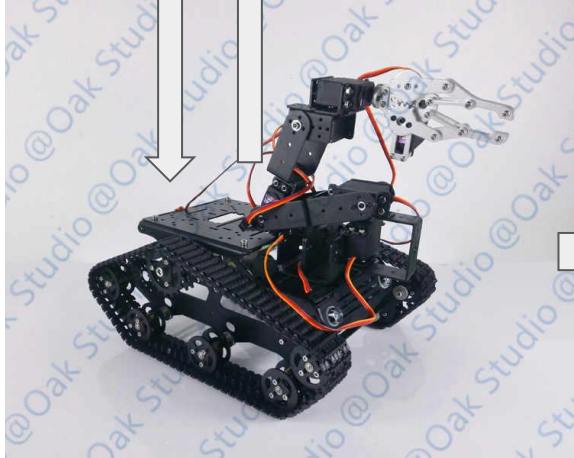Drone camera less likely to get fried.

Rescue robots-Phase 1

Drone image processing for robot arm on tank rescue mission
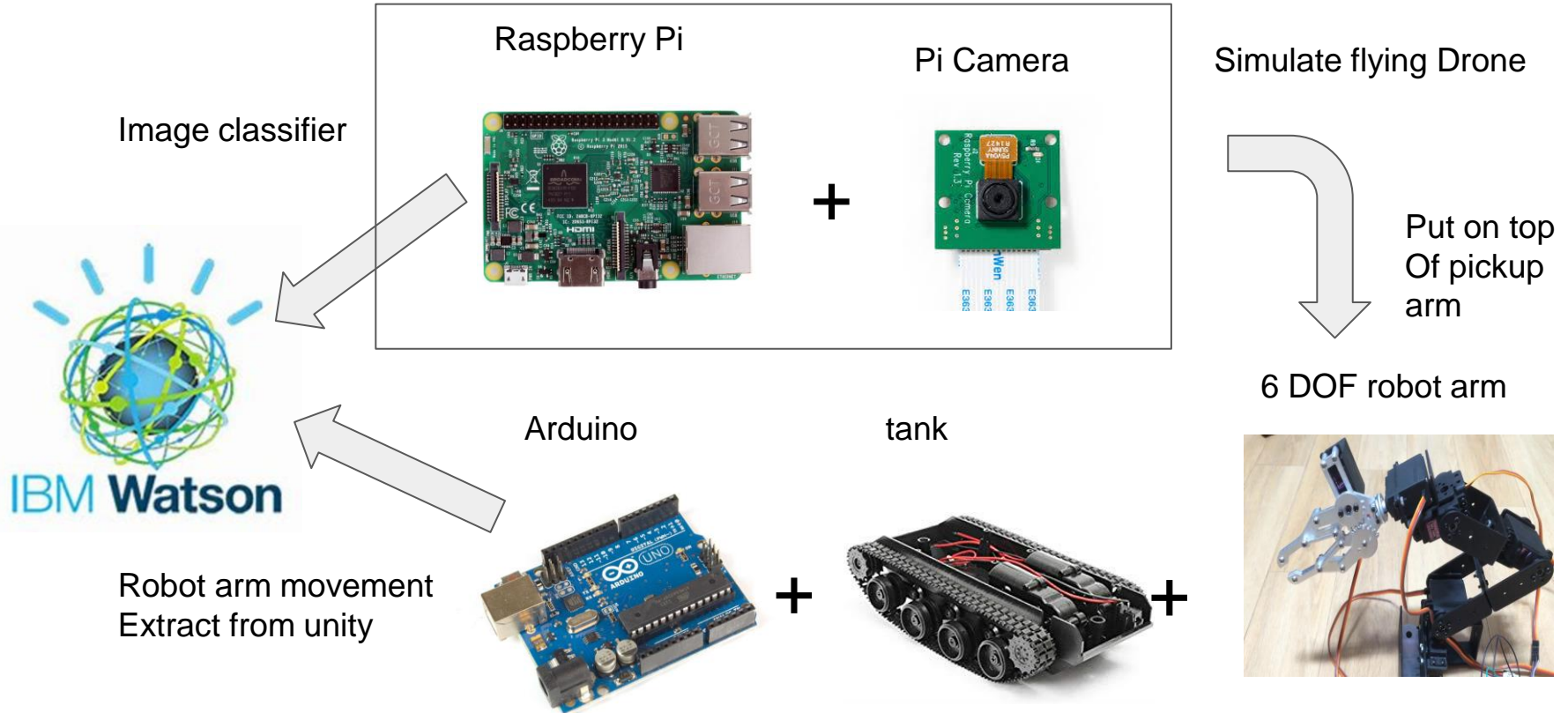
Difficult for rescue team(example firefighter/police) to reach and save lives.

