Smart

Mirror

Goal:

The goal of this project is to create an interactive smart mirror, based on the C++ programming language.

Research Question:

How can I use the C++ programming

language to create a smart mirror?

Global

Context:

Scientific and Technical Innovation

Link to GC:

Out of the six available options to choose from, I could have chosen any one of them and created some sort of link to it, with enough effort. However one specific Global Context seemed to fit this project particularly well, “Scientific and Technical Innovation”. This is especially relevant to my project goal, because my plan is to take a fairly technical and out-of-reach aspect (for most people) of a really cool piece of technology and innovate it to the point where it is intuitive, easy-to-use and not nearly as intimidating as it would have been otherwise.

Why Build a Smart Mirror?

In 2009, an interconnected network of smart devices was proposed, it became known as the ‘Internet of Things’ or ‘IoT’ for short. The main selling point of IoT was the speedy analysis and transfer of information known as ‘Big Data’ from device to device. The Google definition of big data is, *“Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions.”* Back in 2009 this was nothing more than a concept, a cool thought experiment, but now with new technologies like cloud computing and the general exponential increase in computing power since then, IoT technology is now a reality something so widespread that you probably use some form of it every day, maybe without even realizing it. One practical, real-life application of this is if you were googling for “cheapest iPhone 8 Plus phone cases” on your phone, the search term ‘phone cases’ is extrapolated in conjunction with the model number/identifier of the phone (iPhone 8 Plus) and the term ‘cheap’ by an algorithm especially designed for this type of data analysis, to show you a Souq.com ad for 4 different iPhone 8 Plus cases, all under 50 AED. This ad will be visible on all of your devices signed into the same Google account, this is known as ‘targeted advertising’. A more user-orientated application is with smart homes, you ask the personal assistant on your phone to unlock the door, turn the lights on and set the temperature to 20 degrees as soon as your son reaches home. As soon as your son is in range of the home’s security system, it will unlock the door just for him, turn the lights on and adjust the thermostat all simultaneously and extremely efficiently.

All of this is part of an extremely lucrative market that spells out one thing. Above all else, people want convenience. They want their data presented to them in a way that is both unobtrusive and intuitive, while still feeling like something straight out of Star Trek. That’s why my goal for the personal project is to create an interactive smart mirror, based on the C++ programming language. Not only is a project like this extremely challenging, but it is also something I am genuinely interested in. One programming language I am already quite adept with is the ‘Swift’ programming language, which is quite similar to C++ is a number of ways, but is generally more complex, since it is much older and has much wider range of practical applications/platforms. This project will require me to have at least an adequate understanding of the C++ programming language for it to be successful. Unfortunately for me, C++ isn’t the only thing I will have to learn. I will also have to figure out a way to incorporate all the technical aspects of this project in an easy-to-use, intuitive and inviting package. This project is especially personal to me, not only because it is part of my particular area of interest, but because it requires me to learn new skills that I am not extremely familiar with yet, but will enjoy learning regardless.

The Setup and Installation Process of the Software

The Software Running (Post-Configuration) on the Display

The Raspberry Pi on the 3D-Printed Mount

The Display Mounting Materials

The CAD Model of the Raspberry Pi Mount

The Back of the Finished Product (Without Power-Cabling)











