Instructions for Using CAVIARGUI Program for Annotating JPG Video Streams

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This is the user guide for a Java program that allows a user to manually annotate video sequences. The annotations are done on a frame-by-frame basis. Annotations include geometric descriptions (bounding boxes of individuals and groups, including the principal axis) and semantic descriptions of current activities and situtations. Boxes are limited across frames to give both detection and tracking information.

The software is also useful for viewing the ground truth labels distributed with the image sequences.

The unpacked software is compiled as javac *.java.

This software is offered as is. You could ask Jose Vazquez questions about it, but you might not get any answers (s0238349@sms.ed.ac.uk).

1   Running CAVIARGUI

To run CAVIARGUI change to the directory above the xmlcaviargui directory and type 'java -mx128M -ms64M xmlcaviargui/CAVIARGUI' at the command prompt. On DICE machines the program is currently stored in the directory

- '/home/rbf/homepage/CAVIARDATA1/'.

This will display the control panel and will load in the default sequence which is EnterExitCrossingPaths1cor. Each sequence of jpgs is stored in a subdirectory of the name of the sequence called JPEGS. Data file are saved to the directory of the name of the sequence as a XML file.

2   Using CAVIARGUI

CAVIARGUI consists of 4 distinct panels (Figure 1), the leftmost one being the one containing the currently loaded image file for the video stream, the second from the left being the edit individual box panel, the second from the right being the edit group box panel and the furthest to the right being the file options menu.

3   Video Stream Panel

Use this panel to draw boxes around the target. Click the mouse on the image to draw the initial point and drag and release to draw the box onto the image.
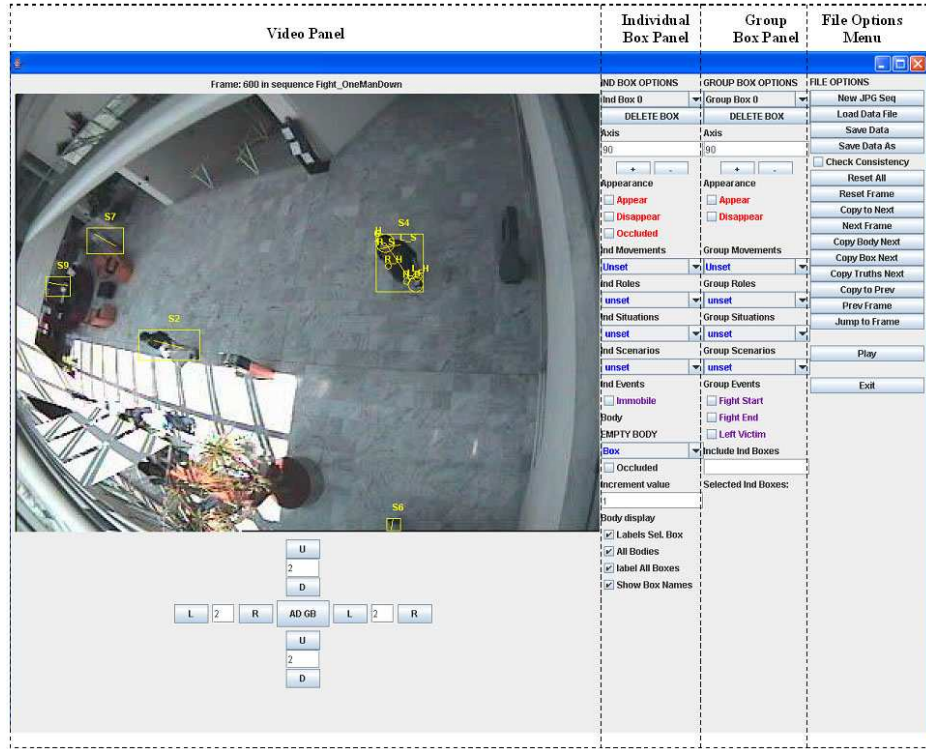
Figure 1: Caviargui interface

Once drawn the box may be resized so that it makes a more tight fit to the person or group of persons. The top U/D buttons will move the top line by the number of pixels specified in the text field up/down, the left L/R buttons will move the leftmost line of the box left/right by the number of pixels specified in the textfield, and so on. The textfield between these U/D, L/R buttons must contain a multiple of 2 in it as the image is double scale, an error message will appear if this is not correct.