Main aim to speed up rescue efforts and penetrated dangerous area. Aslo can speed up cleaning toxic area.
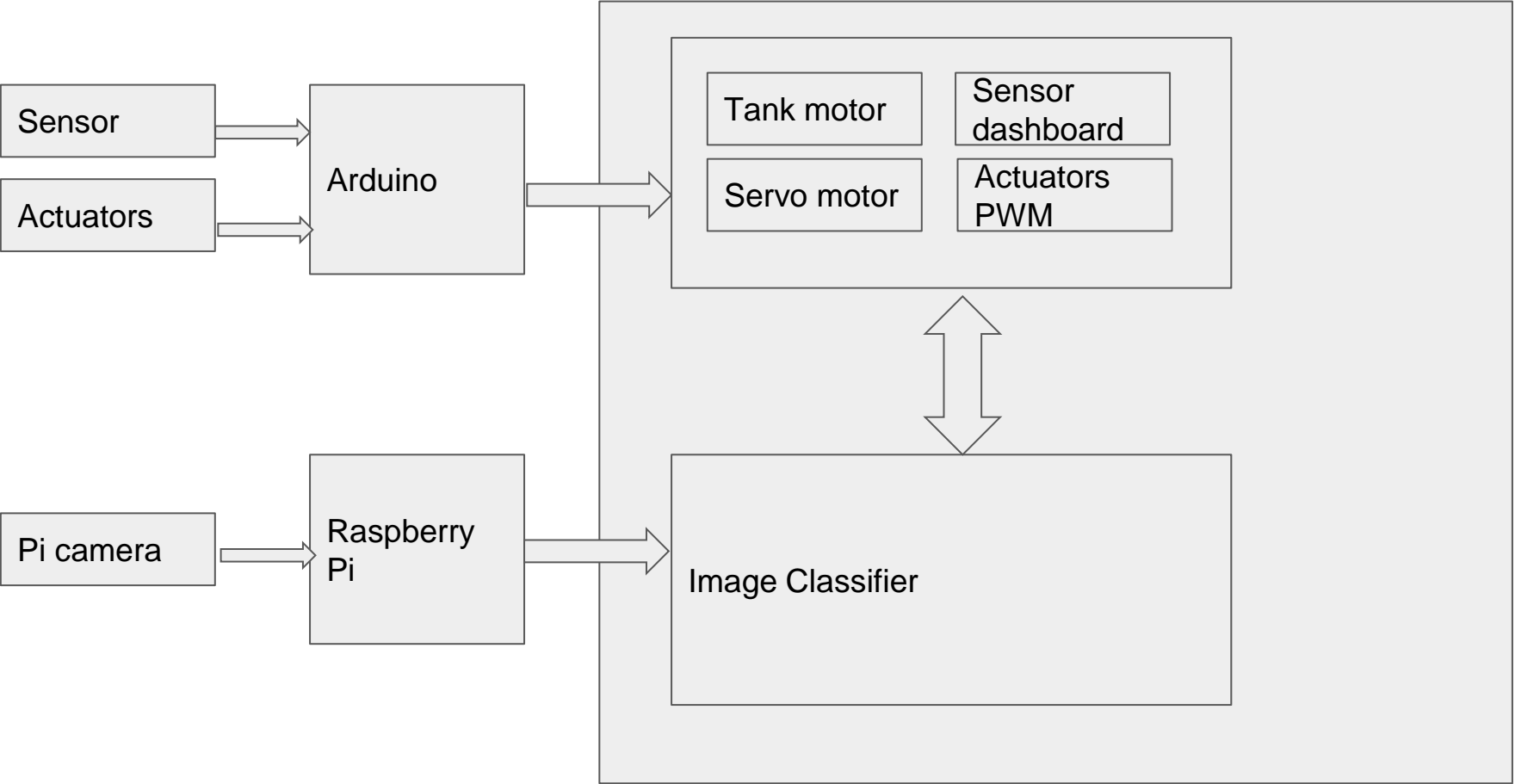
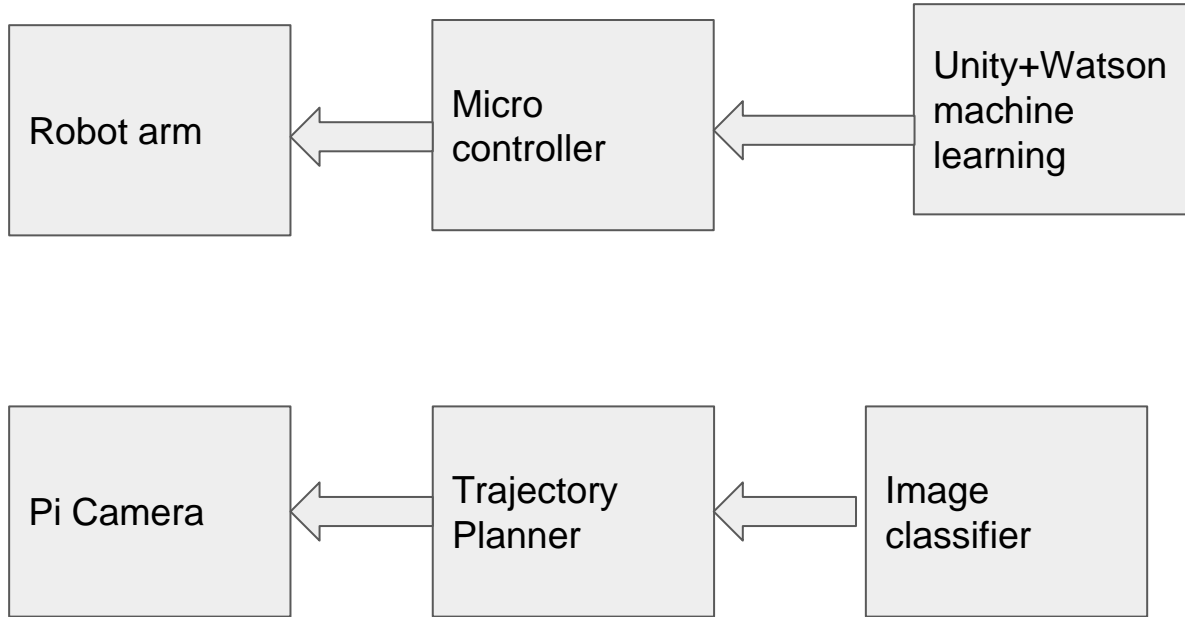Robot arm on tank more likely to survive firestorm.

