Carnegie Mellon

Work It
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# Electrical & Computer ENGINEERING

Product Pitch

With the spread of COVID-19, many people have transitioned to working out from home instead of at the gym. But it's hard to find the motivation for at-home exercising, especially when workouts lack variety.

To solve this issue, we decided to create an exercise game—Work It—designed to engage the user and respond directly to their fitness level. Work It has three different workout types: arms, legs, and core. It initially evaluates the user's fitness level for each of those categories with a standard set of exercises to provide an appropriate full-body workout. Over time, the user will be re-evaluated and Work It will modify the user's workouts to match their progress.
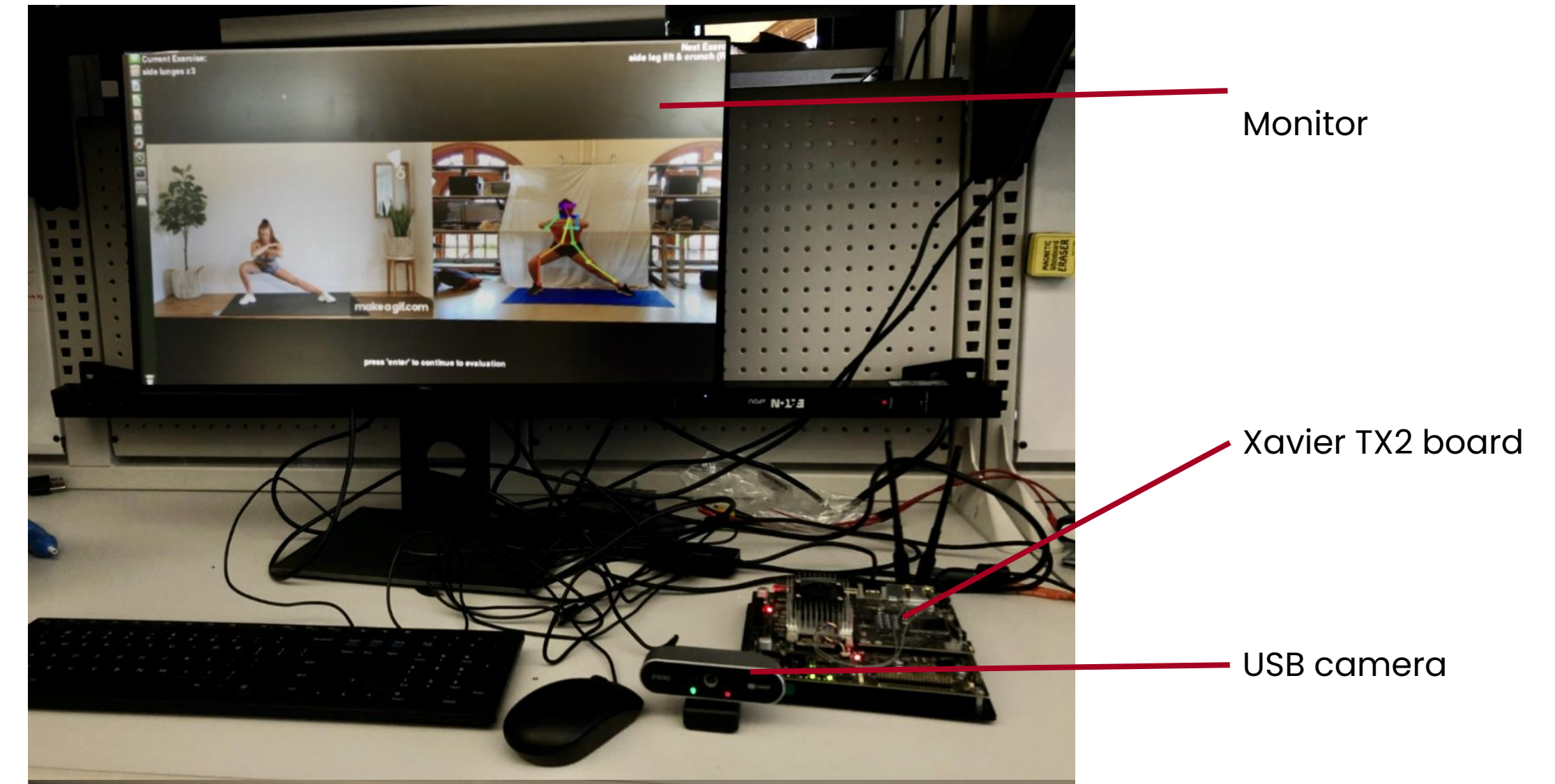
System Architecture

