Project Software ver.1

Using OpenCV and python, hand gesture recognition can be detected. Therefore, the eye can follow the motion of the finger. [1,2]

Using ZED camera or kinect camera, the depth can be detected. As a result of this, eye is sensible to perceive the people are moving close to the eye or moving away to the eye. [3,4]

Eye can be recognize human gestures. Emotion recognition can be detected via Convolutional Neural Networks(CNN), face databases. [5,6]

Using dlib or face_recognition libraries in OpenCV, eye is able to detect the faces.Moreover, eye has some characteristic motions to specific faces. To illustrate, if X person are looking to the eye, eyelid will close. [7]

In order to detect a human posture, openpose library in OpenCV is used. Thanks to this, eye has specific reactions to the people's movement. [8,9,10]

The robotic arm and the gripper can be modelled in the ROS and their movements can be controlled and observed whole steps of the project. [11,12,13]

References

[1] Heintz, B. (2020, February 12). Training a Neural Network to Detect Gestures with OpenCV in Python. Retrieved from
https://towardsdatascience.com/training-a-neural-network-to-detect-gestures-with-opencv-in-python-e09b0a12bdf1

[2] Sadaival. (n.d.). Sadaival/Hand-Gestures. Retrieved from
https://github.com/Sadaival/Hand-Gestures/blob/master/gesture.py

[3]How to Use OpenCV with ZED in Python. (n.d.). Retrieved from
https://www.stereolabs.com/docs/opencv/python/#

[4]Amiller. (2017, February 10). amiller/libfreenect-goodies. Retrieved from
https://github.com/amiller/libfreenect-goodies

[5] Kumar, A. (2019, July 1). Demonstration of Facial Emotion Recognition on Real Time Video Using CNN : Python & Keras. Retrieved from
https://appliedmachinelearning.blog/2018/11/28/demonstration-of-facial-emotion-recognition-on-real-time-video-using-cnn-python-keras/

[6] Palkab. (n.d.). Emotion Recognition With Python, OpenCV and a Face Dataset. Retrieved from
http://www.paulvangent.com/2016/04/01/emotion-recognition-with-python-opencv-and-a-face-dataset/

[7]Rosebrock , A.(2018, June 18). Face recognition with OpenCV, Python and deep learning. Retrieved from
https://www.pyimagesearch.com/2018/06/18/face-recognition-with-opencv-python-and-deep-learning/

[8] Gandhi, N. (2018, August 25). Real-time Pose Estimation in webcam using OpenPose : Python 2/3 & OpenCV. Retrieved from
https://medium.com/pixel-wise/real-time-pose-estimation-in-webcam-using-openpose-python-2-3-opencv-91af0372c31c

[9] CMU-Perceptual-Computing-Lab. (n.d.). CMU-Perceptual-Computing-Lab/openpose. Retrieved from
https://github.com/CMU-Perceptual-Computing-Lab/openpose/blob/master/doc/modules/python_module.md

[10] CMU-Perceptual-Computing-Lab. (2020, January 20). CMU-Perceptual-Computing-Lab/openpose. Retrieved from
https://github.com/CMU-Perceptual-Computing-Lab/openpose

[11] How to simulate a robot with Gazebo & ROS. (n.d.). Retrieved from
https://community.arm.com/developer/research/b/articles/posts/do-you-want-to-build-a-robot

[12] Jmichiels. (2017, September 27). jmichiels/arm. Retrieved from
https://github.com/jmichiels/arm

[13] Wiki. (n.d.). Retrieved from
http://wiki.ros.org/robotican/Tutorials/Arm%20manipulation