By Mohamed Ikbal

Propose setup-Phase 1

Raspberry Pi

Pi Camera

Simulate flying Drone

Image classifier

+

Put on top
Of pickup
arm

6 DOF robot arm

Arduino

tank

Robot arm movement
Extract from unity

+

+

Solution-Phase1

Watson(Red Node)

Sensor

Actuators

Arduino

Tank motor

Servo motor

Sensor dashboard

Actuators PWM

Pi camera

Raspberry Pi

Image Classifier

Phase 1

| Robot arm | ← | Micro controller | ← | Unity+Watson machine learning |

| Pi Camera | ← | Trajectory Planner | ← | Image classifier |

Phase 1

Sensor

Temp
Humidity
Rain
Ph
Fire
Vibration
Sound

Actuator

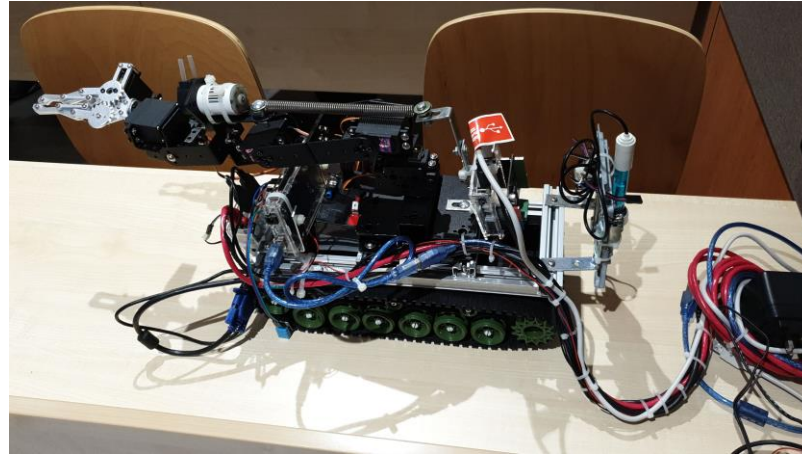Winch
Drill
Plasma torch
UV torch

Conclusion: Pictures taken by drones can be use to support robots on the ground for rescue, lifesaving, area cleaning and speed up recovery to normal lives.

Moving forward: Robot have platform to mount sensor and actuator expansion including super computers. Attach solar cell can extend life of robots and drones can dock on top of it for charging.

Outcome during competition-Phase 1

1)  2 Arduino board was burnt out from 9V power jack because of sensor shield cause
    short circuit to selected power pin. Replace 5 V regulator and use direct control of
    servo motor.

