Electrical, Computer & Energy Engineering
University of Colorado Boulder

90% Asian

Orient: *Remote Viewing Virtual Reality System*

Hongtao Cai, Kevin Lee, Sipeng Liang, Dylan Oh, Jean-Christophe Owens

Objective

With remote viewing and virtual reality being limited in their functionalities and market, Orient aims to expand these markets and interlink them together. By combining the two markets, the market we have created is immersive remote viewing systems with our user base focused on USAR

Introduction

Optimize two systems to work in parallel to offer immersive remote viewing with the use of a VR environment

System 1:
VR headset which contains a phone used to provide the immersive viewing environment with our custom application and control the movements of system 2 by the user's head movements

System 2:
Viewing platform which contains the camera, pan/tilt platform, and live streaming circuit board that will provided the viewing environment for system 1

Conclusion

Our initial goals were ambitious, resulting in a refocusing of the project to act as developing a prototype for our future entrepreneurial endeavors. From this prototype we gained various skills and realized the possibility of a functioning product. With continued development of features and capabilities, we see our product being highly marketable

How It Works
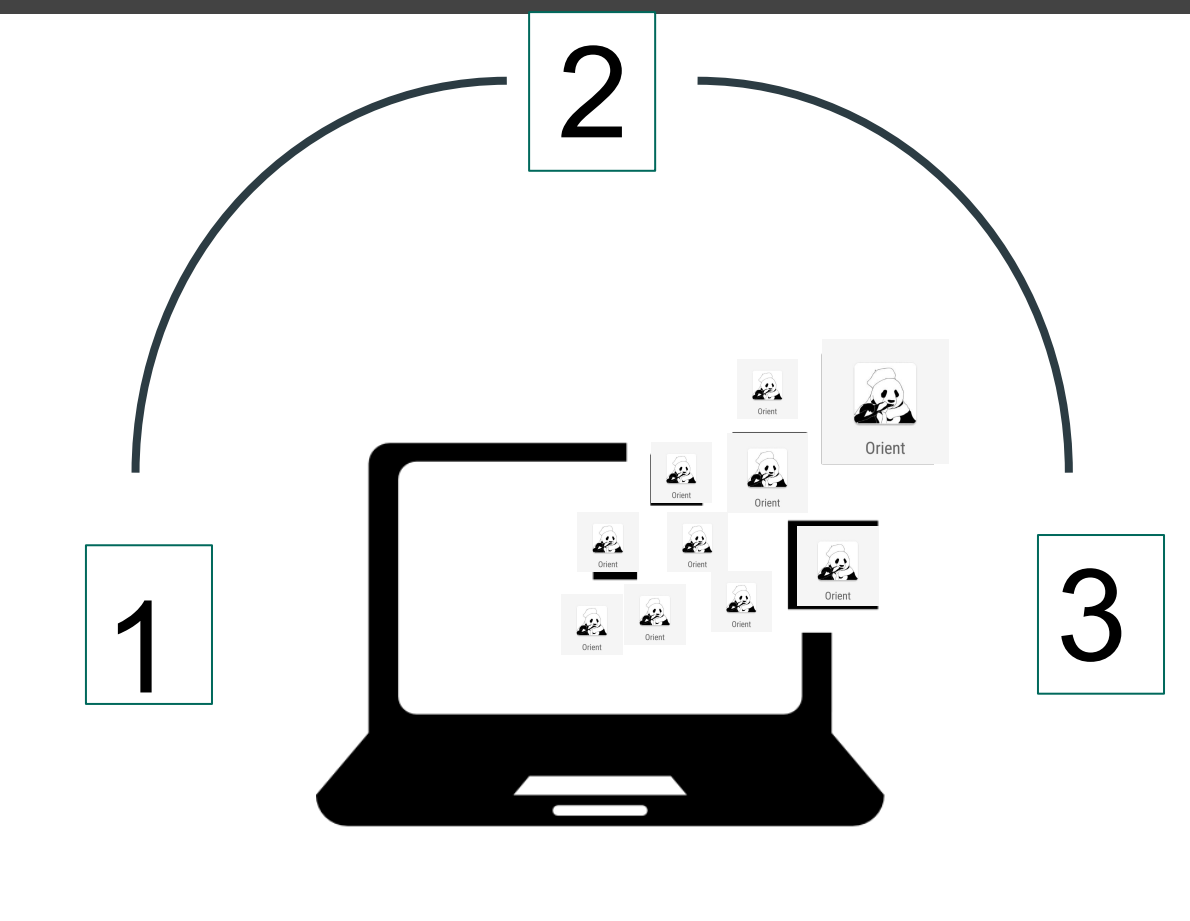
Full Stack Solution
- Hardware   - Cloud
- Firmware
- Software

