

# Fire-Fighting Robot

Group-9

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Github Page

# Problem Statement

Firefighters face serious risks from heat, toxic smoke, and dangerous environments, leading to potential burns, long-term health issues, and physical injuries.



- Heat
- Smoke and Gases
- Dangerous Locations



Source:- [checkmatefire.com](https://checkmatefire.com)

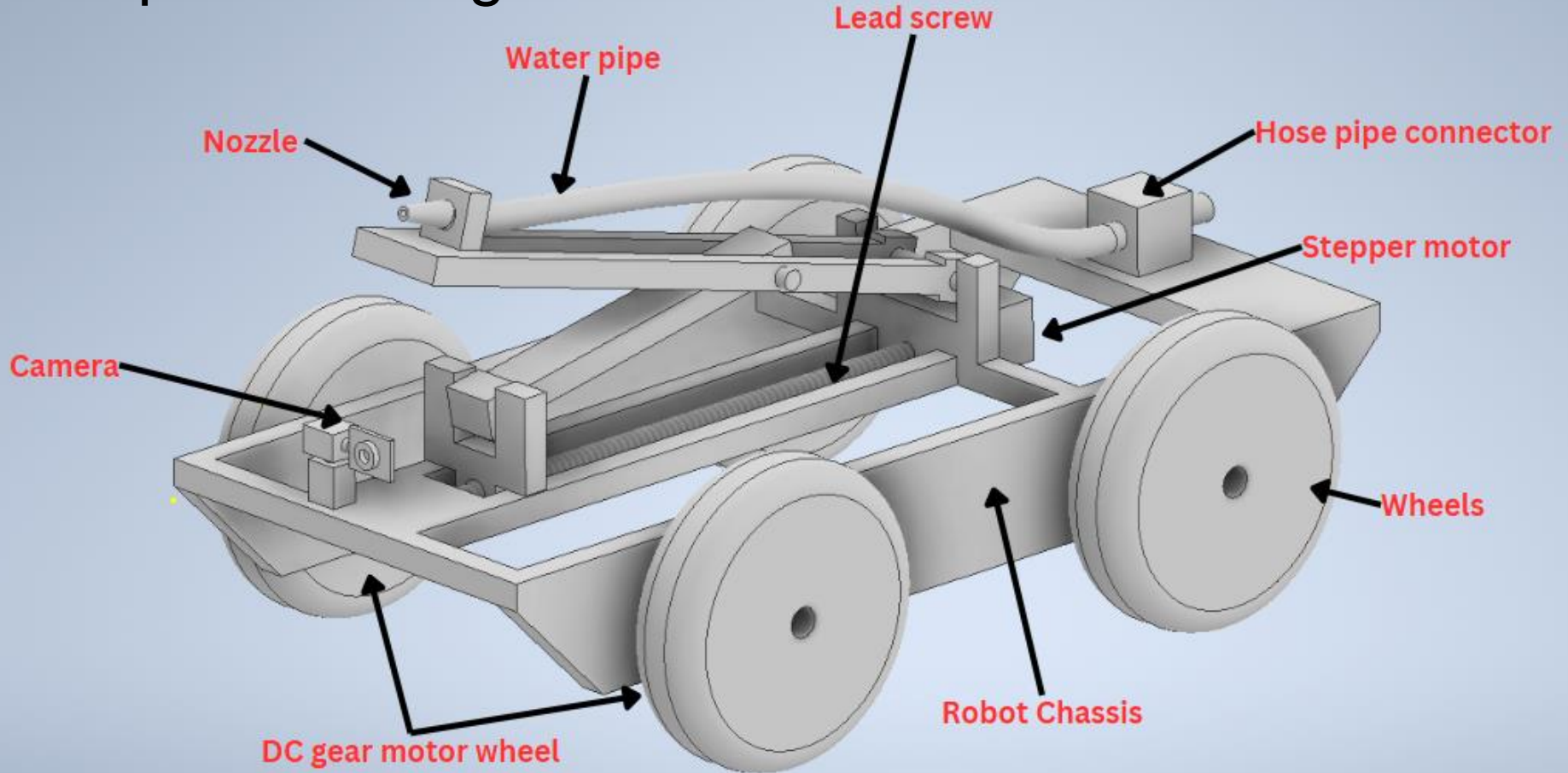
“why a problem”.