2)  Node-red on raspberry pi not able to work when install original Stretch program. Had to
    delete and reinstall
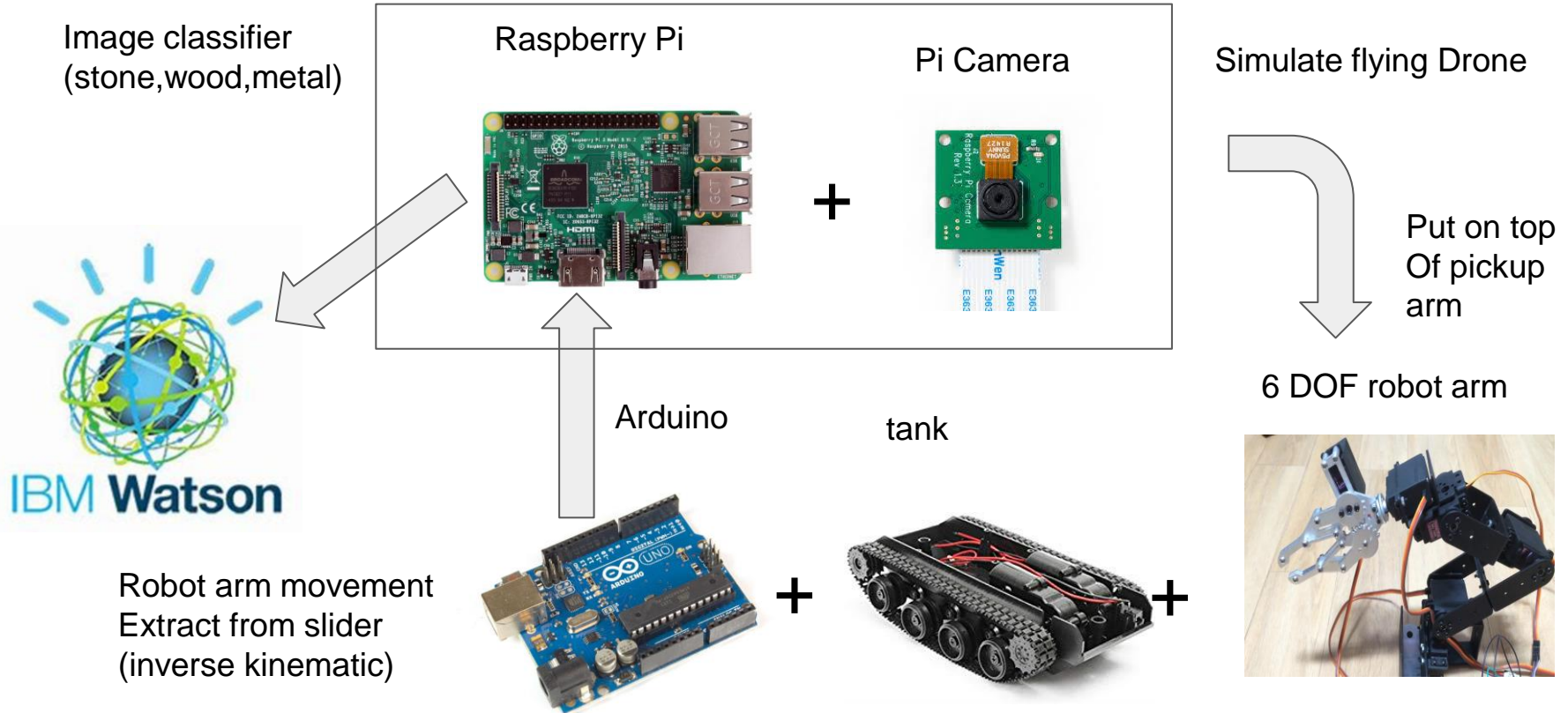
Phase1



Not working model

Phase2



Working model

Propose setup-Phase 2

Image classifier
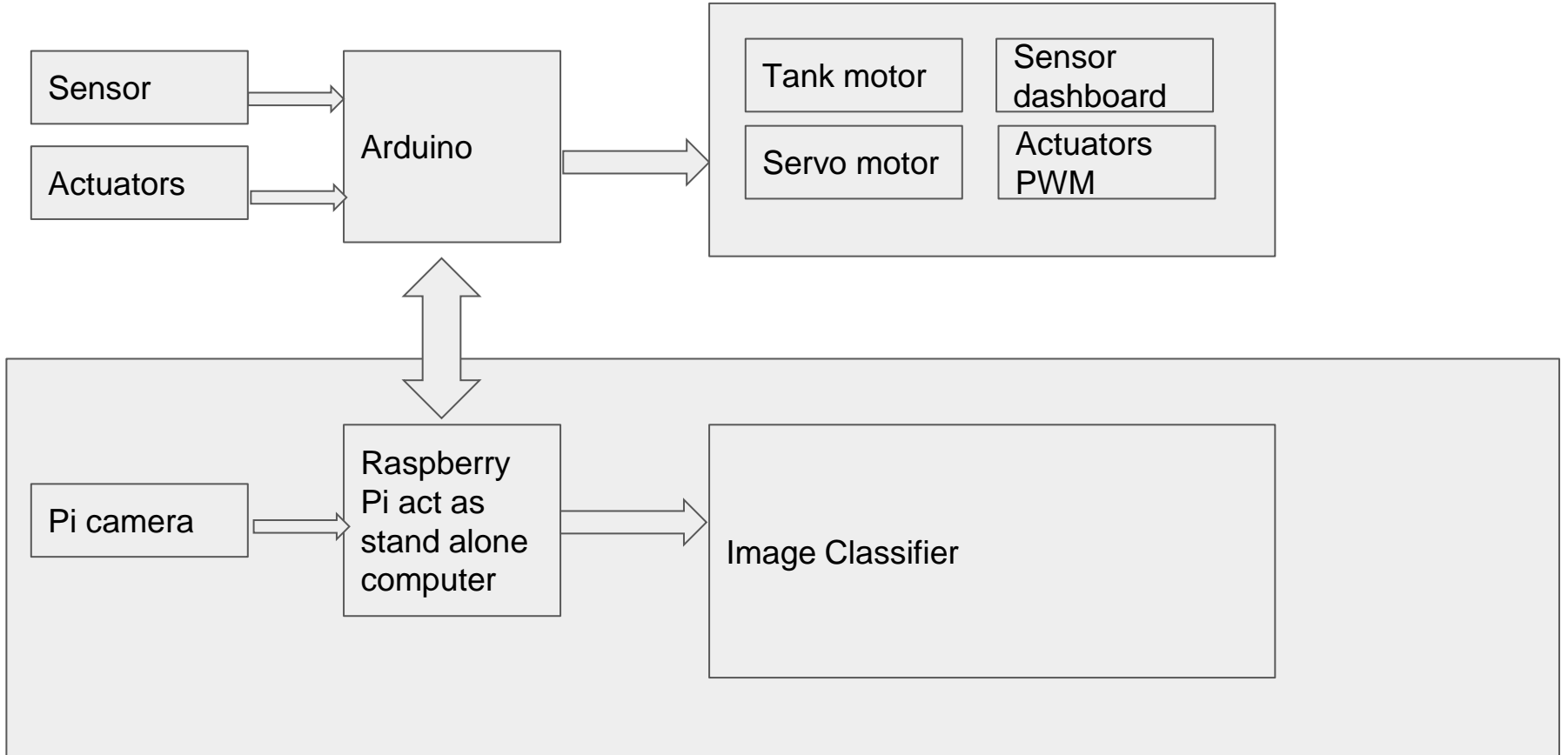(stone,wood,metal)

