

# PyroPulse

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WE Failed As Humans





**\$71.7 BILLION**

Annually in direct  
damages and  
Firefighting expenses

-World Bank



7.2 BILLION METRIC  
TONS OF CO<sub>2</sub>

In 2020, wildfires emissions  
of CO<sub>2</sub>

- European Space Agency





# 8,000 SPECIES

Wildfires threaten the  
survival of over 8,000  
species worldwide

- International Union for Conservation of Nature

# Challenges in traditional Management



Delayed  
Detection



Communication  
Gaps



Resource  
Constraints





AI enriched our lives, and the moment has arrived to safeguard our planet



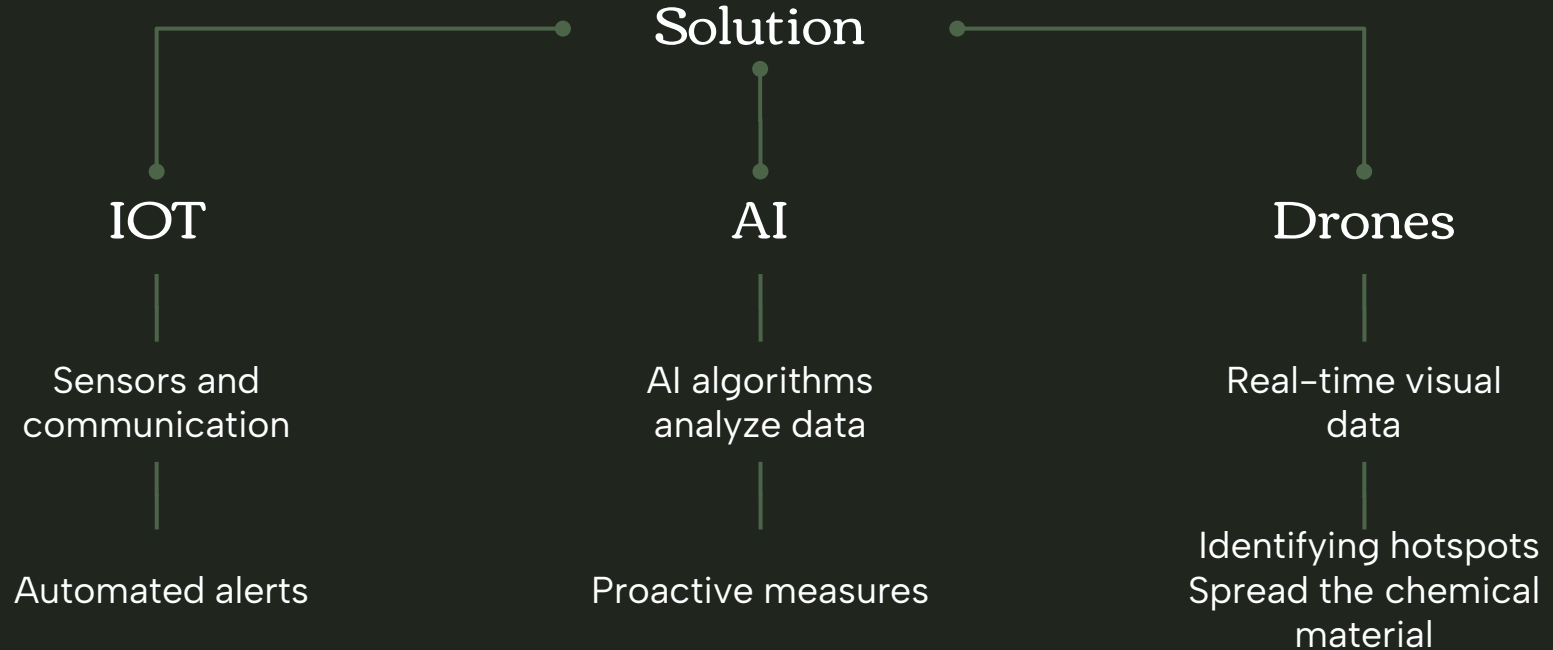


01

# Technical

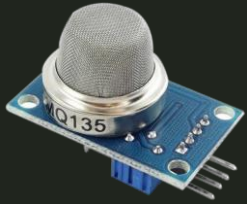
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# Technical Part:





# IOT Materials



Air Quality Sensor



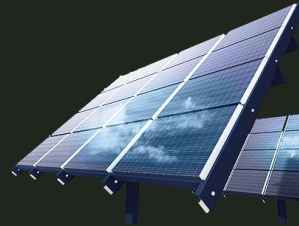
NodeMCU



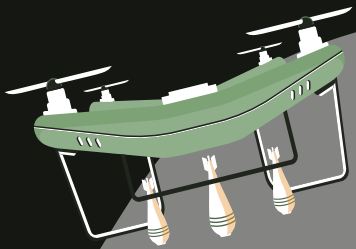
Relay



Cellular Modules



Solar Cells



DRONE

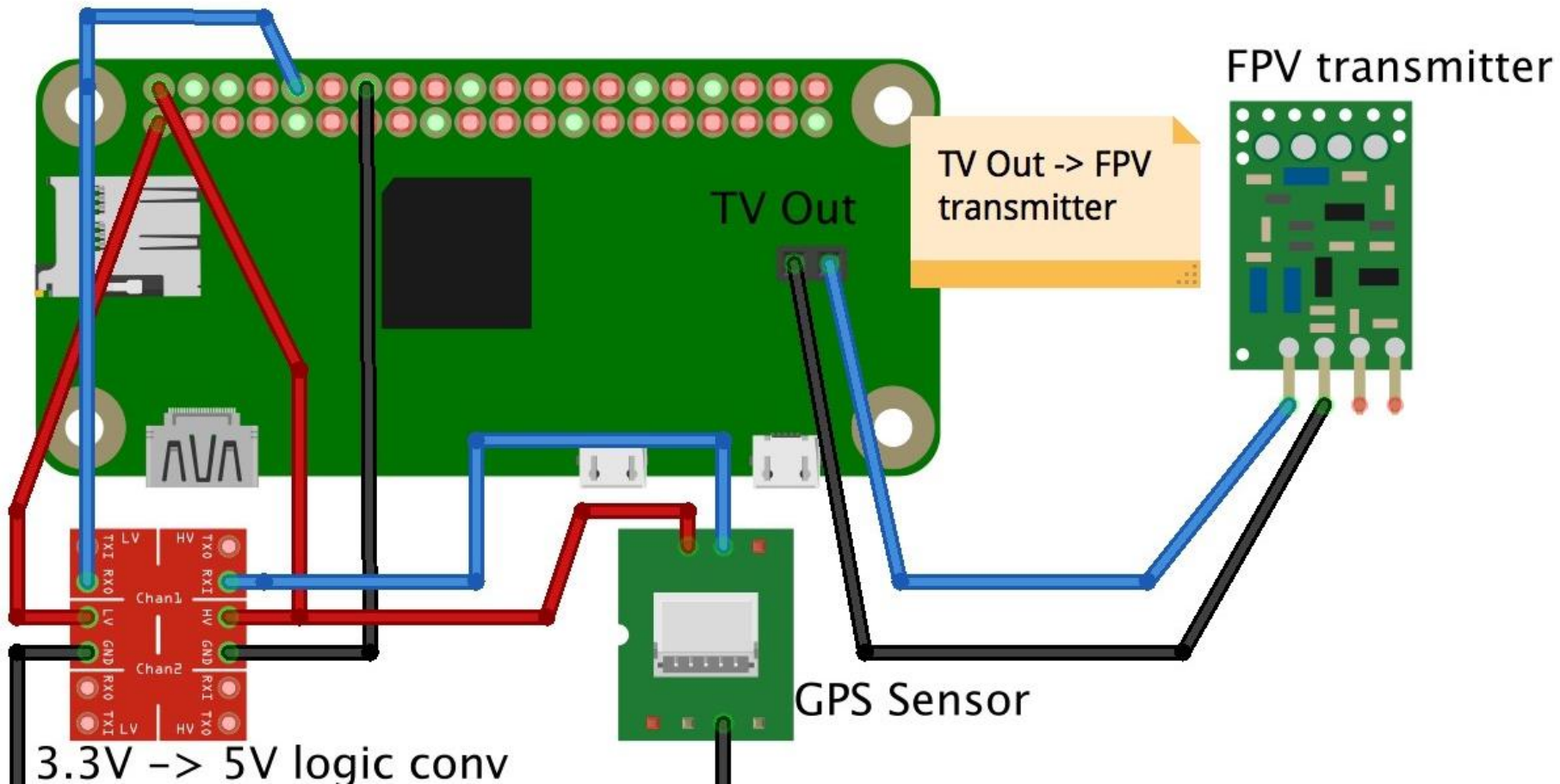


