TEAM CO: ACOUSTIKILL



Use Case

WHAT AND WHY ACOUSTIKILL?



Non-invasive

Autonomous

Scope

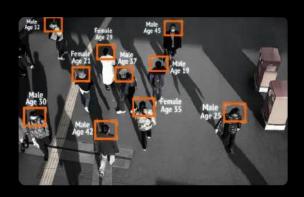
Use Case Requirements



Robot



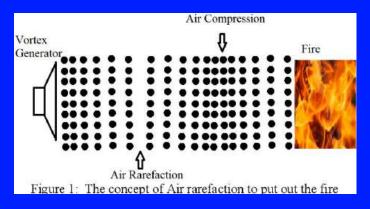


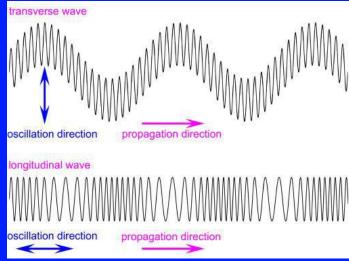


Detection

Use Case Requirements

Why use acoustic waves to extinguish fires?





Technical Challenges

WHAT ARE KEY CHALLENGES?



Distance

Time

Speed

Consistency

Solution Approach

Speaker

VORTEX RING

VORTEX RING

SUBWOOFER

air pump for low frequency

COLLIMATOR

Collimator

BAFFLE Smaller opening through which

air is forced

Subwoofer Magnet

Solution Approach

Robot

Robot Kit





Lipo Battery

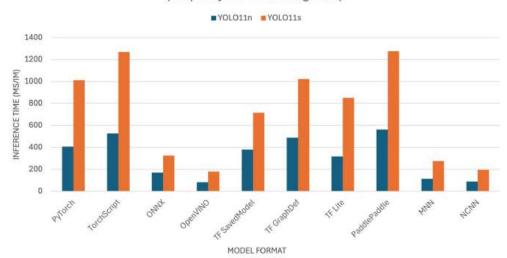
Motor parameters(9V& 150rpm)



Solution Approach

Detection

Inference Time per Image by Model Size and Format (Raspberry Pi 5 at 640 Image Size)





Testing

Preliminary Distance and Angle

Speaker-Fire Distance

Speaker Angle Distance

Robot Mechanics and Response Time

Fire Identification Accuracy

Fire Identification Time

Robot Motion with Model



Tasks and Division of Labor

Cole	Kushaan	Stephanie	All						
Constructing Robot Kit	Collect Fire Image Data	Constructing Speaker Apparatus	Preliminary Fire Tests						
Test Robot Mechanics and Response Time	Writing Fire Detection CV Model	Testing Speaker-Fire Distance	Design Review						
	Testing Fire Identification Accuracy	Testing Speaker Angle Distance	Integrating CV Model with Robot						
	Testing Fire Identification Time		Integrating Robot with Model and Speaker						

Gantt Chart

	PROJECT TITLE AcoustiKill							COMPANY NAME Acoustikill DATE 1/27/2025																			
	PROJECT MEMBERS	Stephanie M	ao, Cole Ma	cSwain, Ku	ishaan Misra										DATE	1/27/	2025										
													PI	ASEO	NE												
PHASES		TASK OWNER					PHASE ONE WEEK3 WEEK4 WEEK4																				
	TASK TITLE		START	DUE	IN DAYS	PCT OF TASK COMPLETE	м	Т	W	R	F	М	Т	W	R	F	М	Т	W	R	F	м	т	w	-	F	М
3	Project Initiation and Early Stage Testing						1/27	1/28	1/29	1/30	1/31	2/3	2/4	2/5	2/6	2/7	2/10	2/11	2/12	2/1:	3 2/1	4 2/17	2/1	8 2/1	9 2/2	0 2/2	1 2/24
1.5	Proposal Presentation	Steph	1/29/25	2/3/25	4	50%																					
1/1/1	Preliminary Fire Tests	All	1/30/25	2/5/25	5	0.00%																					
8(2)	Collect Fire Image Data	Kush	2/2/25	2/9/25	7.	0.00%																					
103	Assemble Parts List	All	2/3/25	2/7/25	4																						
NA:					0																						
15					0																						
1.6					0																				T		
1	Proof of Concept and Testing																										
201	Design Presentation	Kush	2/10/25	2/16/25	6																						
2.1.	Finding Succesful Distance w/ STD Speaker	All	2/19/25	2/26/25	7																						
163	Finding Succesful Angle w/ STD Speaker	All	2/19/25	2/26/25	7																						
2.4	Design Review	All	2/24/25	2/28/25	4																						
2.5	Constructing Speaker	Steph	3/10/25	3/17/25	7																						
2.6	Constructing Robot Kit	Cole	3/11/25	3/18/25	7																						
F-2	Writing Fire Detection CV Model	Kush	3/12/25	3/19/25	7																						
3.	Project Construction and Testing																										
3.1	Test Speaker-Fire Distance	Steph	3/23/25	3/30/25	7																						
3.2	Test Speaker Angle Distance	Steph	3/23/25	3/30/25	7																						
3.7.1	Test Robot Mechanics and Response Time	Cole	3/25/25	4/1/25	6																						
3.2.2	Test Fire Identification Accuracy	Kush	3/25/25	4/1/25	6																				T		
3-3	Test Fire Identification Time	Kush	3/25/25	4/1/25	6																						
3.3.1	Interim Demo	All	3/30/25	4/2/25	2																						
4:	Project Assembly and Finalization																										
4.1	Integrating CV Model and Robot	All	4/6/25	4/13/25	7																			Т	T		
4.2	Testing Robot Motion with Model	All	4/9/25	4/15/25	6																			Т	T		
4-3	Integrating Robot w/ Model and Speaker	All	4/13/25	4/17/25	4			-																	T		
4.5	Final Presentation	Cole	4/16/25	4/20/25	4																1				T		
4.6																					1				1		

Conclusion

Acousti·Kill

proper noun

1. an autonomous robot that detects
fire, using acoustic waves to
extinguish