Raspberry Pi

Pi Camera

Simulate flying Drone

+

Put on top
Of pickup
arm

6 DOF robot arm

Arduino

tank

Robot arm movement
Extract from slider
(inverse kinematic)

+

+

Solution-Phase2

Watson(Red Node)

Sensor

Actuators

Arduino

Tank motor

Servo motor

Sensor dashboard

Actuators PWM

Pi camera

Raspberry Pi act as stand alone computer

Image Classifier

Image classifier to help in rescue effort:
1) Remove debris from affected site
2) By sorting out debris material can be recycle to help recovery



Stone

Wood

Robot arm with raspberry pi-camera
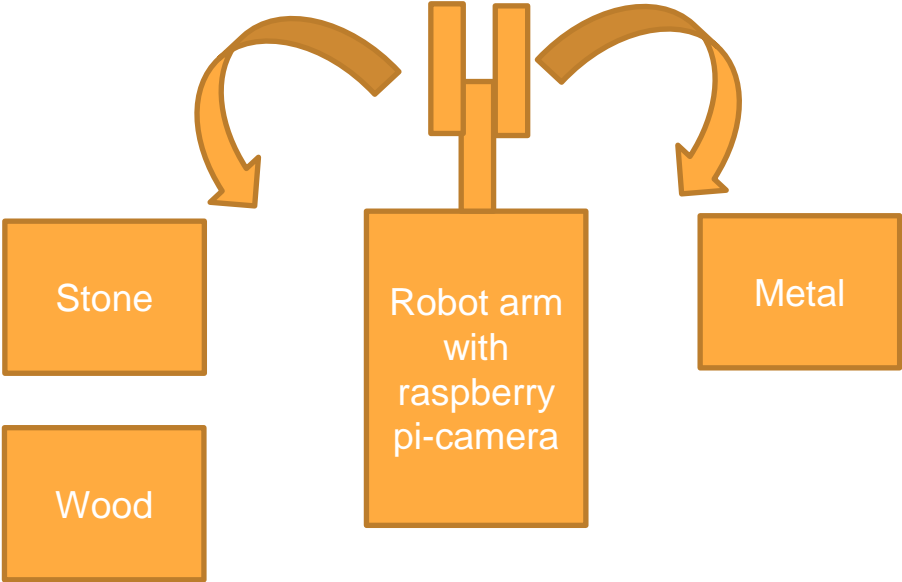
Metal



ion

| | |
|---|---|
| metal | 0.86 |
| fire | 0.15 |
| wood | 0.06 |
| others | 0.03 |
| earthquake | 0.00 |
| stone | 0.00 |
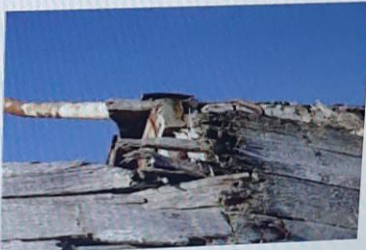
ion

granite-crushed-stone.jpg

images.jpeg

| | |
|---|---|
| stone | 0.91 |
| metal | 0.00 |
| earthquake | 0.00 |
| fire | 0.00 |