4   Individual Box Panel

Use this to select, delete, change the axis of orientation and alter the ground truth values of the box currently being edited. To select a new individual box select an identifier from the drop down menu at the top of the panel. To delete the currently selected individual box use the delete box button located below the select individual box menu. To update the axis either the plus or minus buttons will add/minus 1 degree to the orientation. Otherwise a number can be typed into the textfield which is updated upon pressing the return button. To select the relevant ground truths the check boxes and drop down menus with the relevant label should be checked/selected. By default the drop down menus for movement, role, situation and scenario are initialized to unset. *NOTE THAT CHANGES CANNOT BE MADE TO AN INDIVIDUAL BOX IF THE*

CURRENTLY SELECTED BOX IS A GROUP BOX.

To create/edit a body part for an individual person select the proper body part in the drop down menu. Body parts are initialized by selecting the body part in the drop down menu and afterwards using the mouse to define the dimensions. Circles are created in the case of the head, left arm, right arm, left feet and right feet (drag and drop mouse operation). For the case of the shoulders a shoulder line is created (drag and drop mouse operation). In the case of the gaze an input dialog allows the user to introduce the orientation.

Once the initial body parts have been set, they can be modified using keyboard shortcuts, in the case of circle body parts the center and radious of the circle can be altered; for te line shoulder the endpoints of the shoulder lines can be modified. Once body parts have been set for a box it will not be possible to modify the dimensions of the box to avoid the situation where body parts are drawn outside the box. If its necessary to adjust the box size the body parts have to be deleted first.

Body parts can be either visible or occluded according to the user criteria. The user could decide to estimate the positionof a body part if he feels confident enough otherwise the part can be not drawn.

In the bottom part of the Box Panel a display options are provided to the user. The purpose of these boxes is to visualize all of the labeled bodies and their tags, or just the current body and its tags, since in cluttered frames is hard to visualize which body parts belong to a particular box.

5   Group Box Panel

Much the same as the individual box panel. There is the further option to specify which individual boxes are contained within the group box, to use this click in the text field below the label 'Include Ind Box', list the individual boxes that are to be contained within the group box, separated by commas. Press return to enter these individual boxes into the group box data structure. Individual boxes that are contained within the currently selected group box appear in the label below. The bounding box for the group must be at least as big as the bounding box for the contained individual boxes. Again a group box cannot be altered if a single box is the currently selected box.

6   File Options Panel

Consists of the following buttons:

6.1   File Operations

1. *Load JPG*: Loads new jpg sequence and deletes all previously stored data. Will ask if there are hundreds or thousands of frames in the video sequence as this is essential for the program to work out the JPEG file names from the name of the jpg sequence. An error window will appear if the file cannot be found. The user should only type in the name of the entire sequence and the program will load the first image in that sequence. To jump to another frame in the sequence use the 'Jump to Frame' button further down this panel. Also this *LOAD* button must be used first if the

user wishes to load a previous saved file for another sequence of jpgs, as initially the sequence must be loaded so the program knows where to look for the file.

2. *Load Data File*: Loads a data file, with all previous annotations. The last annotated image is the default image that is loaded in. An error window appears if the file cannot be found. Will add the .xml extension if the user does not.

3. *Save Data*: Saves the all the annotations that have been done to the file that has most recently been loaded or saved.

4. *Save Data As*: Pops up a window where the name of the data file to be saved should be entered, and saves this file to disk. Will add the .xml extension automatically if the user does not.

6.2   Frame Operations

1. *Reset All*: Resets the datastructure containing all the information annotated so far on all frames. Effectively deletes all work done.

2. *Reset Frame*: Resets all annotations on the currently selected frame

3. *Copy to Next*: Copies the currently selected frame's information from the current frame to the next frame, and then loads the next frame. Labour saving - do not have to redraw all boxes, annotations, etc.

4. *Next Frame*: Loads the next frame but with any previous set annotations. Keyboard shortcut "n".

5. *Copy Box Next*: Copies the currently selected box to the next frame. This key is useful for labelling a single individual through the sequence, as usually only the bounding box position changes slightly the labels remain unchanged. Keyboard shortcut "b".

6. *Copy Truths Next*: Copies the currently selected box's labels to the same box in the next frame. This key is useful if it is later realised that a box has incorrect truth values over a long sequence. Labels do not vary a lot over time so they can normally be copied from box to box without change. Keyboard shortcut "t".

7. *Copy Body Next*: Copies the body parts on the current selected box to the same box on the next frame. This key is useful to set initial estimates about the position and dimensions of the body parts in the following frame. When a body part its not inside the next frame box it will be either adjusted to fit. If the circle of the circles its outside the box the body part will be removed.

8. *Copy to Prev*: Copies the currently selected frame's annotated information from the current frame to the previous frame, and then loads the previous frame. Labour saving - do not have to redraw all boxes, annotations, etc.