# Proposed Solution

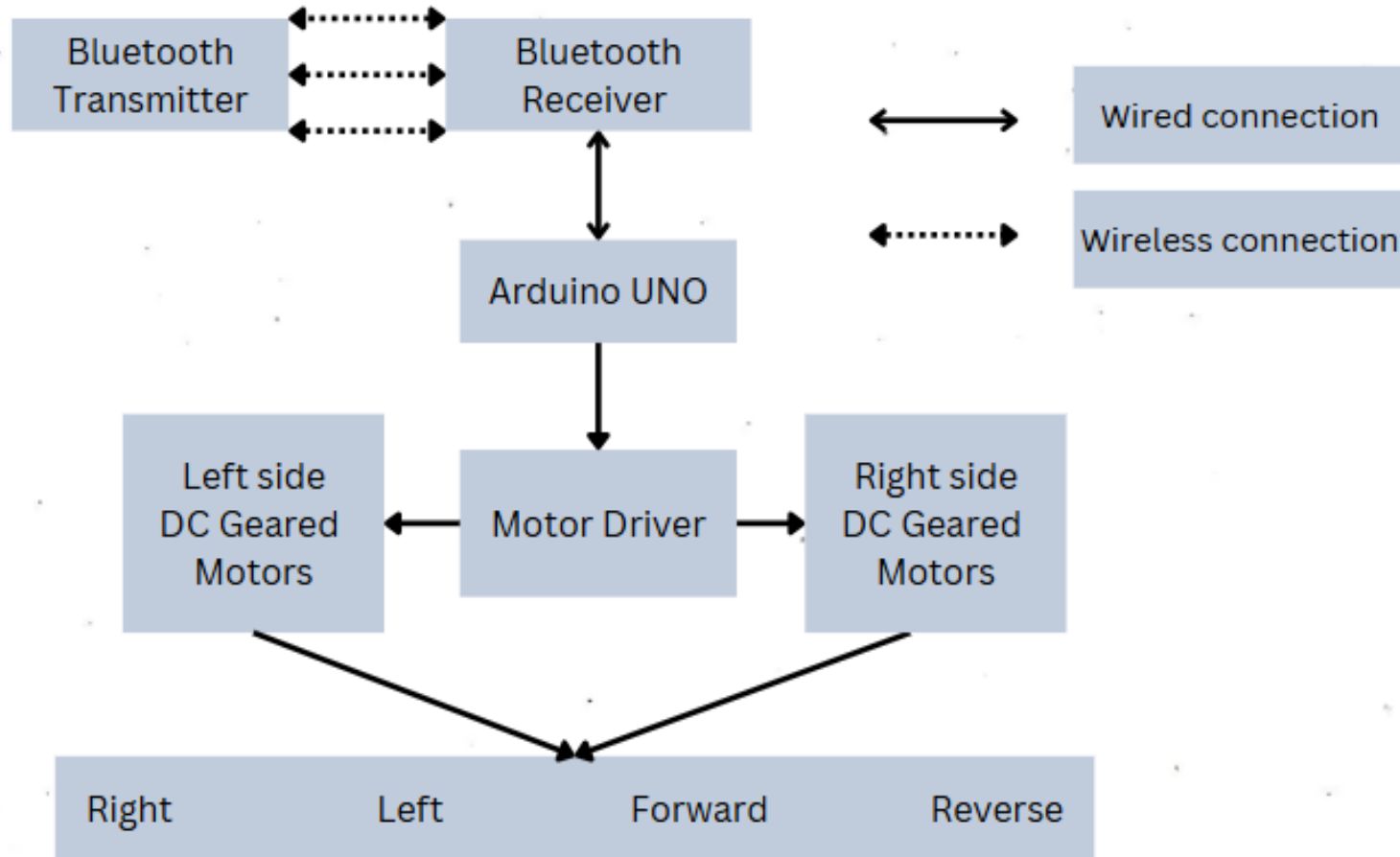
Developing the fire fighting robots to enhance the safety of the firefighters.