Block diagram of system components

Jetson TX2
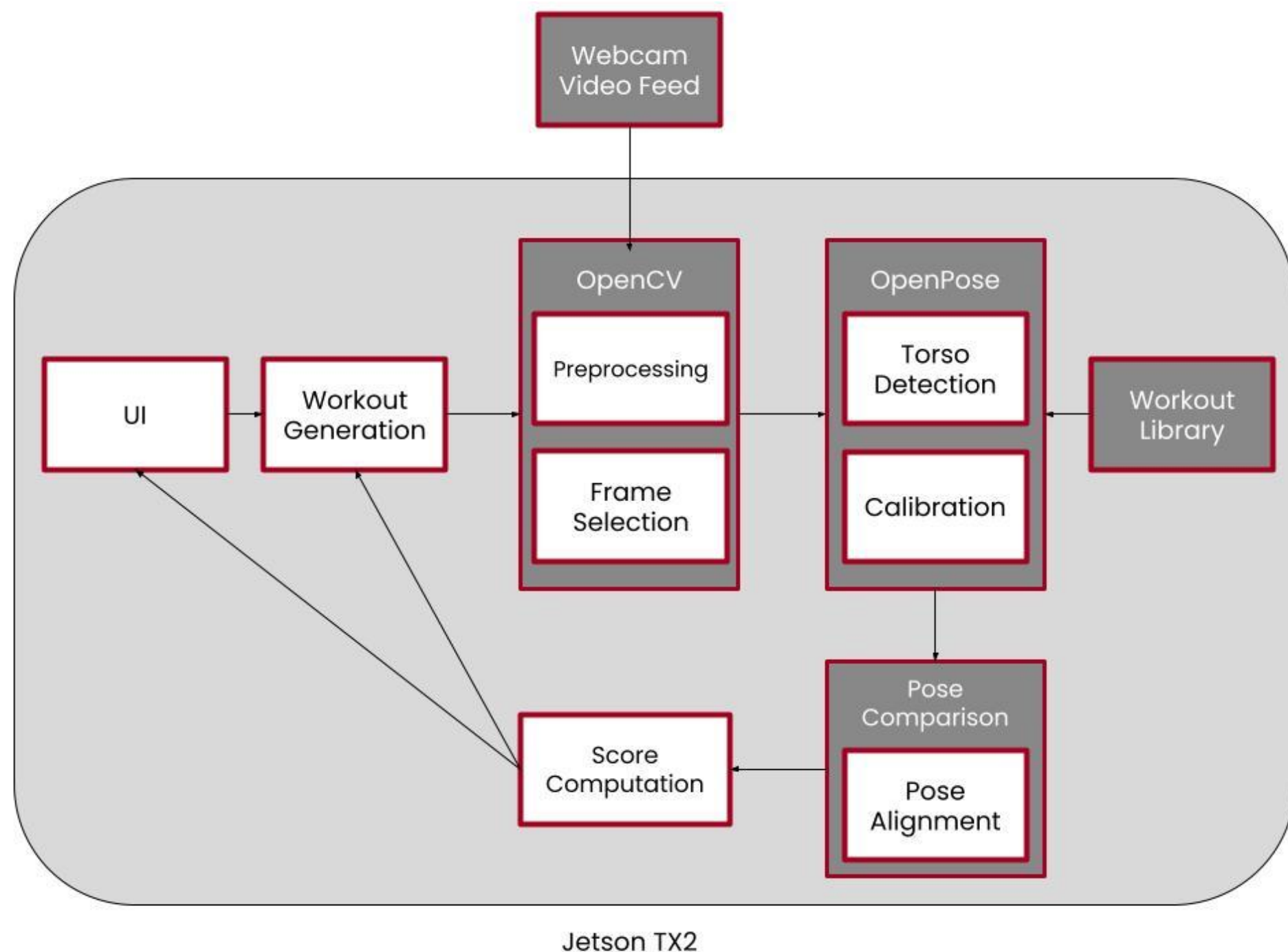
System Description

Product setup

- Monitor
- Xavier TX2 board
- USB camera

System Evaluation

Goal and Actual System Performance Metrics

Requirements	Metrics	Actual
Hardware Performance	< 1 min time limit	< 3 seconds
OpenPose Detection	90% accuracy	86% accuracy - CMU Tensorflow OpenPose model
Pose Alignment	90% accuracy	90% of poses detected correctly at 432x368 frame size
Pose Comparison	90% accuracy	arm exercises - 91.67% accuracy core exercises - 85.71% accuracy leg exercises - 94.12% accuracy average accuracy - 90.5%
Score Computation	Score should reflect user's completion and accuracy	Score changes based on form and repetitions