SENG 499: Progress Report 2

Group 499/14

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Introduction

This project aims to make any UVC-compatible webcam capable of performing basic gesture control recognition. The goal of this is to enable gesture control applications in a vehicle's infotainment system to enable drivers to focus on the road. As touchscreens replace the functionality of buttons, tactile feedback is less possible for drivers and as such a more modern approach is needed.

The development of this project will first focus on recognition of various gestures using background-independent recognition; common techniques such as colour filtering, shape-matching, and static background subtraction will be applied so as to recognize a human hand.

Gesture recognition will be implemented in various stages throughout the development process. The first such stage is to recognize the hand and motion of the entire hand. This can be used to implement gestures such as switching songs or screens by providing a simple "forward" and "back" api.

The next step will be to analyze the movement and orientation of the hand. The change throughout a motion will be used to determine various gestures, and a simple API will be provided which exposes this gestures to the programmer.

The last stage of development will incorporate the actual implementation in the target vehicle, the UVic EcoCAR2. As the camera is pointed at the vehicle's infotainment display, certain characteristics can be guaranteed about the image the camera will see. These characteristics will be used to increase accuracy of gestures as well as work towards improvements to the touchscreen's operation such as pinch gestures.

Progress To Date

The development efforts so far have focused on the actual interfacing with the camera. The Qt library was initially used to capture video from the webcam as this would be a cross-platform solution; however, the video capture interface does not work on windows. Therefore, the openCV

library is used to capture and analyze the video and the Qt library will simply be used to create an interface.

Progress made so far is summarized below:

- Qt webcam capture and integration into image analysis flow
- OpenCV webcam capture and analysis
- Discussion and research into detection methods
- Task assignment
- Website development begun
- Very basic demo of capabilities started

The work so far has focused on set-up and enabling management of the project; the next few weeks focus will shift to actual development and testing of the system. Initially a simple display which simply shows which gestures are recognized will be used, and once this is working the integration into larger systems through usage of an API will be started. As development unfolds the team will gain a greater understanding of the scope of work necessary to complete the targeted for completion by the end of the project.

Morgan McKenzie		Log 1, May 16 - June 16
Date	**Time(h)**	**Description of Task**
From previous log	0	
16/05/2014	2h	Meeting to discuss project
16/05/2014	0.5h	Meeting with Project Supervisor
18/05/2014	2h	Looking into camera with Qt/QML
19/05/2014	2h	Looking into camera with Qt/C++
20/05/2014	2h	Researching similar open-source initiatives
23/05/2014	2h	Meeting to discuss project status and assign tasks
25/05/2014	5h	Working on Qt/OpenCV integration for ARM processor
26/05/2014	0.5h	Working on progress report
29/05/2014	0.5h	Preparing slides for presentation to class
02/06/2014	3h	Working on implementation of test gui and camera integration
04/06/2014	0.5h	Preparing slides for presentation to class
30/05/2014	2h	Meeting to update on project status and re-assign tasks
10/06/2014	5h	Working to switch to OpenCV to capture video instead of Qt
16/06/2014	2h	Meeting to work on deliverables for project
Current Total	29h	
Cumulative Total	29h	

Justin Sketchley		Log 1, May 16 - June 16
Date	**Time(h)**	**Description of Task**
From previous log	0	
16/5/2014	2h	Meeting to discuss project
16/5/2014	0.5h	Meeting with advisor
23/5/2014	2h	Meeting to delegate project tasks
26/5/2014	1h	Completed Progress Report
26/5/2014	3h	Testing tutorials of hand recognition using opencv
29/5/2014	3h	Working on building Opencv and Qt on Windows using Mingw
30/5/2014	2h	Update project status meeting
2/5/2014	3h	Working on building Opencv and Qt on Windows using Visual Studio binaries
3/6/2014	3h	Debugging problems with Qt on Windows
3/6/2014	2h	Complete project presentation #1
5/6/2014	3h	Working on integrating webcam into Virtualbox
9/6/2014	2.5h	Testing tutorials of webcam control on Windows using Opencv
16/6/2014	2.5h	Complete project presentation #2, progress report #2, worklog #1
Current Total	29.5h	
Cumulative Total	29.5h	

Brandon Jacklyn		Log 1, May 16 - June 16
Date	**Time(h)**	**Description of Task**
From previous log	0	
16/05/2014	2h	Meeting to discuss project
16/05/2014	0.5h	Meeting with Project Supervisor
20/05/2014	2h	Research UVic student web hosting and server capabilities. Research previous student websites and understand website requirements
21/05/2014	2h	Research client side javascript and css frameworks. Choose Twitter Bootstrap & JQuery as frameworks. Create website sample home page and host it on UVic
23/05/2014	2h	Meeting to discuss project status and assign tasks
23/05/2014	3h	Research OpenCV and Qt. Setup linux virtualbox image for development. Initialize git repository.
26/05/2014	0.5h	Working on progress report
30/05/2014	2h	Meeting to update on project status and re-assign tasks
04/06/2014	0.5h	Preparing slides for presentation to class
09/06/2014	4h	Create website home page using bootstrap styling. Create website home page theme image with gimp. Embed home page with sample youtube video. Implement JQuery size scaling for youtube videos on mobile
14/06/2014	7h	Mockup About/Documents/Contact Us web pages on paper. Create Documents/Contact Us web pages with emphasis on both mobile and desktop element styling and positioning. Create mockup About web page with space for content.
15/06/2014	1h	Investigate bootstrap tablet and large screen support. Change downloadable document links to thumbnails and fix positioning for tablets
16/06/2014	2h	Meeting to work on deliverables for project
Current Total	28.5h	

Cumulative Total	28.5h	

All group members attest that this is a correct record of their activities and time spent.