9. *Prev*: Loads the previous frame but with any previously set annotations. Keyboard shortcut "p".

10. *Jump to Frame*: A textfield will pop up and the number entered will be the frame in the sequence that is jumped to. If it does not exist an error window appears. The frame will have all the annotations that have been done during this session (or a previous one if a file is loaded).

11. *Copy and adjust*: This operation is only possible to execute for group boxes. Its functionality is similar to the copy to next operation with an additional adjustment operation to the current dimensions of the group box according to the single boxes that belong to the group box. The adjusted box will exaclty fit around the boundaries formed by the single boxes. This command is only accesible using the keystroke "w" (not visible on the GUI). To use this functionality just set a group box that encloses the individual boxes that belong the group and type in the ids of the members that belong to the group box before using this command.

6.3   Miscellaneous Operations

1. *Check Consistency*: When the check consistency option is activated the program will check that the current movement, role, situation, scenario are consistent according to the CAVIAR specification (for further information about the valid states consult the labelling states reference, accesible from the project page). The checking is performed once the user tries to change the current visible frame, an auxiliary window will ask whether to proceed or remain in the current frame to remove the inconsistencies.

2. *Play*: Plays the sequence from the currently selected frame to the last frame in the sequence showing both the image data and the annotations. This is very simple so there is no stop function and no buttons can be pressed as no threads have been used. Also boxes may flicker quite badly as it goes from screen to screen. You might find pushing the "n" button repeatedly more useful for viewing the labeled sequence.

3. *Exit*: Exits the program. Will ask if you wish to save changes made if any buttons have been pressed since the last save.

7   Keyboard Shortcuts

Several keyboard shortcuts have been added to speed up users' progress:

1. *Copy Box Next*: b

2. *Copy Truths Next*: t

3. *Next Frame*: n

4. *Prev Frame*: p

5. *Copy and Adjust*: w

For manipulating box boundaries the cursor keys are used, where each key corresponds to one side of the rectangle. The up arrow corresponds to the top side, the left arrow to the left side, the down arrow to the bottom side, and

the right arrow to the right side. Pushing the key moves the corresponding line outwards. By holding down the control (CTRL) key and then pushing the arrow key, the side moves in the opposite direction.

*** *NOTE*: After selecting an individual or group box from the drop-down-list at the top right of the window, you *MUST* click on another button before the following controls work. This is to restore focus to the window (since the cursor keys can be used in a drop-down-list).

1. *Move Selected Box's Left Side Left by One Unit*: ← (left arrow)

2. *Move Selected Box's Left Side Right by One Unit*: CTRL + ← (control and left arrow)

3. *Move Selected Box's Right Side Right by One Unit*: →

4. *Move Selected Box's Right Side Left by One Unit*: CTRL + →

5. *Move Selected Box's Top Side Up by One Unit*: ↑

6. *Move Selected Box's Top Side Down by One Unit*: CTRL + ↑

7. *Move Selected Box's Bottom Side Down by One Unit*: ↓

8. *Move Selected Box's Bottom Side Up by One Unit*: CTRL + ↓

8 Keyboard shortcuts for body parts

To adjust the body parts once they have been set the following shortcuts have been added:

1. *key "d"*: Delete the current selected body part.

2. *key "z"*: Toggle through the body parts on the current selected box.

3. *key "x"*: Delete all the body parts of the current selected box.

4. *key "c"*: Change the status of the currently selected body part to occluded/not occluded.

5. *key "a"*: When a body part represented by a circle is selected the radious of the circle is increased. When the gaze is the selected body part the gaze angle is rotated clockwise. The increment is defined in the field "increment value".

6. *key "b"*: When a body part represented by a circle is selected the radious of the circle is decreased. When the gaze is the selected body part the gaze angle is rotated counterclockwise. The increment is defined in the field "increment value".

7. *key "←"*: When a body part represented by a circle is selected the center it's moved to the left according to the value in the field "increment value".

8. *key "→"*: When a body part represented by a circle is selected the center it's moved to the right according to the value in the field "increment value".

9. *key "↑"*: When a body part represented by a circle is selected the center it's moved up according to the value in the field "increment value".

10. *key "↓"*: When a body part represented by a circle is selected the center it's moved down according to the value in the field "increment value".

11. *keys "1", "2",...,"8","9"*: Instead of using the toggle shortcut the user can directly select a body part using these keys which have been assigned accoridng to their positions in the drop down menu being "1" to select the box, "2" for the head and so on.

Queries and Bugs to Jose Vazquez s0238349@sms.ed.ac.uk.