Remote Free TV

A Gesture Based Natural User Interface for Roku Smart TVs

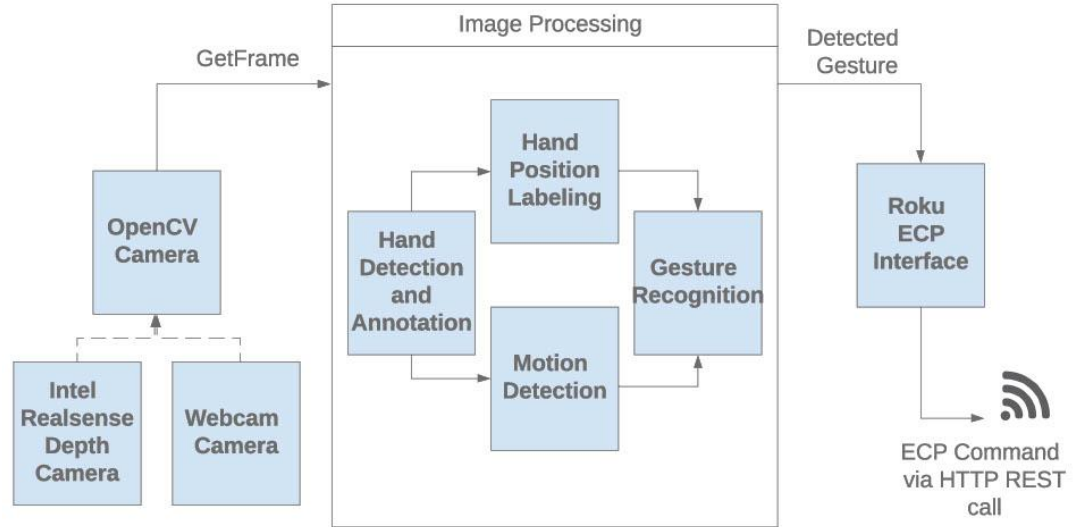Brent George, Sam Gonzalez, Tyson Lin

Problem Statement

➢ TV remotes have traditionally been the only/primary interface for TVs

➢ Studies show users only use a subset of 7-10 buttons

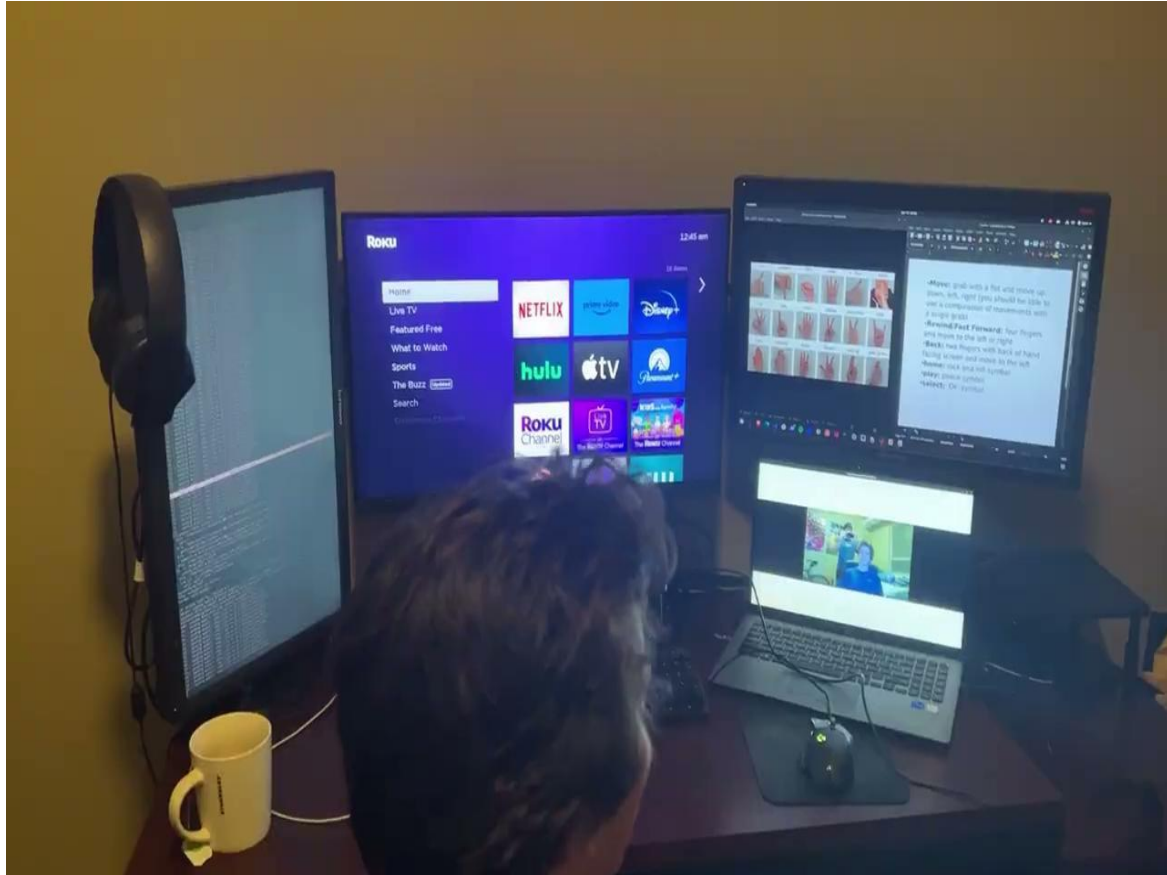➢ Remote loss, otherwise engaged hands, multiple users - all bad use cases for remotes

Solution

➢ Gesture Control for Television Interface!

➢ Focus on reliability and user intuition (learning curve vs ease for expert user)

➢ Camera + ML + Roku

Demo

Results

	Median	Mean	Std. Deviation
Rating (1-5)	3	2.85	1.07
Correct	65.21%	59.39%	15.20%
Missed	34.78%	34.56%	12.45%
Incorrect	3.70%	6.03%	6.68%

Sample Size n = 7

Current Limitations

➤ MediaPipe struggles to detect hands while moving and in bright scenes

➤ Slow processing times lead to undesirable high latency (100+ ms)

➤ HaGRID dataset appears to be skewed towards lighter skin tones

➤ Worse scores with nontechnical users suggests a nonintuitive gesture mapping

Concluding Remarks

➢ Remote Free TV reliably detects static gestures, but struggles with motion

➢ Further refinement and better hardware will mitigate many limitations

➢ We suspect voice controls and gestures are capable of permanently replacing TV remotes in the near future!