

# Project Overview

Oculus Research Project || Media Visualization frameworks

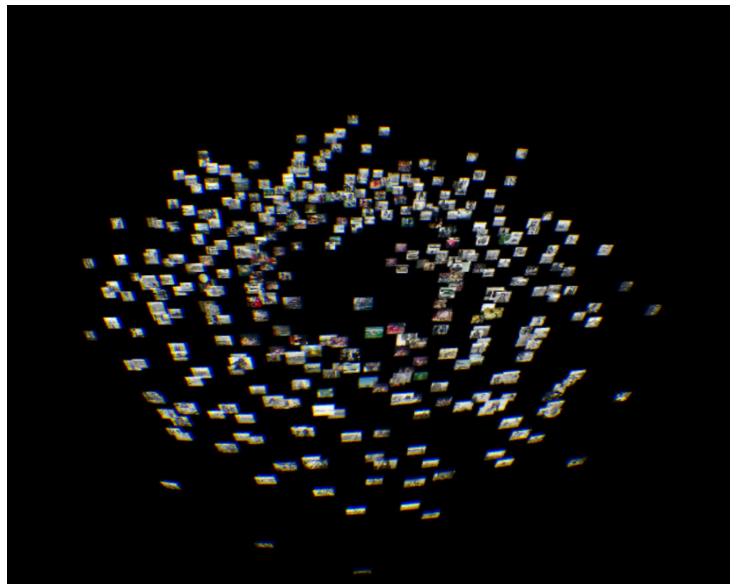
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## Project goals

The goal of the oculus project is to create an immersive experience using photographs from the [James Bay](#) dataset. The framework is meant to be flexible and serve any similar image based dataset with minimal changes.



## What is the Oculus?

Virtual reality has been around for a while but it is really with the Oculus rift that head mounted displays (HMD) have become affordable. The oculus is essentially a low persistence state of the art display designed for VR. A wide angle display allows an immersive experience for a wide range of content.

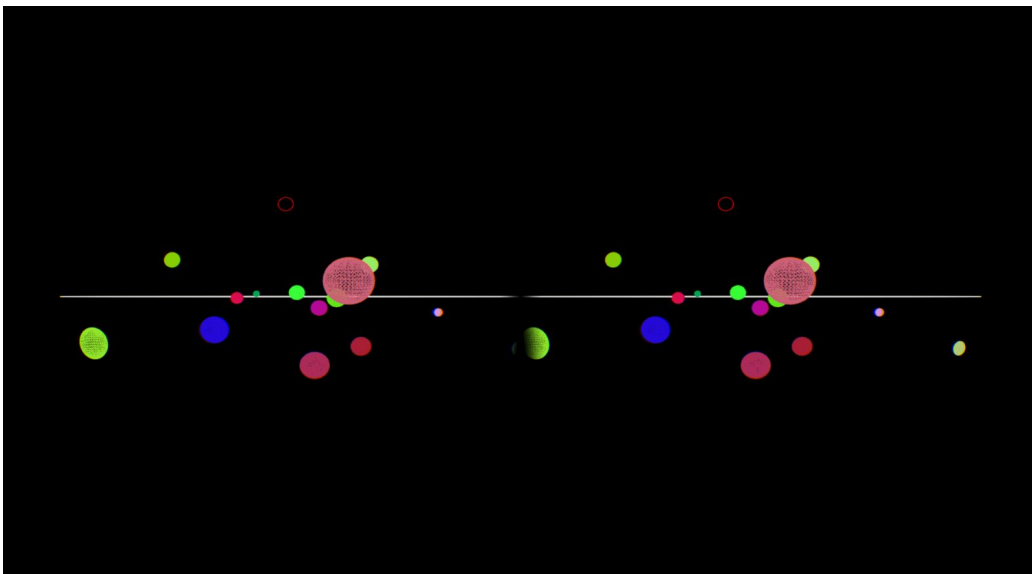


### Setting up the Oculus

Setting up and interfacing the oculus is fairly straightforward. The instructions are as follows:

1. Download the appropriate [Oculus SDK](#).
2. Setup instructions are available [here](#).
3. If the development is being on a mac turn on display mirroring. Also rotate the secondary monitor by 270 degrees for correct orientation ( it is still a hack may not be required)
4. I uses [ofxOculusDK2](#) addon for openframeworks and setting up the environment. It is available [here](#).
5. Run the xcode example named OculusRiftRendering available with the addon.

If everything is installed correctly this should show up on the screen.



>> in case of any technical issues please contact me at [mohit@mat.ucsb.edu](mailto:mohit@mat.ucsb.edu)

## **Oculus & Openframeworks**

It is important to make sure that the addon's file structure and the oculus dlibs are setup correctly in order to make the addon work correctly.

Here is how the addon works:

For regular screens the graphics card renders the scene once @60fps.

However for any VR application the scene need to be rendered twice: once for the left eye and once for the right. Their is a slight displacement in the camera position when the scene is being rendered leading to different perspectives. These different perspectives lead to the "3D effect" when visualized through the oculus.

The ReadMe [here](#) explains how to correctly setup for the oculus in OF. Note the orientation in oculus works differently than in OF so you may have reverse signs for the z axis.

## **Oculus & Processing ( and why not to use processing for graphic intensive purposes )**

Oculus DK2 is a high resolution display that is designed to run at 75 Hz. Moreover every scene is rendered separately for each eye. This translates into high graphics requirements and fast processing. As processing is based on java, it is inherently much slower than C++ / Unity which are better suited for such requirements.

## **Oculus for Media Visualization**

The current application recursively and exhaustively searches inside the data folder of the application to search for images ( for now it is images only). If required associated data files (csv) can be added to the same folder. The constructor is setup to extract the EXIF data if present from all images. This can possibly help when arranging images in a certain form. In current scenario the image arrangement is informed by image order or the metadata associated with the data file. However doing so has multiple issues associated with them especially as clustering results in images being illegible. Future work could involve clever z-buffering and using alpha transparency. Interacting with images in 3D space has not been explored.