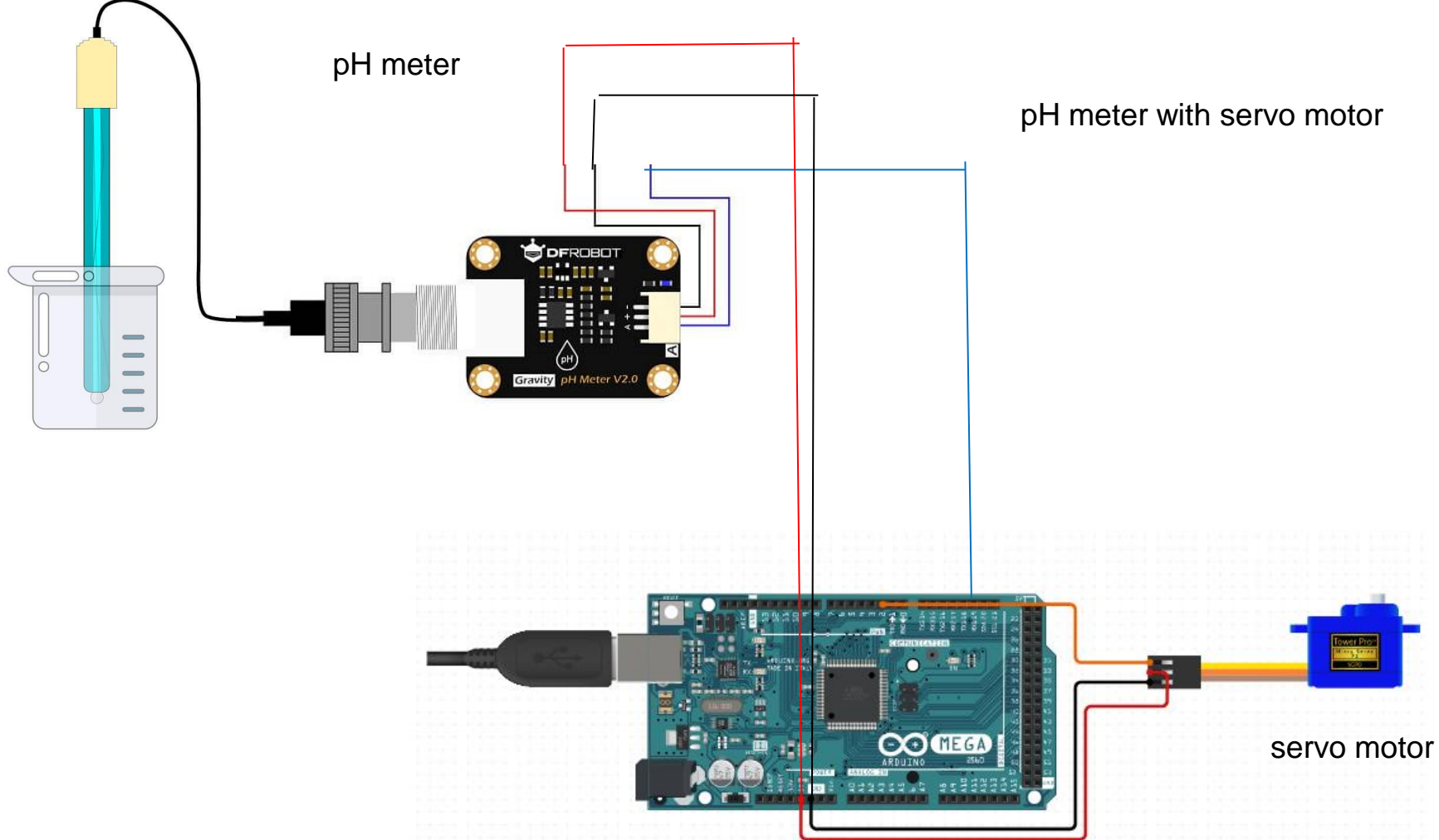| | |
|---|---|
| wood | 0.70 |
| fire | 0.31 |
| metal | 0.25 |
| earthquake | 0.05 |

