

# Team E8 - TableCast

## Design Review

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# Design Requirements

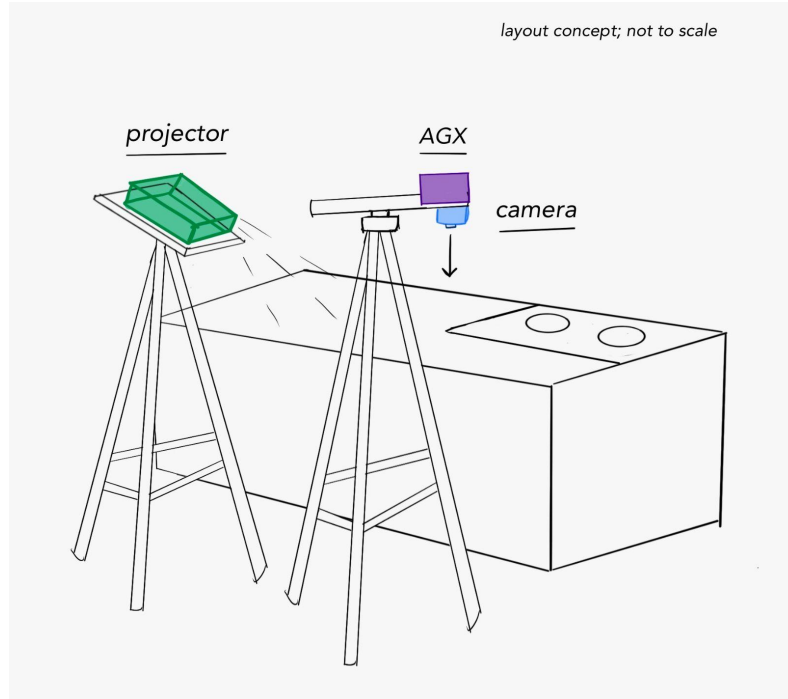
- IR1. Projector mount must be adjustable
- IR2. Warped projection on table looks flattened
- IR3. Voice commands must recognize wake word to complete any command
  - IR2a. Accuracy of 90%
- IR4. Camera must be mounted such that it points down and is 3-5 feet above the counter
- IR5. Gesture recognition must have 99% accuracy

# Solution Approach

- Major Design Changes
  - Camera & AGX Mount - on a tripod, centered above counter
  - Projector Mount - on a tripod, at an angle
- Societal Effects
  - Economic: Lower cost alternative that can be efficiently packed
  - Public/Health/Welfare
    - User-friendly interface that encourages beginners to cook and lead healthier lifestyles
    - Designing secure mounting mechanisms to ensure user safety
  - Social/Cultural: Increased accessibility to recipes across cultures

# 3D Diagram

- Projector stand tripod
- Tripod with horizontal arm - overhead camera positioning
- 3D printed case to protect camera component