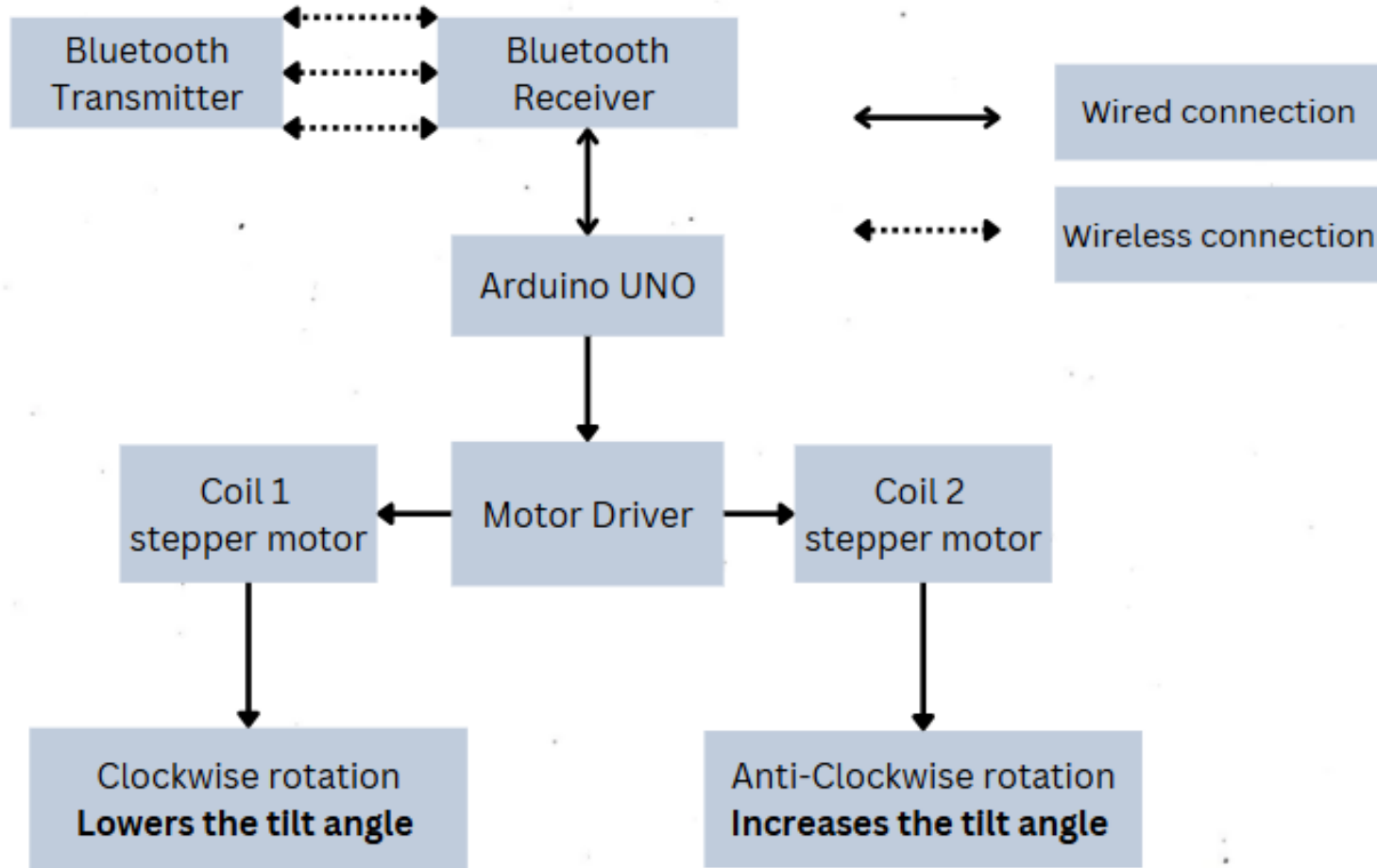
# Proposed Design