Setup
----
1) Plug in Power
2) ssh into Orient (user +Pw)
3) Run "python 4Expo.py"
4) ------------------------------------
5) Install OrientExpo from Playstore
6) Launch App + Play
7) Start to move around!
8) Quit App + Power Off Orient!
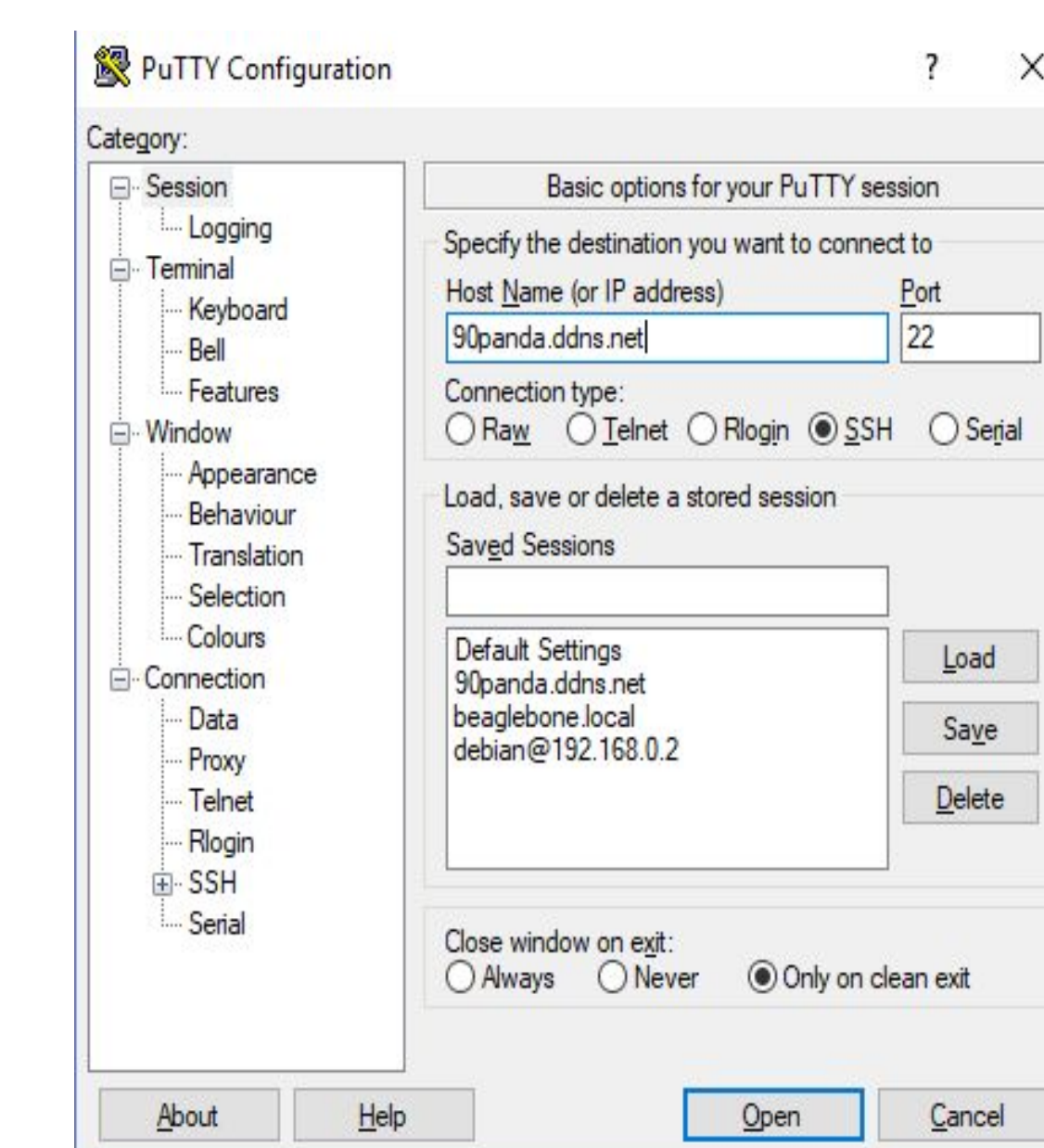------------------------------------