# Projection UI

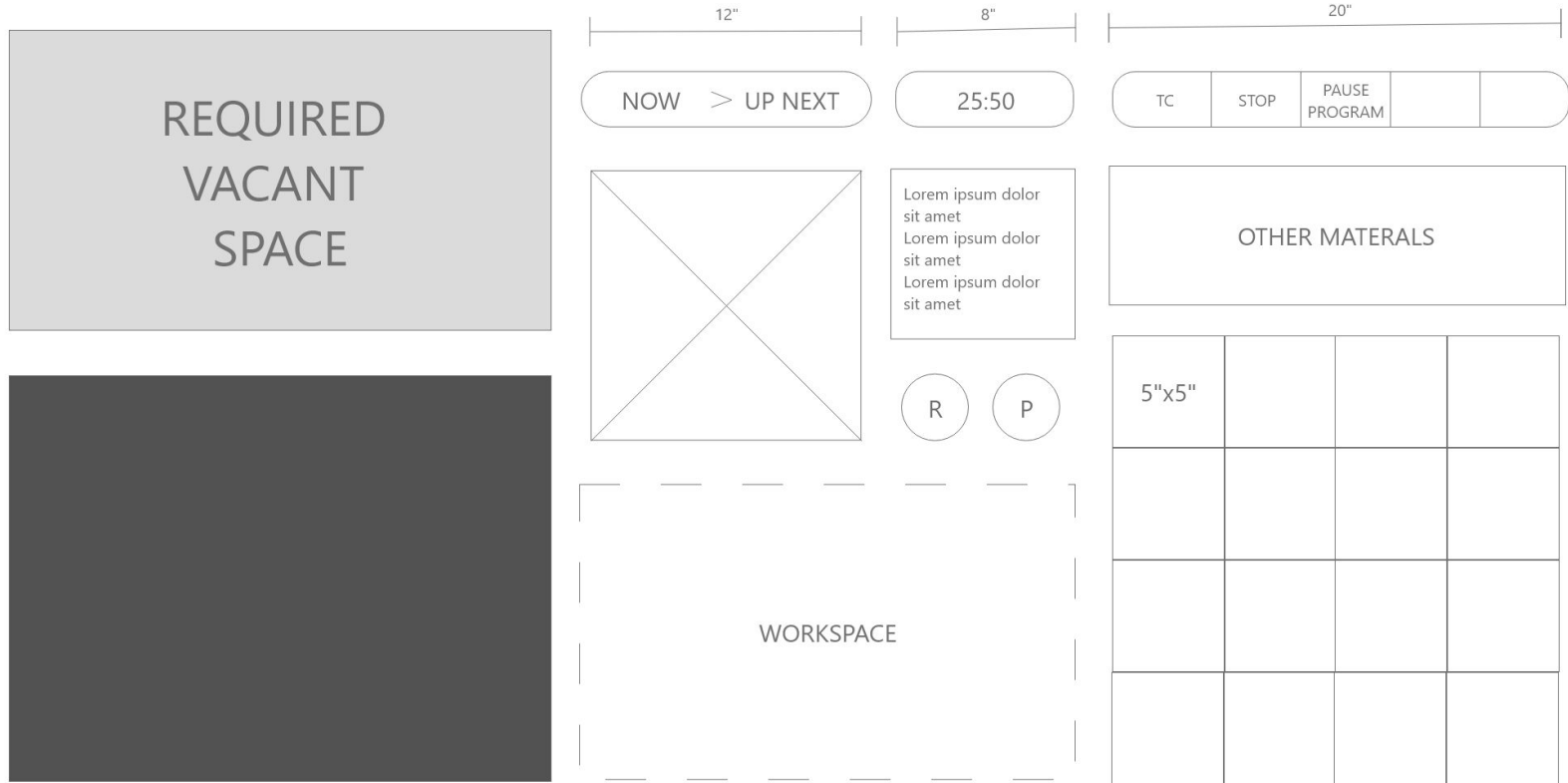
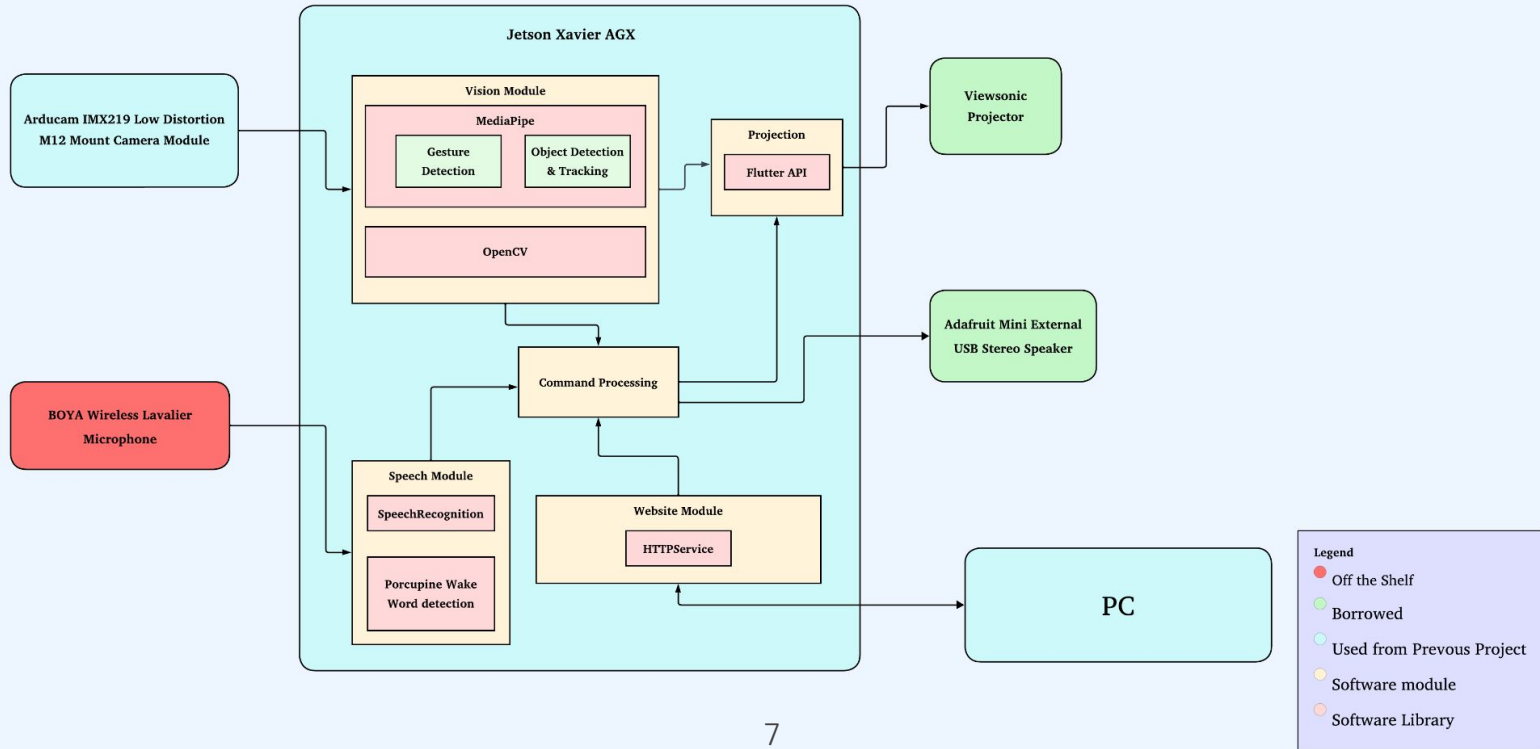