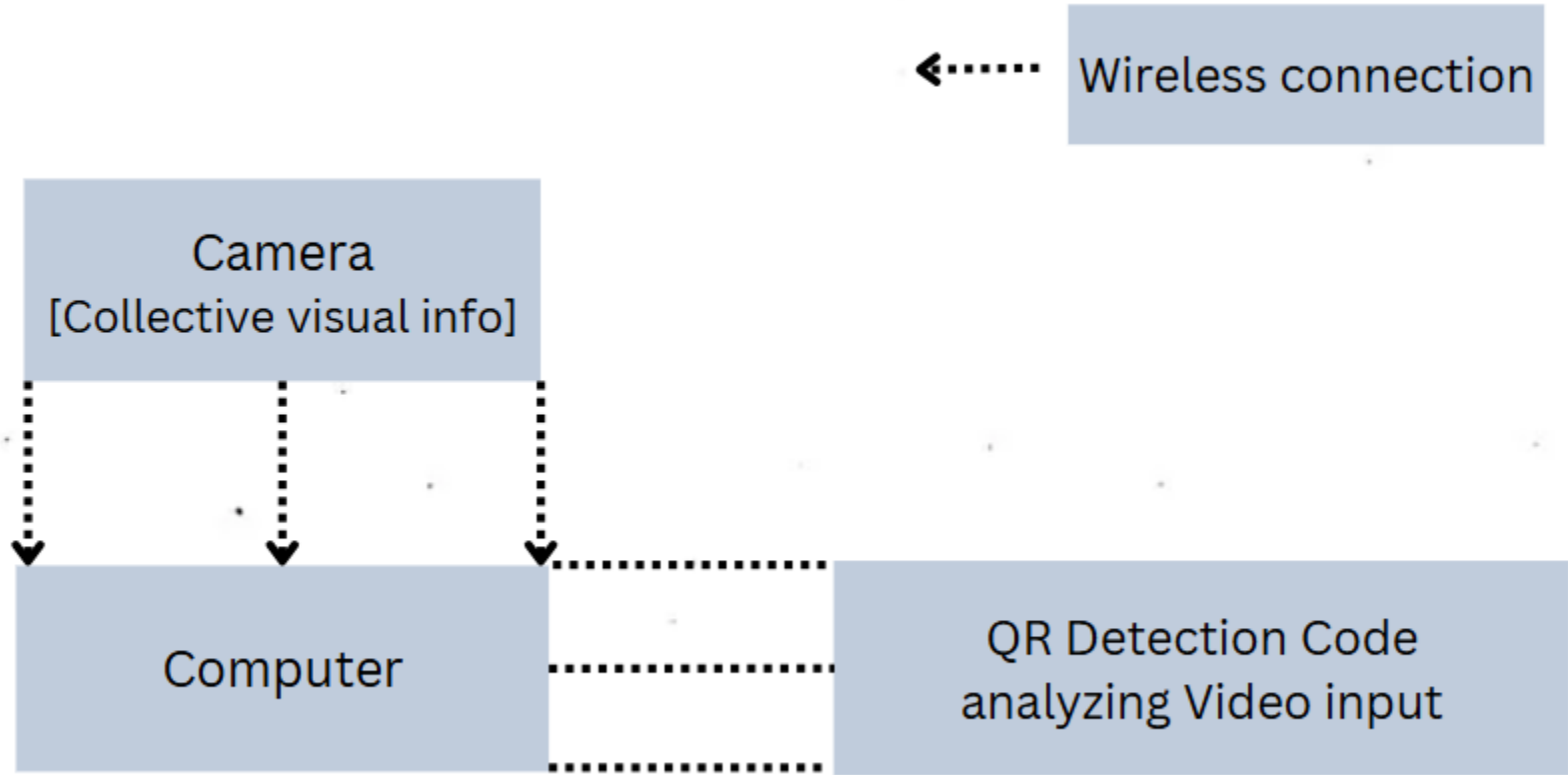
# Mechatronic Architecture For Motion Control



