIM model

illustration of the proposed system

- Dynamo provides visual programming code for BIM that can be used to visualize sensor data in real-time.

Conclusion

This study proposes a fire evacuation management system using sensors to:

- detect a fire early by understanding the fire and smoke behaviors
- collect and analyze environmental and temperatures data collected by sensors.
- determination of the location of its occupant
- suggest ideal methods of evacuation
- Dynamic compartmentation.

the study showed that BIM tools can:

- visualize environmental data in a 3D model.
- track the residents in real-time.
- alert residents.

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