

HEAD-MOUNTED EYE TRACKER

User Manual for the real-time eye tracker

by

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1 Introduction

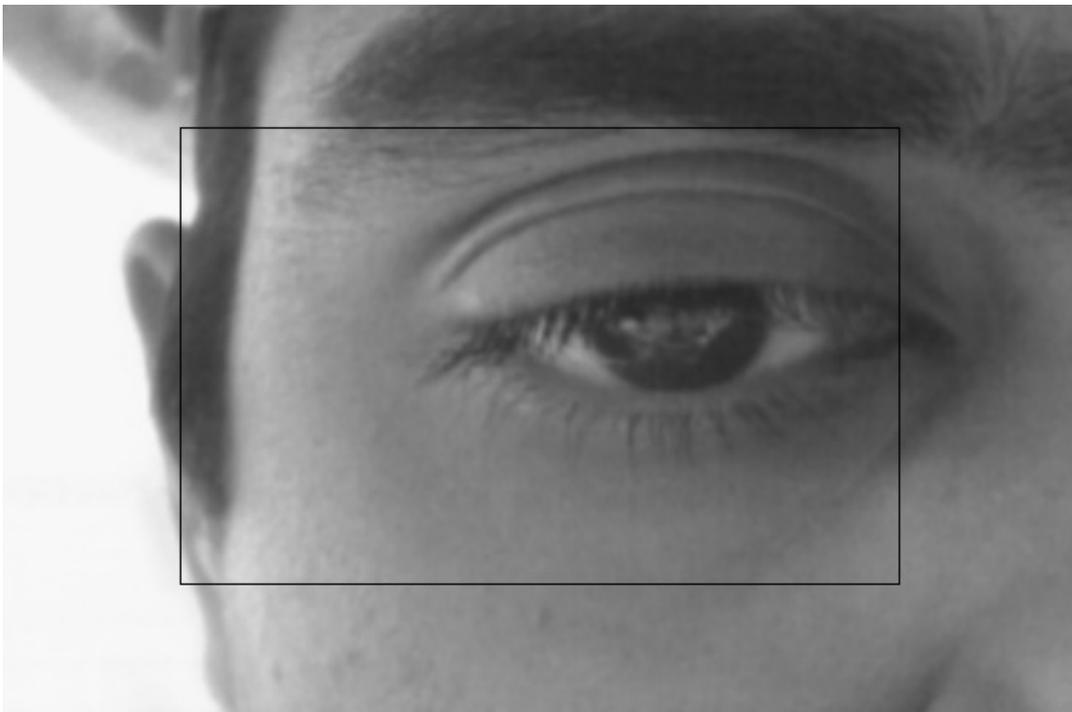
This document provides usage instructions for the auto-eye-tracker developed by Anil Ram Viswanathan and Zelan Xiao.

2 Build instructions

- Install Microsoft Visual Studio 2010.
- Navigate to the folder, *software/source/eye_tracker_auto/build*. Double click on *auto_eye_tracker.sln*.
- Select Build->Build Solution to build the project.

3 Run instructions

1. Wear the helmet, and connect up the hardware. Hardware connection instructions are present with the hardware itself.
2. Navigate to *application/*.
3. Double click on *auto-eye-tracker.exe*.
4. Wait for two windows to open up. One should show the scene video, the other should show the eye video.
5. Make sure that the subject's eye is within the rectangle shown in the eye video, like so:



6. On the console terminal, select the camera corresponding to the eye camera.
7. Press 'c' to enter calibration mode, 't' for tracking.

3.1 Calibration

1. Adjust the parameters in 'Edges' window so that the eye is detected properly. Increase the 'alpha' parameter in the 'cut-out' window to 90. If required, increase or decrease the 'min_radius' – this stands for the size of the iris. The circle shown should match the iris.
2. Shine a bright object, like a flashlight towards the camera. The scene camera should recognize it and track it with a black bulls-eye, like so:



3. Have the subject look at the brightest object.
4. Keep the object at four positions – top edge of view, bottom edge of view, left edge of view and right edge of view. At each point, once stabilized, press 'n'. If the system accepts the data point, it will beep twice.
5. Once all four points have been covered, press 't' to enter track mode. Press 'c' to enter calibration mode at any time during the session.

3.2 Tracking

There is no input required during the tracking phase; the estimated eye position is shown as a white

bulls-eye. If the position is outside the frame, the bulls-eye appears at the corresponding edge.

