Myflection

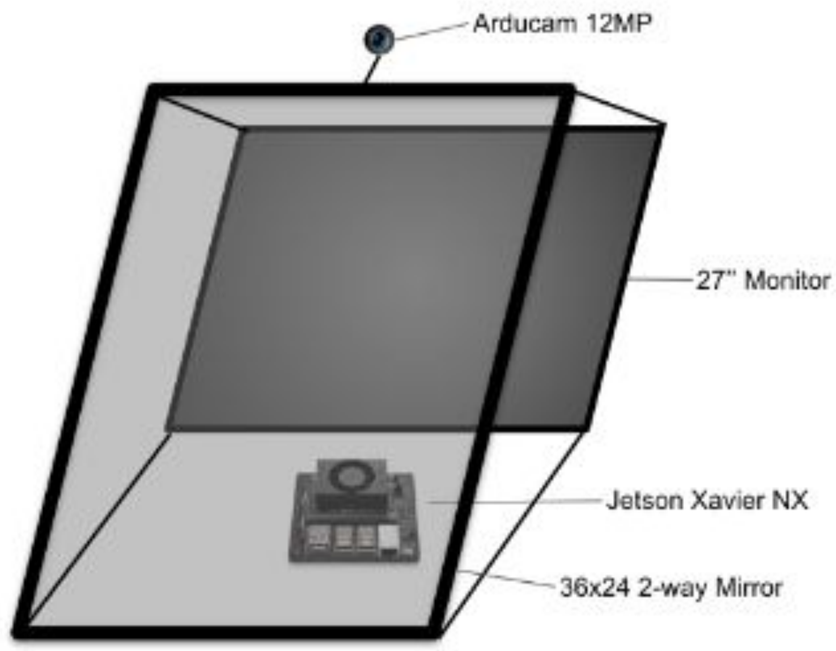
Team D4: Ramzi Hamdalla, Wonho Kang, Jeremy Ryu, and Yun Lee
18-500 Capstone Design, Spring 2022
Electrical and Computer Engineering Department
Carnegie Mellon University

Product Pitch

Myflection is a smart mirror aimed to assist people with choosing an outfit. Our smart mirror will analyze your torso and recommend a couple outfits in your wardrobe that look good together. Because our product is very centered around the user, our core requirement is a fast, accurate recommendation output. This can be split up into 4 distinct use-case requirements: time taken to upload tags to the database, time taken to upload photo of piece of clothing to the database, time taken to run torso detection, and time taken to retrieve image url after recommendation algorithm. Ultimately, our smart mirror will display the top 5 best-fitting outfits on the mirror screen.