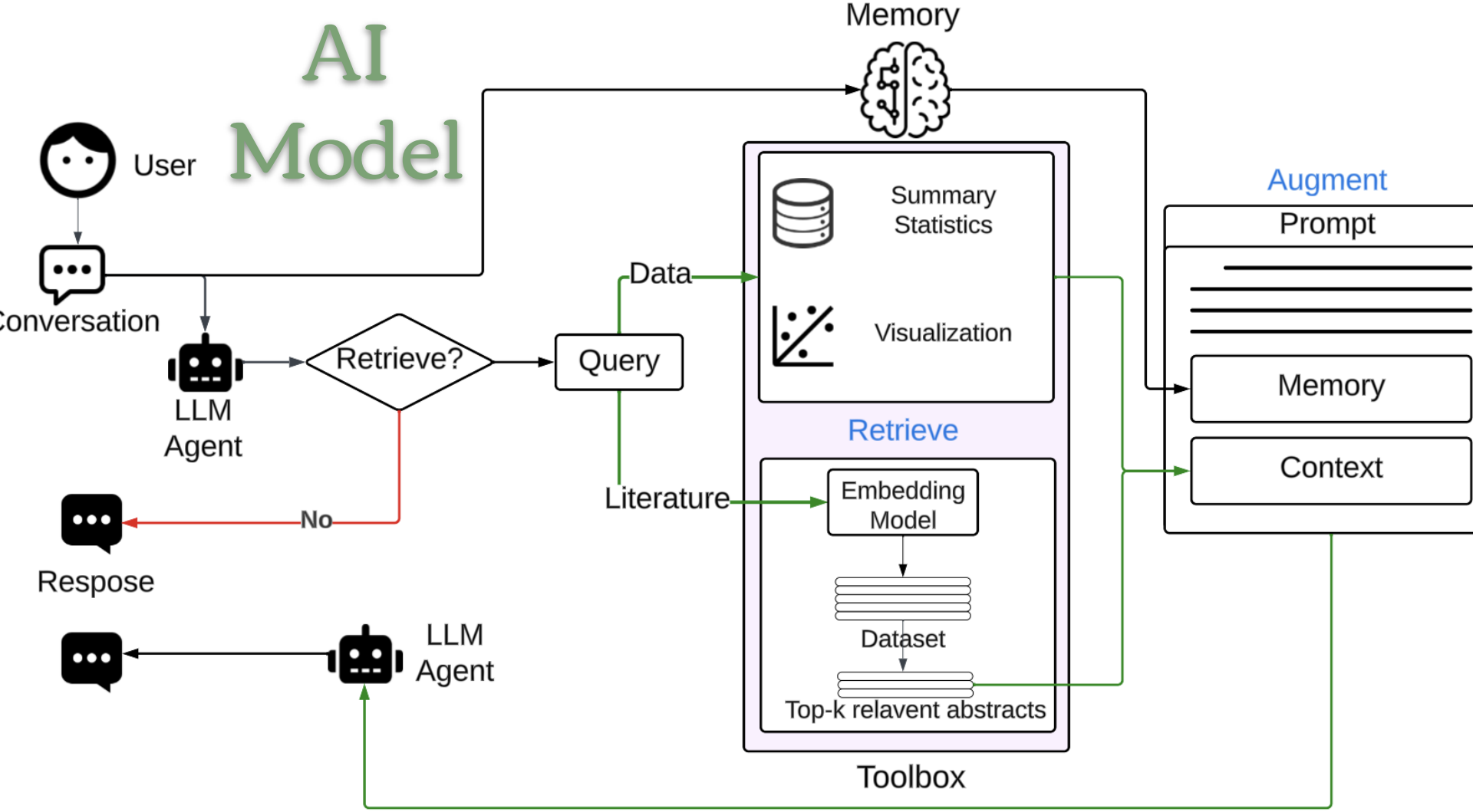






# Drone interface







# LLM agent

01

## User profile module

Asking clarifying questions to get a comprehensive understanding of the user's concerns