Table UI (Left Aligned Burner)

# Components Block Diagram



# Trade Studies

## Gesture Recognition

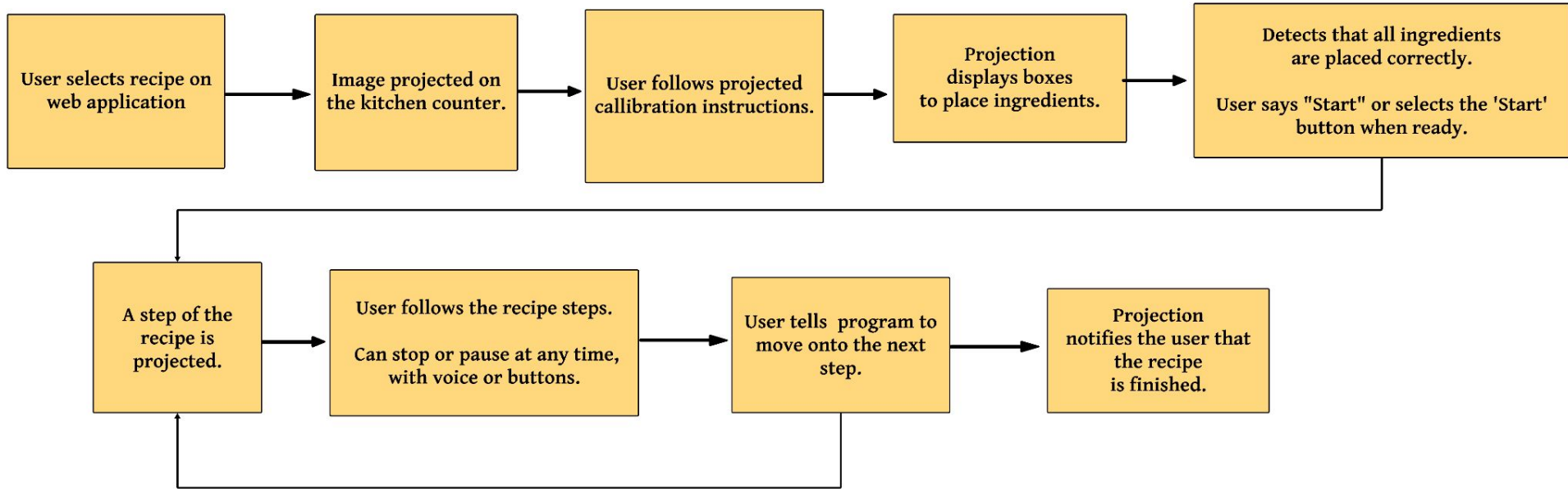
	MediaPipe	OpenPose
Computing Power	5	3
Latency	5	3.5
Precision	4	5
Total	14	11.5

## Projector

	ViewSonic	VANYKO
ANSI Lumens	5	3
Projection Size	3	4
Projector Size	4	2
Cost	4	4
Total	16	13



# Solution Flow



# Testing & Verification

- IR1. Test stability with projector weight at 5 different recommended heights
- IR2. Test wake word at 5 different decibel levels with varying disturbances to imitate kitchen environment
  - IR2a. Ensure accuracy of 90%
- IR3. Check camera stability at heights between 3-5 feet and clarity of counter image
- IR4. Verify gesture recognition has 99% accuracy with 5 different backgrounds
- IR5. Match warped projection on table to actual image and test straight lines and geometric shapes

# Risk Factors

- R1. Camera falls (redundant mounting security)
- R2. Projector falls (redundant mounting security)
- R3. Camera is damaged by food (covered with plastic wrap)
- R4. Gesture is ignored (increase sensitivity)
- R5. Gesture is recognized incorrectly (increase testing)
- R6. Wake up word ignored (increase sensitivity)
- R7. Voice command recognized incorrectly (increase testing)
- R8. Server crashes (Safe system shutdown)

		Severity				
Likelihood						
		R7				
		R4				R1, R2, R3
		R5, R6				R8

# Schedule