Tank motor
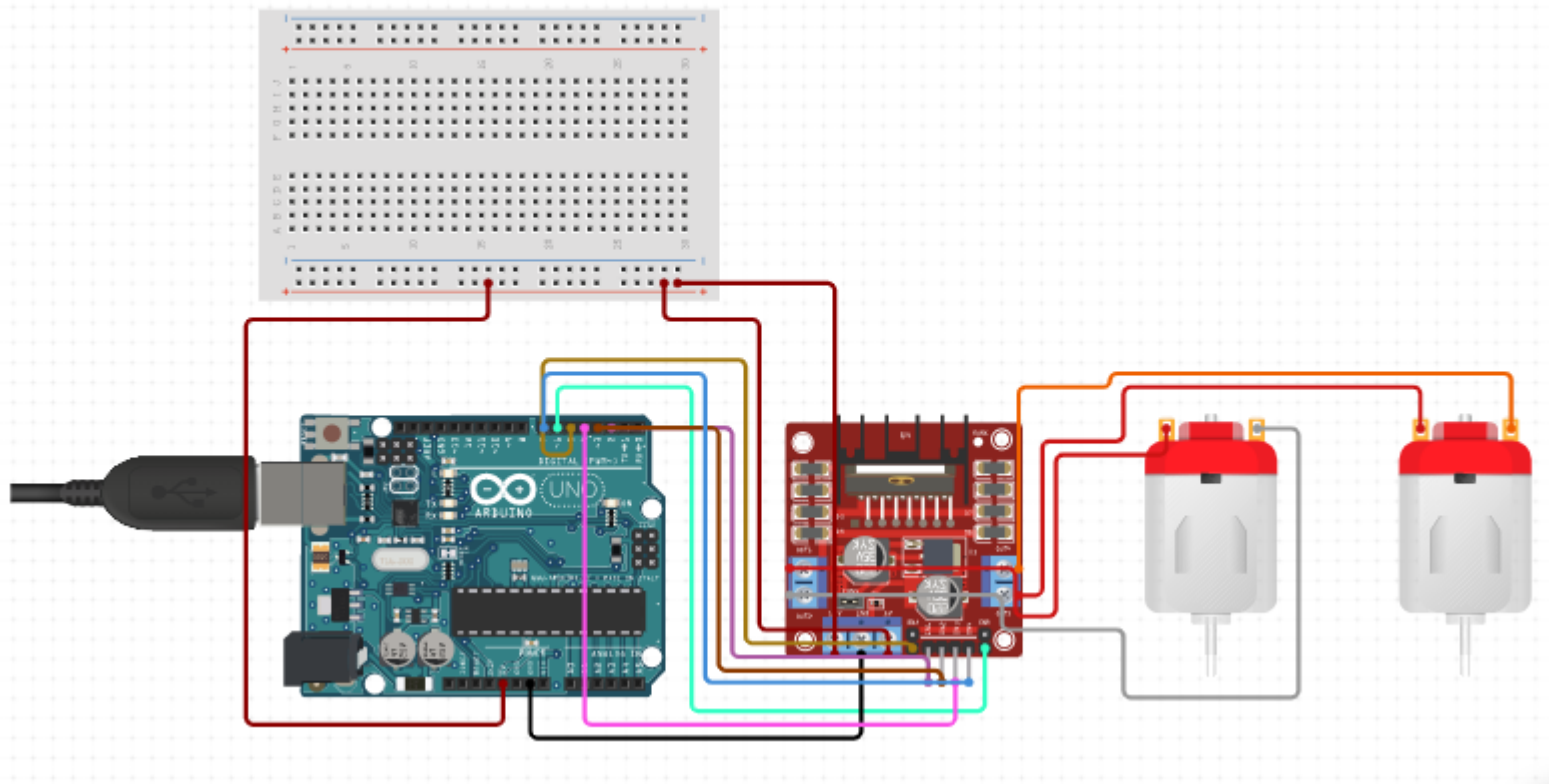
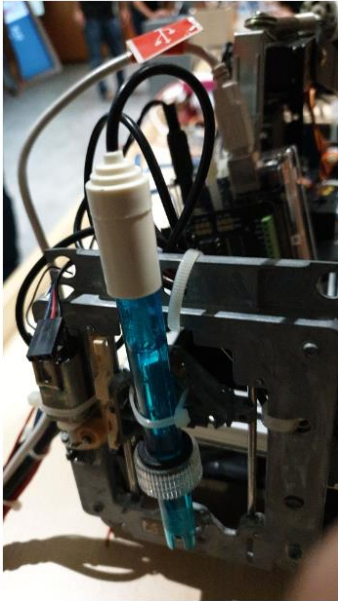Arduino UNO