02

## Planning module

Planning and communicating a strategy to address the user's concerns

03

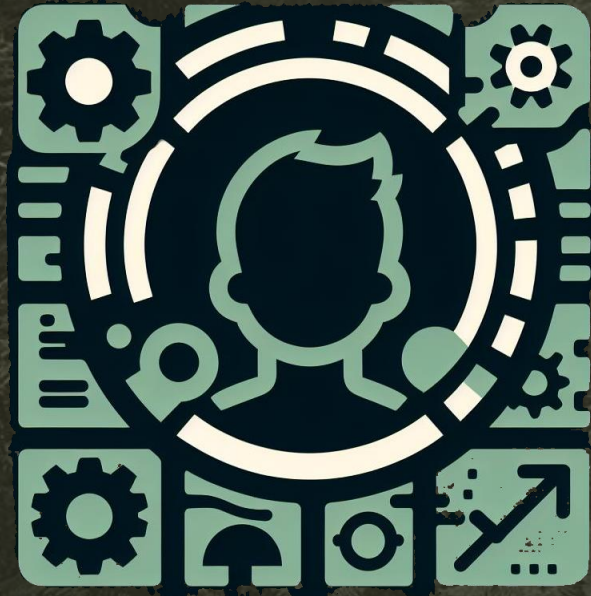
## Memory module

Providing and explaining relevant quantitative and qualitative information to the user.

04

## Toolbox module

01



# User Profile Module

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PyroPulse revolutionizes user engagement by seamlessly collecting valuable information from domain experts through intuitive and focused questions. Our LLM agent streamlines the process, ensuring precision in initial queries and future improvements to eliminate repetition.





# Planning Module

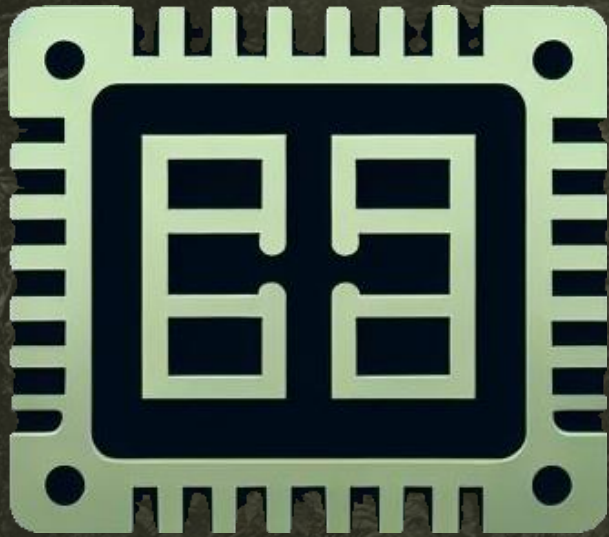
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In the planning module, PyroPulse unveils a systematic, four-part approach to address user concerns:

1. Understand specific concerns and objectives.
2. Identify and interpret key data, including the Fire Weather Index, long-term fire history, and recent incidents.
3. Research academic papers.
4. Develop informed recommendations.



03




# Memory Module and Toolbox Module

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PyroPulse memory module helps keep conversations on track by remembering key details from past talks and guiding the expert on the next steps. While the data tools provide clear info on fire trends and FWI, sometimes they miss highlighting high-risk situations. Users appreciate the time saved, as retrieving and understanding data is usually a time-consuming task.

# Chat interface

 Hello! I'm here to assist you with any questions or concerns you may have regarding wildfires. Could you please share with me why you are interested in learning about wildfires? Additionally, is there a specific project or task where wildfires could potentially have an impact on your plans?