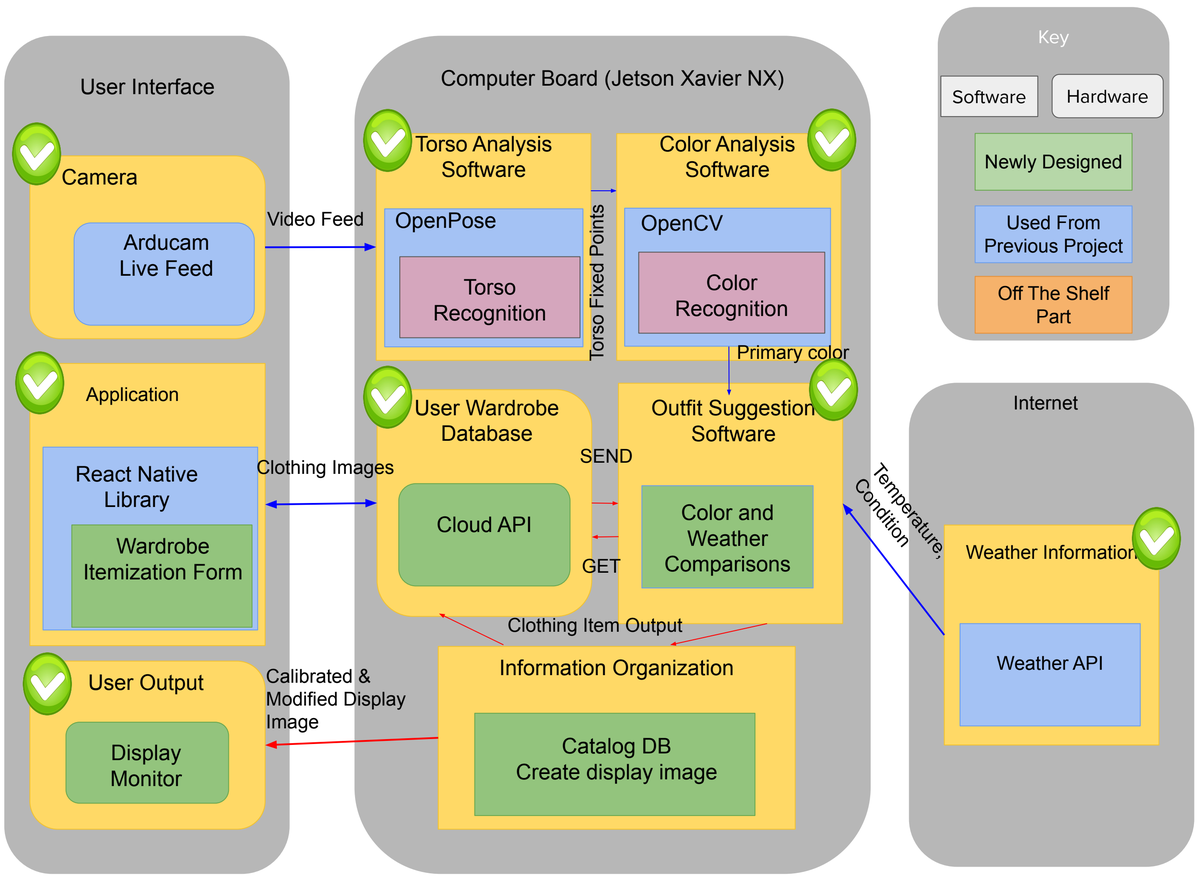
System Description

A diagram of the physical system is shown. As illustrated, an Arducam will be placed on top of the two-way mirror along with a monitor, and a Jetson Xavier NX placed behind the mirror. The Arducam will take a snapshot of a user standing in front of the mirror, and the Jetson will be in charge of most of the necessary computations, including analyzing the user's torso and the color of their clothes, using the relevant software. The system will receive a notification from the application when to start scanning the user, and will communicate with a cloud database to access the user's wardrobe.



System Architecture

The block diagram demonstrates the overall system architecture. The project is done mainly in software, and system architecture can be divided into three parts: user interface, computer board, and internet. The user interface is composed of a camera, application, and monitor, while the computer board is in charge of most of the necessary computations, and the internet is used to store and receive information about the weather and the user's wardrobe.



System Evaluation

Our testing methods were relatively straightforward as the only important metrics were accuracy and time. We tested all our use case requirements through running each component and logging the time taken to complete.

Time Taken to Upload Tags

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
1.794s	0.997s	1.037s	1.574s	0.881s	1.04s	1.159s	1.186s	0.868s	0.830s

Time Taken to Upload Photo

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
1.424s	1.502s	1.027s	0.735s	1.173s	0.881s	1.598s	1.373s	1.085s	0.871s

Torso Detection Accuracy

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

OpenPose Completion Time

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
4.3s	5.7s	6.4s	7.1s	5.2s	5.5s	6.1s	4.8s	5.7s	6.3s

Conclusions & Additional Information

Although our project does not meet some of the specifications that we wanted it to, it shows a successful attempt at creating a device that can assist and ease the burden of picking an outfit for early morning risers. We hope that this proof of concept proves the functionality of other devices that would increase everyone's quality of life.

Team D4: My-Flection – Carnegie Mellon University
ECE Capstone Spring 2022 – Ramzi Hamdalla, Wonho Kang, Yun Lee, Jeremy Ryu (cmu.edu)

Electrical & Computer ENGINEERING
Carnegie Mellon