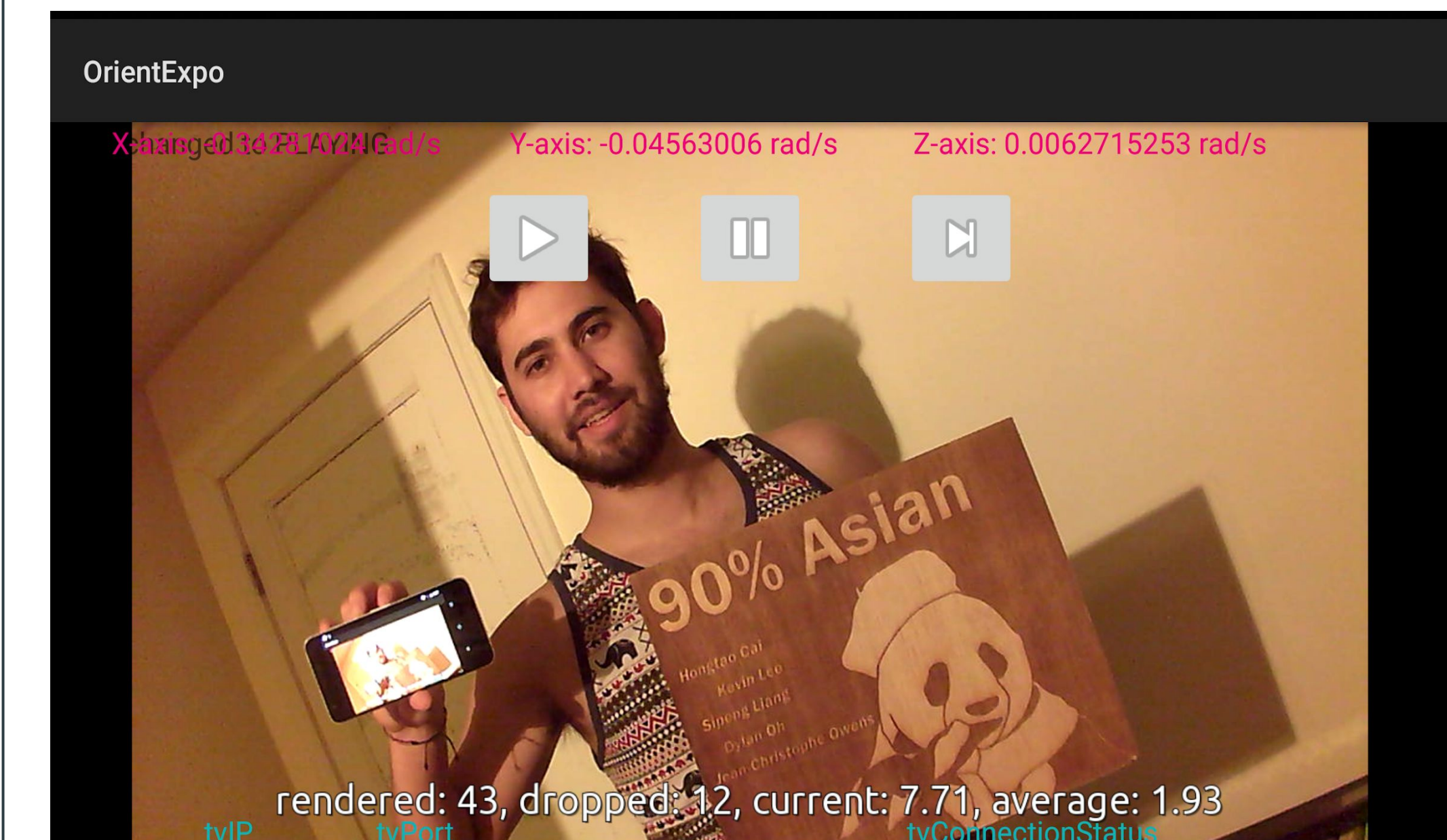*Fig. 1 - Secure Shell Interface*

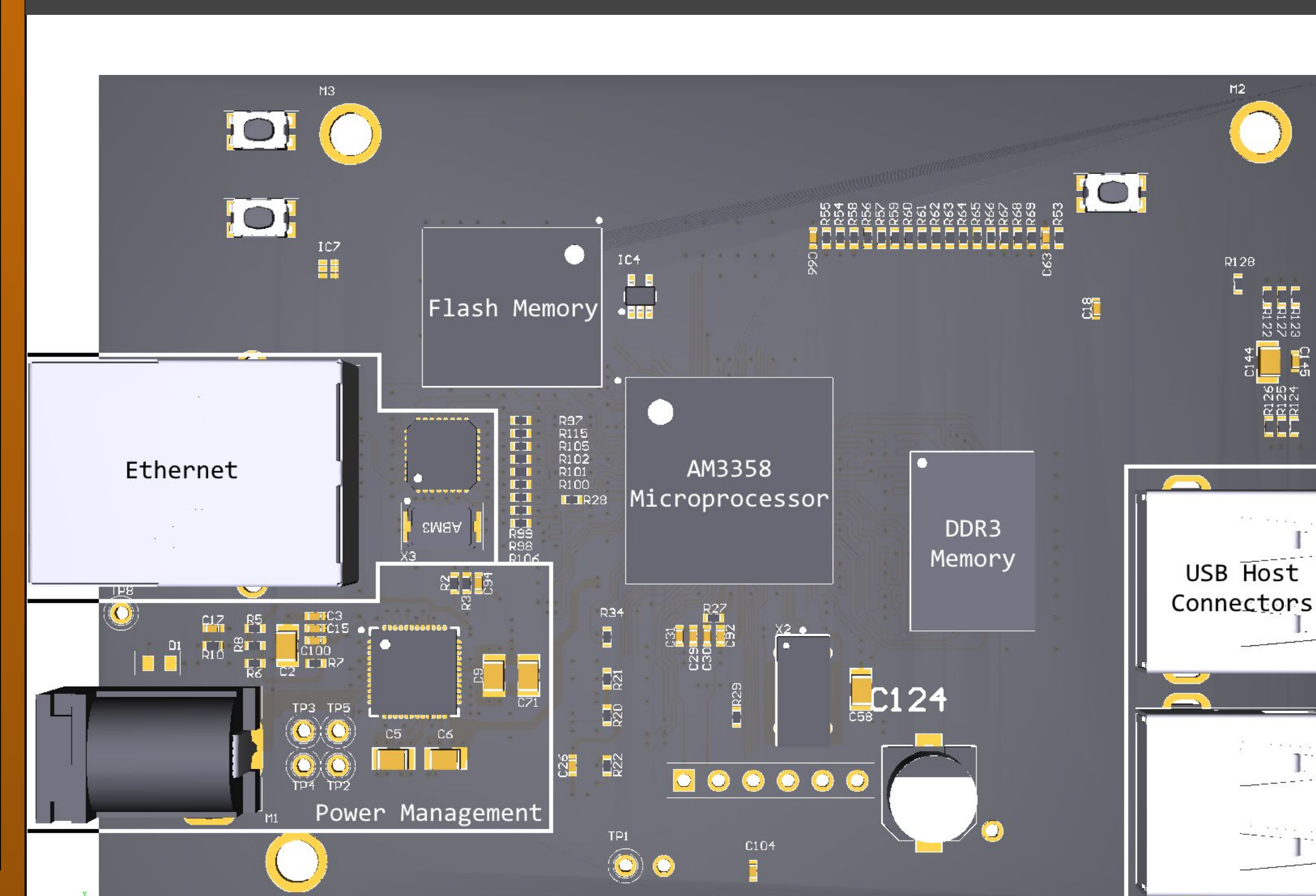*Fig. 2 - Application Interface*

System Design

Fig. 5 - Custom PCB

- 6-layer board design based on the BeagleBone Black v3