 We had a high intensity fire near Las Vegas, NM. What are the primary risk factors we should be concerned about?

 That sounds concerning.  Are you specifically concerned about the impact of the fire on the environment, property, or public safety?



 Public safety

 I see. Are you interested in learning about ways to prepare for wildfires and ensure public safety, or are you interested in the broader impact of wildfires on communities and public safety measures? 

Ask me anything?



 The Fire Weather Index (FWI) for the Sangre De Cristo Mountains region indicates potential future fire risks based on the projected values. Historically, the FWI has shown seasonal variability, with higher values in the summer and autumn months, indicating a higher fire danger during these periods. The FWI is projected to increase across all seasons as the mid-century and end-of-century values are higher compared to the historical FWI. In particular, the end-of-century FWI values are notably higher, especially in the spring and autumn seasons, which suggests an increased wildfire risk in those periods.

The projected increases in FWI values signal a heightened potential for fire activity in the region, indicating that the conditions conducive to wildfire ignition and spread are expected to become more prevalent in the future. Considering the specific concerns about wildfire risks and climate change impacts in the area, these FWI trends underscore the importance of proactive measures to mitigate the escalating wildfire risks and adapt to changing environmental conditions.

You can access the data source for these FWI values on the Climate Risk & Resilience Portal (ClimRR) developed by the Center for Climate Resilience and Decision Science (CCRDS) at Argonne National Laboratory through the following link: [ClimRR Portal](#)

Do you have any questions about the interpretation of the FWI data or would you like to proceed to the next step?

## Fire Weather Index (FWI) Data for Location (lat: 35.9, lon: -105.6)

Category	Spring	Summer	Autumn	Winter
Historical(1995 - 2004)	2.48235011	5.46183014	5.79625988	1.02639506
Mid-Century(2045 - 2054)	4.38321018	7.02821016	5.57479	1.62774897

Ask me anything?



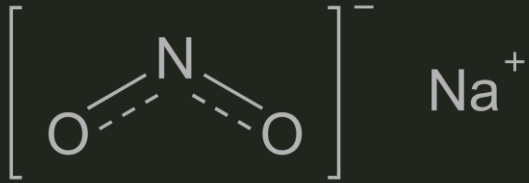


# Chemical Material

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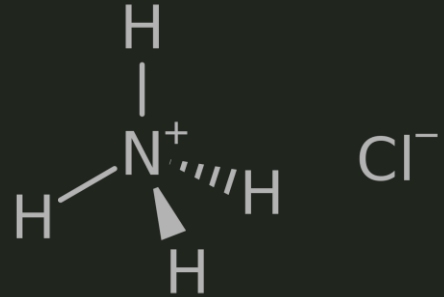
# Chemical Materials



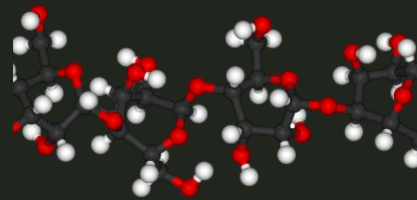
Sodium nitrite



Colloid silica

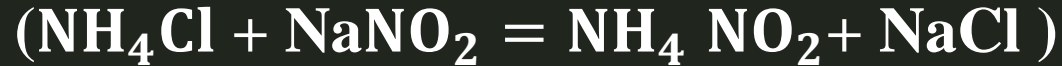


Ammonium chloride



Cellulose

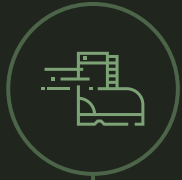
# Five times more Efficient than water



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When it burns, it will give us water and nitrogen, which help in stopping the fire quickly.

# Conclusion



IOT

Detect early signs of wildfires

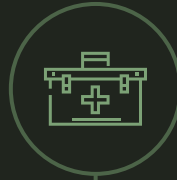
01



AI

Analysis of sensor data

02



Drone

Aerial surveillance

03



Chemicals

Deprive the fire of oxygen and cool the flames

04







Together, let's harness innovation and determination to safeguard our planet from the ravages of wildfires, ensuring a brighter, safer future for generations to come.

# TEAM



REEM Samy



Khaled Salama



Moustafa Fatouh