Automated Baby Monitor

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What is a baby monitor ?

fig 1. vtech baby monitor

Background / Motivation

Baby monitors allows parents to see whether or not the baby is crawling out of the crib

Most of them require an accompanying hardware monitor to receive video footage from the camera

We decided that there was a need for fully automated, easy to use baby monitor for parents/guardians

Baby's movements

Babies in different age groups differ in their capacity to move around.

Being able to configure the monitor so that it would only trigger on certain motions and/or sounds would reduce the false positives.

Implementation

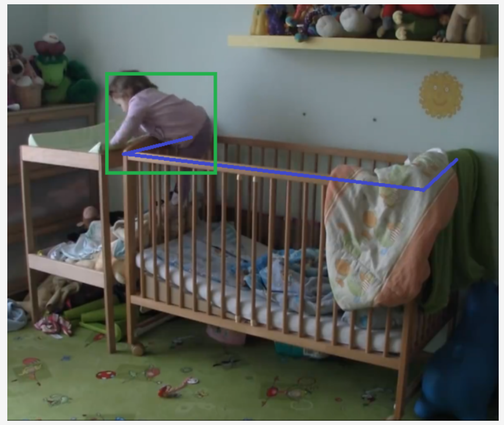

fig 2. Line crossing mechanism

Detecting baby's actions

Achieve video baby motion detection using OpenCV
Achieve simple line crossing detection using OpenCV
Implement a baby crying detection algorithm

In fig 2., Green Rectangle captures the moving baby.
The blue lines capture the edges of the crib.
In the image the green rectangle is crossing
the blue lines showing that the baby is climbing out of the crib.

Android application

Build an android app to control the monitor, receive alerts and receive video
Allow users to configure their settings accordingly

Tecnology Pipeline

Webcam

Raspberry Pi 4

Wifi

Android device

Future work

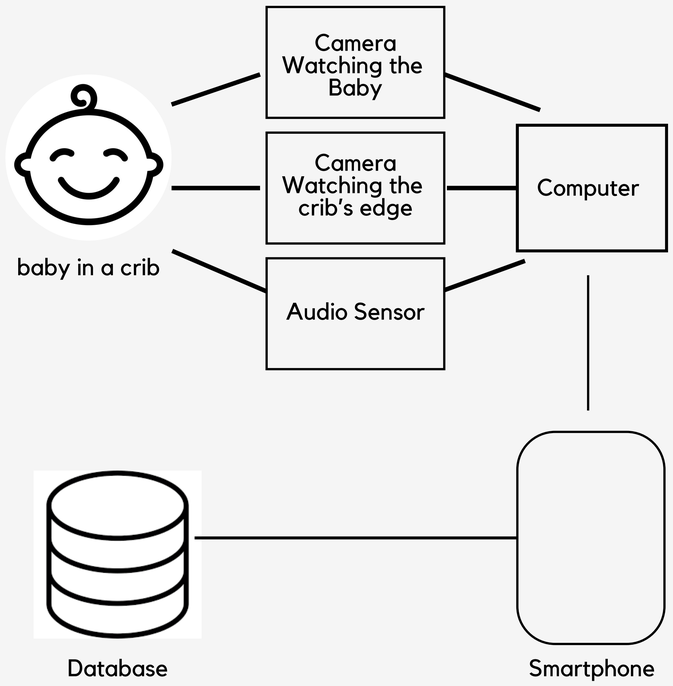

fig 3. Block Diagram of the proposed system

Goals

Implement baby movement detection onto Raspberry Pi
Implement baby audio detection onto Raspberry Pi
Add sensors to improve detection accuracy
Build a server to store user data
Build a testing unit to emulate baby's movement and audio

Stretch Goals

Pattern analysis of the baby's time during the crib
Add layers of security to the application