SwarmFleye User Manual

On the dedicated server machine (Linux or OS X; Windows won't work):
1. Install ffmpeg/ffeserver. Follow the instruction from this underline link to do that (and use Google if you have some troubles with the installation).
2. Put the file ffserver.conf from git repository into the /etc/ folder on the server machine.
3. Connect the server machine to Space Center WiFi network (pass: robotics), both 2.5 and 5.0 are ok.
4. Write down computer's IP address.
5. Run ffserver in terminal with the following command: ffserver -f /etc/ffserver.conf reload -loglevel debug & (you can leave out "-loglevel debug" if you don't want to see log in terminal).
6. Don't forget to kill ffserver process when you finish using it.

On the Space Center PC (or any other with Unity 5 installed on it):
1. If you are not using Space Centre PC, then you need to get project from git repository.
2. Connect the PC to Space Center WiFi network.
3. Navigate to the project folder (C:\Usres\Student\Documents\WeBot VR\Assets_Scene).
4. Open \Assets_Scene folder.
5. Run WeBot UI.unity.
6. By default only one screen is enabled (Cube 4). If you want to connect more robots (up to 3), just enable objects Cube 5 and Cube 6 (click on the desired object in Hierarchy view, then in Inspector tab check the box next to the name Cube 5 or 6).
7. Select active cubes and in the Inspector tab on the right side, in the field Ffserver Image Feed 2 (Script) put the IP address of the server machine (e.g. http://192.168.1.71:8090/robot1.jpg). If you have more robots (cubes enabled), then add corresponding feed names (robot2 and robot3).
8. Press Play button in the top middle of the Unity screen.
9. Switch to the Console view to see logs.
10. Put Oculus Rift on you head.
11. Move away so Kinect can see you well (you have Kinect camera feed inside).
12. Try some gestures (right now robot responds to Swipe Up - move forward, Swipe Down - move backwards, Swipe Left - rotate right, Swipe Right - rotate left).

On the robot:
1. Connect the robot to Space Center WiFi.
2. Open kinect-webot.sh in text editor (file is in the root folder).
3. Change the IP address on the second line to the IP address of your server (for different robots change the feed number accordingly, e.g. feed2 and feed3); You can also play with ffmpeg parameters if you want (resolution, framerate…). Save and exit.
4. Run the script with the following command: sh kinect-webot.sh.

Addition Notes:
1. Gestures that Kinect can recognise are defined in KinectGestures script. You can define your own if you want, or edit the existing ones. If you add your own and want to use them for robot control, you should also change the GestureListener script accordingly.
2. To show the skeletal lines that Kinect is recognising, select Kinect object from Hierarchy view, expand Kinect Manager (script) in Inspector tab, check Compute User Map box, Display User Map box (optional), and Display Skeleton Lines box.
3. Robot controls are sent through another server created at the start of the Unity program. Scripts related to that server are: Control, ClientControl and ServerControl.
4. Video feed and robot control are not going through the same server. For video feed, we are using ffserver and it has to be on a dedicated machine for now. If you can, you could try to establish it on the PC, but as to our knowledge, ffserver doesn't work in Windows.

5. If you get some input/output error for ffmpeg on the robot, it means that it can't establish the connection with the ffserver. There could be million reasons for this, but most obvious and common are: not in the same WiFi network, firewall preventing access, not running ffserver.
6. Every time you terminate the script on robot side, also exit from Unity Play mode. Don't have to terminate ffserver every time.
7. Robots should be unplugged from power sockets during testing.