國立中山大學 工學院 聯合專題競賽與展示
COLLEGE OF ENGINEERING, NSYSU

資訊工程學系
Department of Computer Science and Engineering

肆、Module details

Camera Calibration :to fix the perspective difference of two camera , which will cause Laser Positioning and Animal Detection coordinates mismatch

Original Image
Up: IR camera
Down: RGB camera

Result : after Calibration of RGB camera combined image

Animal Detection

Detection: Marking the difference of normal farm image with current image

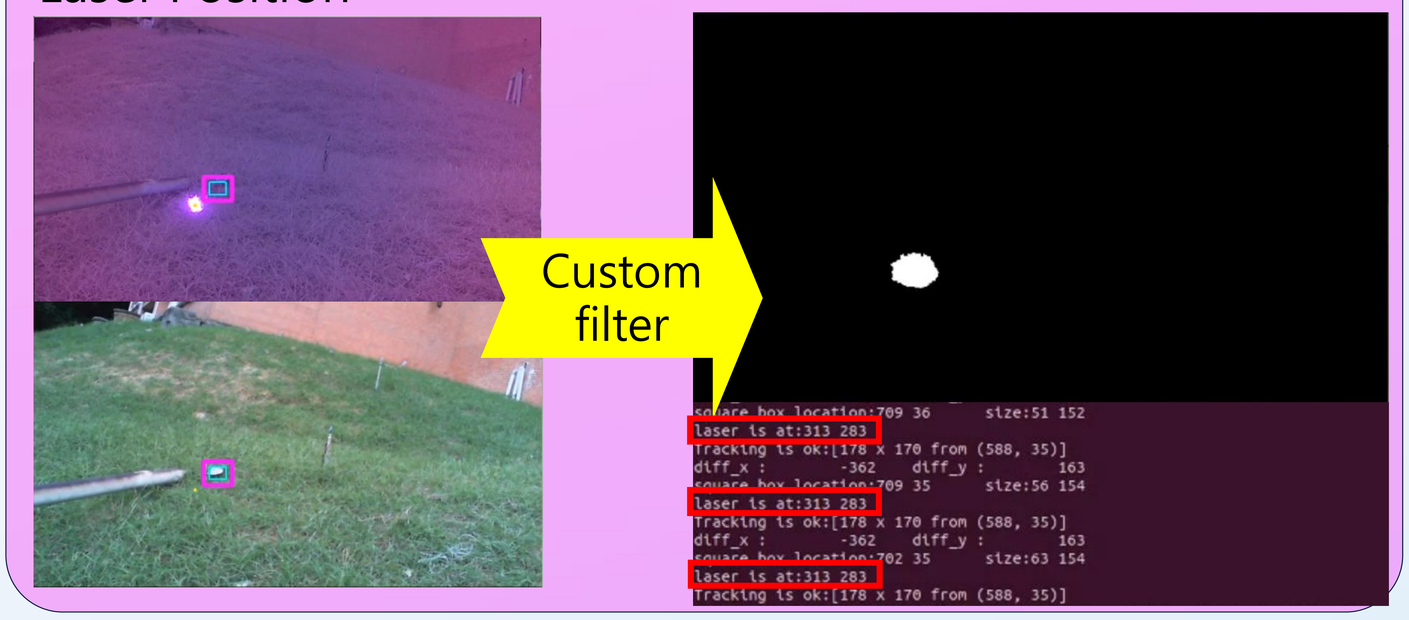
A brick being detected

A people being detected

Tracking: using custom algorithm to judge the marking target is noise or animal movement, if it is animal break into farm , activate KCF tracker for tracking the animal

Laser Positioning:

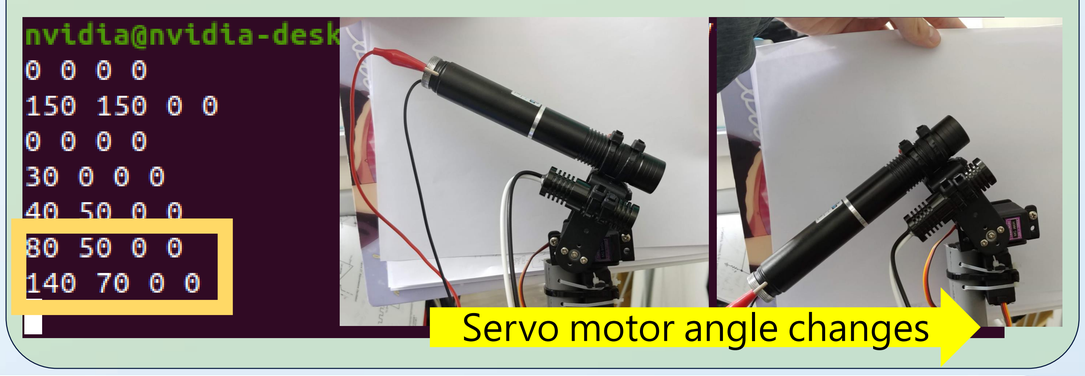
Using luminance and customized intensity filter to find the Laser Position



Motor Control:

An interface in Embedded computing device (Jetson nano) and Arduino and servo motor , which Jetson nano assign the angle of servo motor to Arduino and Arduino translate angle into PWM signal to drive servo motor

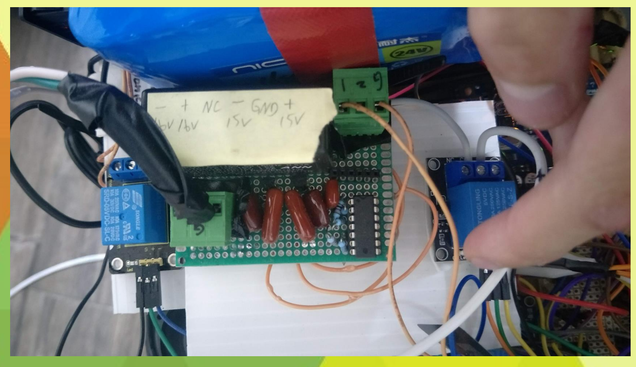
Terminal on Jetson nano



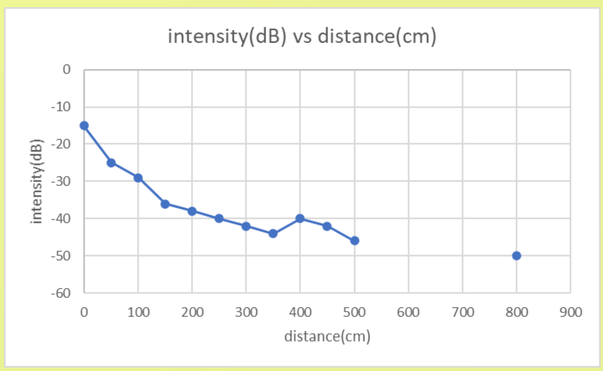
Drive animal method:

Monkey's hearing can up to 45kHz[1] , An Ultrasonic Sonic with high amplitude might drive them away

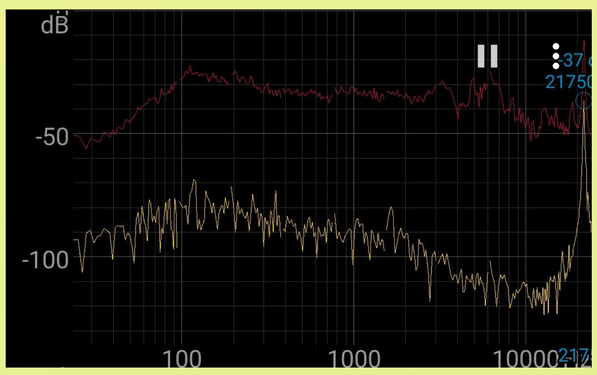
Ultrasonic Generator Circuit



Intensity vs distance plot



Cellphone's microphone spectrum



Monkey moves away

[1] William C. Stebbins, Richard D. Pearson ,et al. "Hearing in the Monkey (Macaca) : Absolute and Differential Sensitivity"