- Second USB connector was added; accommodated design change from one stereo camera to two mono cameras
- Due to time constraints and unforeseen circumstances the board could not be assembled in time
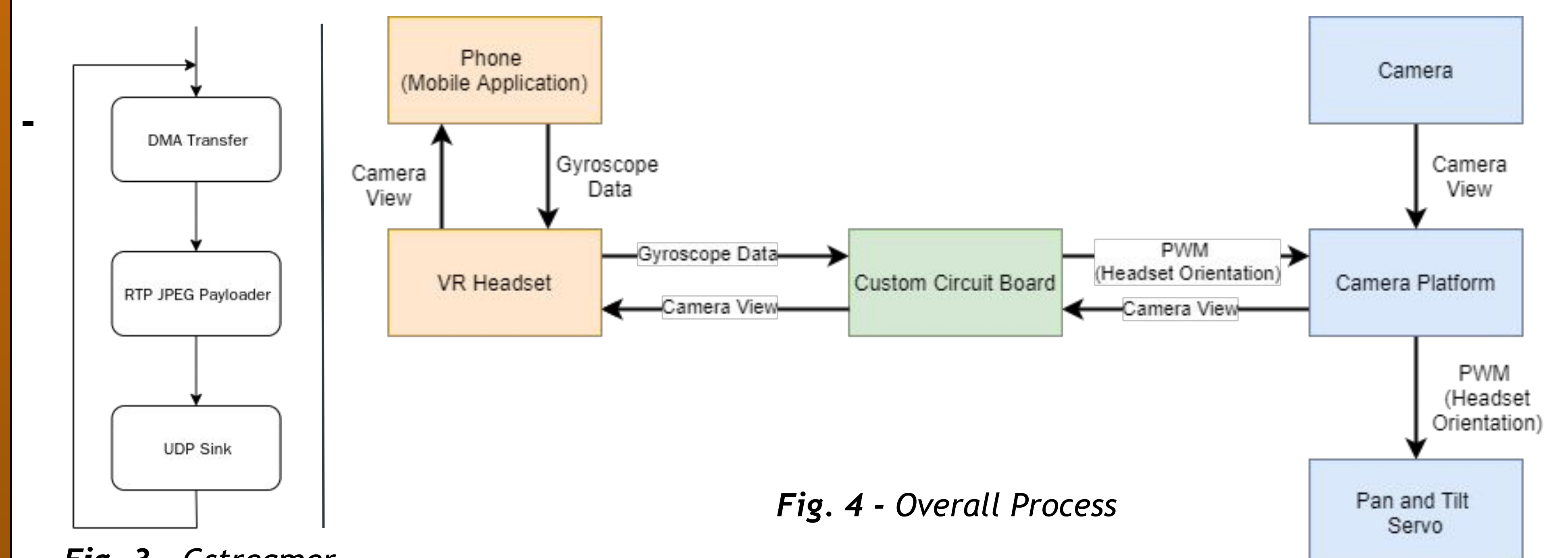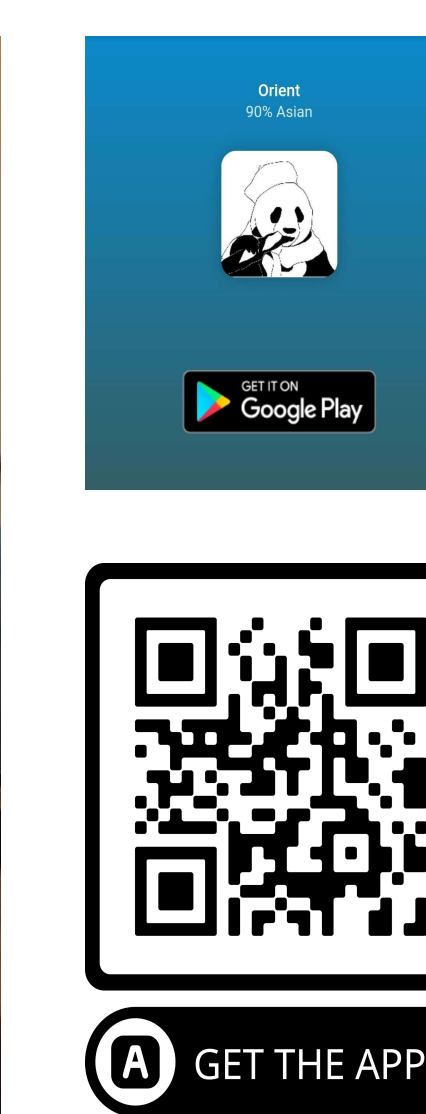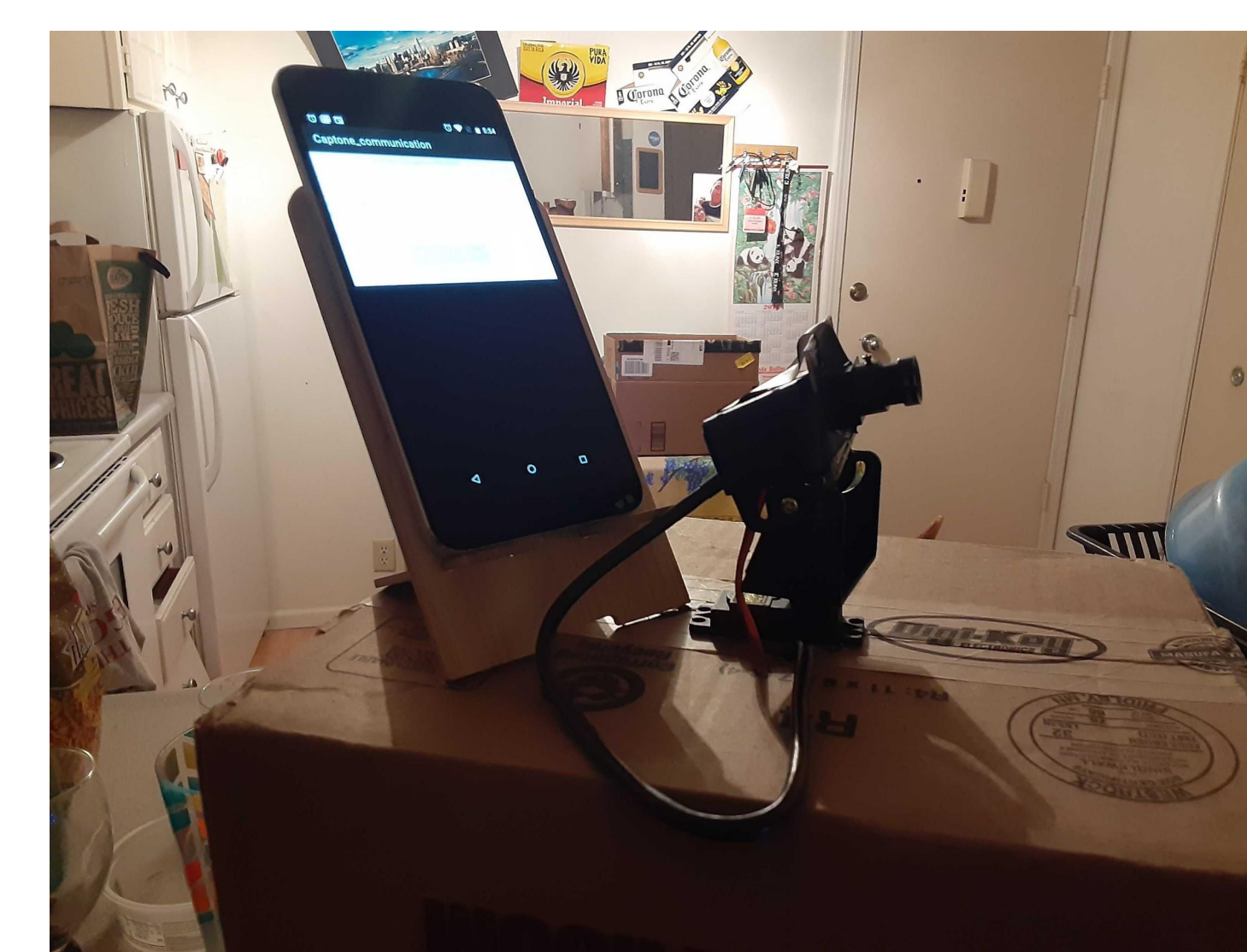
Flow & Block Diagrams

Fig. 3 - Gstreamer Pipeline Flow Diagram

Fig. 4 - Overall Process

Results

Acknowlegements

We would like to thank our sponsor Kyle Judah and the Engineering Dean's Office; Prerit Oberai, Thomas Lund, the instructional team, and Tim May for guidance; the WireWeHere Team for lending us crucial materials; and Audrey Cook for aiding in package ordering and delivery