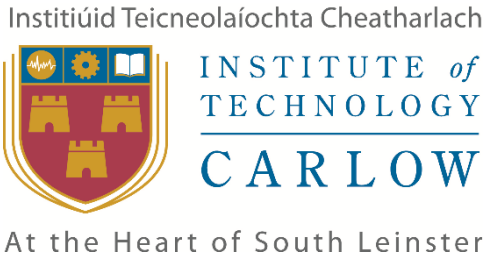

Computer Games Development Project Report Year IV

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Contents

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Project Abstract

I wanted to integrate object/facial recognition into an RC drone that uses telepresence VR to provide a remote physical environment to explore the surrounding area and gather information. The reason for the paper is to create a drone that can identify objects or faces that the camera sees and provides information to the user.

Project Introduction and/or Research Question

The motivation for this project is due to my interest in working on a raspberry pi/Arduino, RC drones, and using OpenCV. I wanted to integrate object/facial recognition into an RC drone that uses telepresence VR to provide a remote physical environment to explore the surrounding area. The problem that I wish to tackle by working on this project is, "What is the impact of telepresence on our daily lives or technology? ". I want to know if it has benefits or detriments to our daily lives.

The importance to the larger community is that it allows object/facial recognition for many fields such as Security and the Military. The specific problem is that I want to use the RC drone with its VR telepresence to check for objects or faces that can be recognized by the camera.

In this paper, we figure out what's the impact of telepresence on our daily lives? The result of this paper is to have a closer look at how it affects us. This paper is different from the rest because when I was researching this topic telepresence and I didn't see anything that talks about if it benefits our lives or its detriment to it.

The remainder of this paper is structured as follows:

- What is telepresence?
- Social and Communication uses?
- Robotic uses?

Literature Review

What is telepresence? Telepresence is the experience of being present at a real-world location while remote from one's own immediate location, meaning if I have a device that streams a camera feed and I have the ability to move that said device I can potentially use it to go to a place that doesn't require the user to move from its location giving the user to be in one area but also in a different area simultaneously.

Telepresence has a variety of applications to be beneficial to us, such as allowing us to be in a different location while not actually not traveling to said location. This has great potential for social communication between other people around the world. There has been researched done on this called [2] immersive group-to-group telepresence in 2013. Where two groups of remoted users interact with one other by using mixed reality, this benefits social and communication because users can now talk and interact with other people as if they are in the same location. While it has its benefits, there are still some potential problems I can see that is already affecting our lives. The users might use this to not leave their homes and to go outside since why bother when you can just turn on the machine you can be somewhere else than home, we can compare this in life where children and teenagers are just staying at home and not going out but rather stay inside their rooms. This type of problem has been increasing in the past few years.

The use of robotics on telepresence has untap potential for uses that can benefit us, for example, it can enhance social interaction suited to certain users such as the elderly or children. There was a conference held on this very topic at the [3][5]ACM/IEEE international conference on Human-Robot Interaction (HRI). The one that interests me since it's close to what I'm doing for my project is [4]Accelerating real-time face detection on a raspberry pi telepresence robot. This [4]topic influenced me on how I should tackle this type of program where it mentions about face detection technique where they use the LBP algorithm because it's faster than the other two techniques. LBPH (Local Binary Pattern Histogram) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number this will be handy for me to use for my project.

Conclusions

Does it benefit our daily lives? or a detriment?

My conclusion on this topic is that it's still young and has a lot of untapped potential to be beneficial to our daily lives rather than a detriment. This type of technology is still being developed like what the papers [3][5] can really give us a benefit if we pursue the idea and use it for social needs.

Evaluation and discussion

The software that turned out compared to what I visioned back in September is that I was really spread thin due to many technologies involved in my project are VR on a raspberry pi drone and controlled by unity, just listing these technologies that I have decided to do gives

me stress. The visioned product I wanted to get done was the facial/object recognition but instead got unfinished work.

Project Milestones

The project milestone I have achieve when working on this project was getting the RC drone built within the first few months which allows me to understand what the drone can provide in terms of potential integration of the telepresence into the drone and understanding the drone itself and its capability to be modified.

The other milestone I have achieved is getting a live feed over the internet to be streamed into unity, this allows me to find ways to make the raspberry pi stream its camera and host it so that unity can retrieve it from the internet.

The last milestone I managed to work on is getting the raspberry pi to receive commands from unity. The idea of getting unity and raspberry pi allows me to give the drone commands to move or view a certain area from unity.

Major Technical Achievements

The major technical achievement is making the unity and raspberry pi connect to one other, which allows me to give commands to the drone from unity. The communication between the drone and unity is quite important since I need a way to move the drone or get information from its camera feed.

The other major achievement that I believe is getting a live feed from the internet since there was no documentation on how to make a live feed to render unity apart from just pre-recorded video.

Project Review

When working on this project at the start of the year, It was very fun learning about the raspberry pi and building the drone, and looking at the possibility of integrating VR and facial/object recognition into one hardware. As the weeks pass by I have been bogged down on little problems like wrong versions or duplicated libraries or code errors on the raspberry pi when I was trying to install beneficial packages for the project.

I got tunneled vision when I was trying to get the camera working with unity, from trying to get the device from the raspberry pi to trying to get the camera to work with the MJPEG streamer, when I tried to make the MJPEG work it gave me errors after following a tutorial I did manage to figure out the problem which is that the library that MJPEG is using has a duplication on the raspberry pi I just got rid of it to make it work. I managed to just get an address from a website and give that address to unity and it'll stream the live feed but it's not what I wanted from it, I wanted a way to just get the raspberry pi to stream its camera rather than just taking a different camera from the internet. The things I have missing on this project is the VR telepresence and the Facial/Object recognition which are the biggest part of the project. If I was restarting this project I would only pick one technology rather than having like three things to be integrated into on hardware, I should have just worked on the Facial/Object recognition by itself than working on a raspberry pi and telepresence VR because I have spread myself too thin and causing me to split my attention to other problems. If someone is doing the same project please avoid working with too much technology since it can get too complicated, better to keep it simple, keep it at one technology.

The technologies I chose would've been ok if I only focused solely on one technology as I stated before I spread myself way too thin when working with multiple technologies. For example the VR telepresence aspect of the project, I thought I can make it work with unity and the raspberry pi but after reading up on VR on unity and I found out that it was near impossible to work with the raspberry pi and unity on the VR. I learned that on the last two weeks of the project due.

Future Work

If a student wants to undertake a project within this area, I would say just work with facial/object recognition since I think that it is very cool to work with and avoid working with more than one technology since it can split your attention and cause you to lose focus on what's important on the project.

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