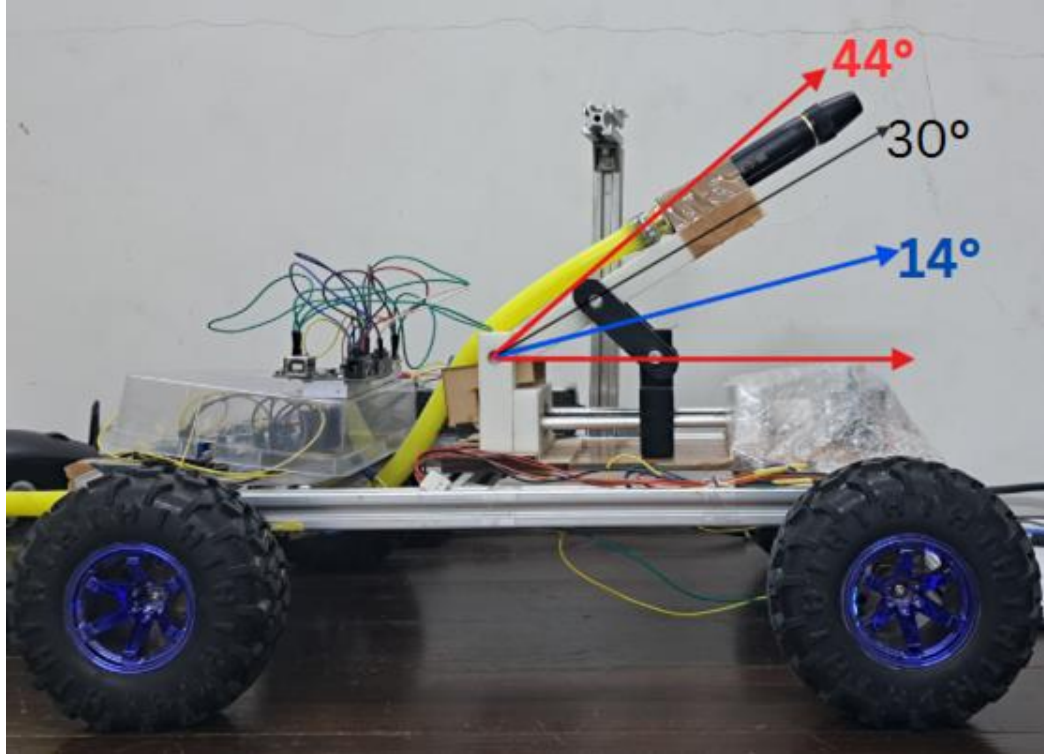
# Mechatronic Architecture for Tilt Mechanism Control



# Mechatronic Architecture for QR Detection



# Robot's Capacity



Avg. Velocity of Robot = **0.4** m/s

Vel. of water from nozzle = **6.4** m/s

@ Water flow rate = 250ml/s

- Range of water jet = **1.9 - 4.5** m
- Max range @  $\theta = 44^\circ$  is 4.2 - 4.3m
- Min range @  $\theta = 14^\circ$  is 1.9 - 2.2m



# Image of Prototype



# Video Demonstration

1. "Fire {QR} Detection & Water Targeting"
1. "Robot Navigating Compact Spaces for Fire Inspection"
1. "Extinguishing Large Open Fire"



Video  
Demonstration

# The Fire Fighting Robot



<https://www.youtube.com/watch?v=QpTfJ0xfP2k>

# Conclusion and Future Development

This robot offers manual control, enabling fire suppression in tight, hazardous spaces where firefighters can't easily reach.

- Aim to make it fully autonomous
  - Ensuring rapid deployment
  - Eliminating the need for skilled operators,
  - Making fire response faster and more efficient.



# Thank You