6 dof robot arm servo motors

pH meter

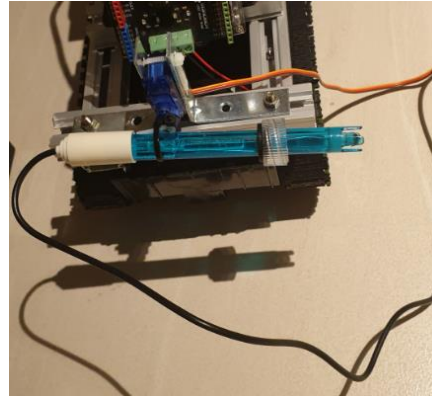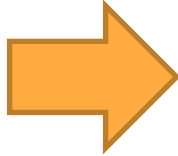pH meter with servo motor
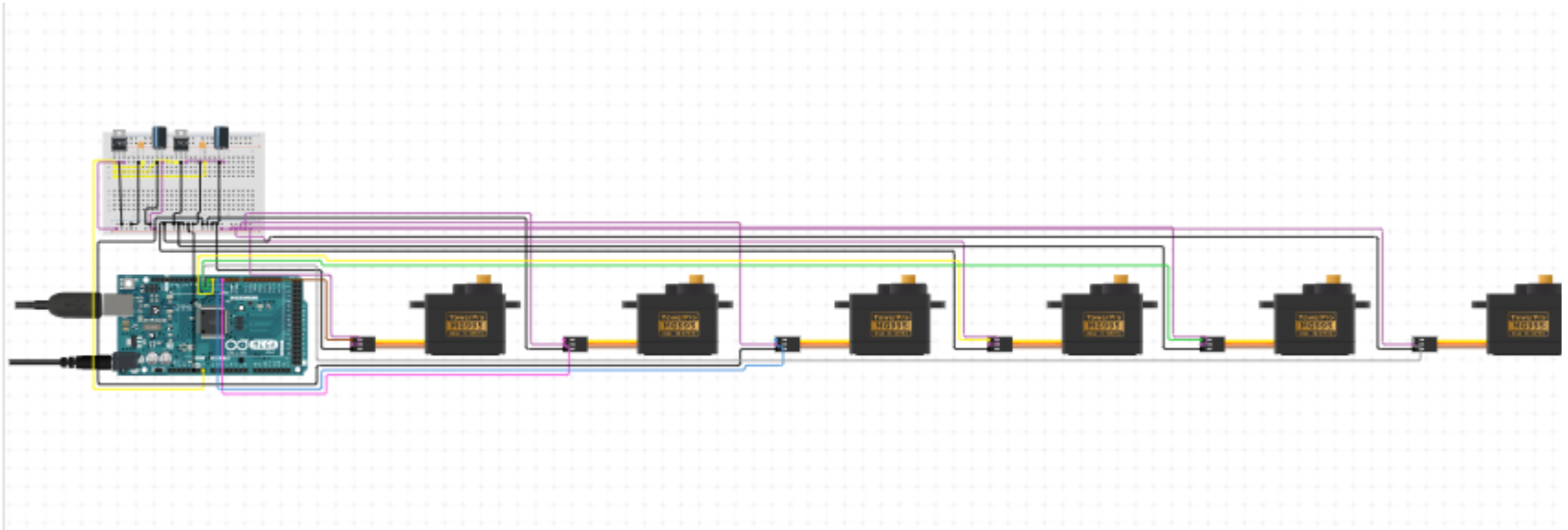
servo motor

pH sensor upgrade

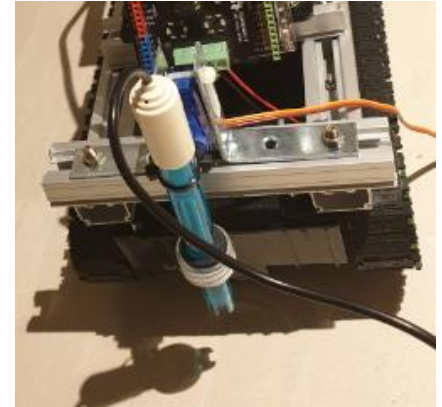Phase1

Up and down motor drive
using old cd disk drive

Replace with servo motor
-up position
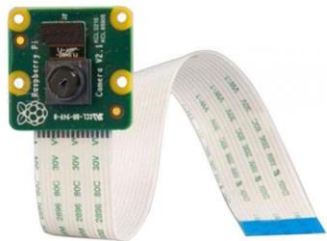
Replace with servo motor
-down position

Full hardware setup-construction around $200 + recycle material

Pi-camera
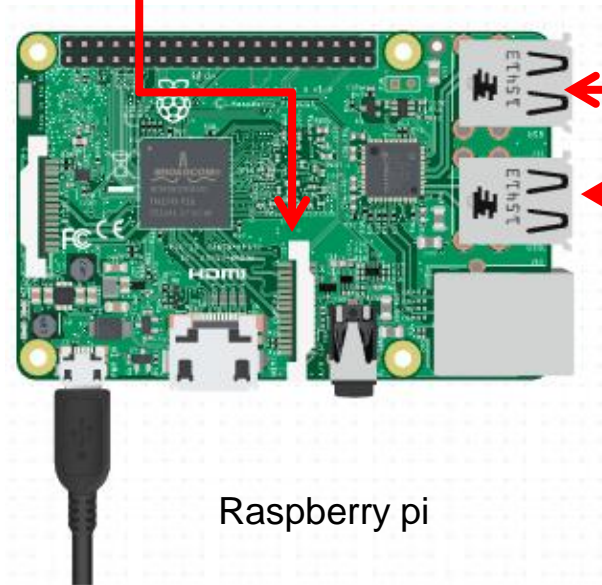
Arduino UNO

H-bridge + dc motors

8 servo motors

Raspberry pi

Arduino Mega

pH meter