

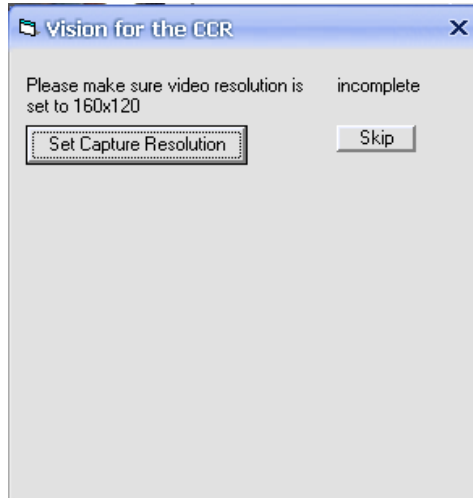
# How to Use the CCR Vision Program

by: Josh Domina

## Section 1 - Setup

### *1.1 Setting the Camera's Resolution*

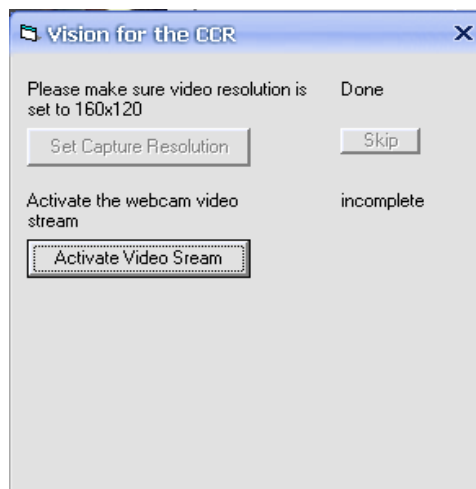
When you first run the program you will be prompted to set the camera's resolution. Please make sure it is set to 160x120.



Click '**Set Capture Resolution**' to set the resolution. If it is already set click '**Skip**' to move on to the next step.

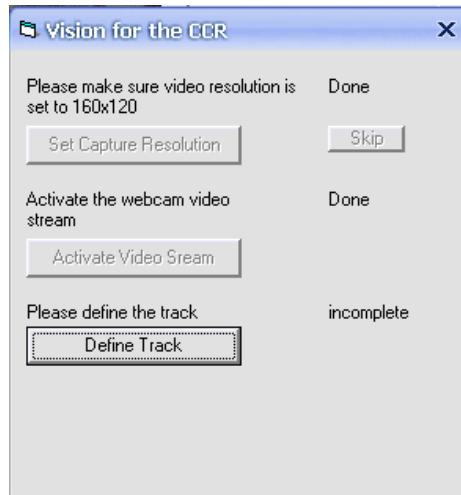
### *1.2 Activating the Video Stream*

You will be prompted to activate the video stream. Simply Click '**Activate Video Stream**' to do this.



### 1.3 Launch Track Definition Module

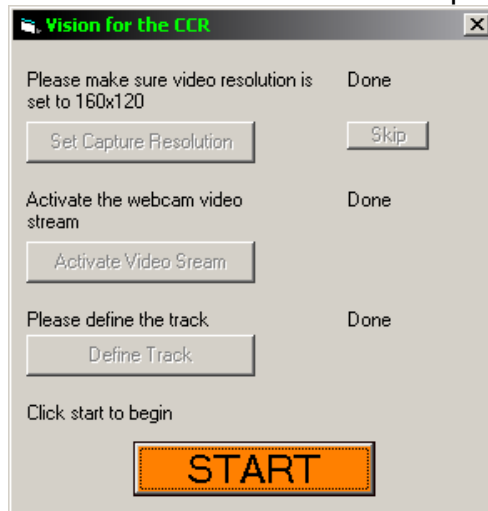
You will be prompted to define the track. Click **'Define Track'** To launch the track definition module



See Section 2 for instruction on how to define the track

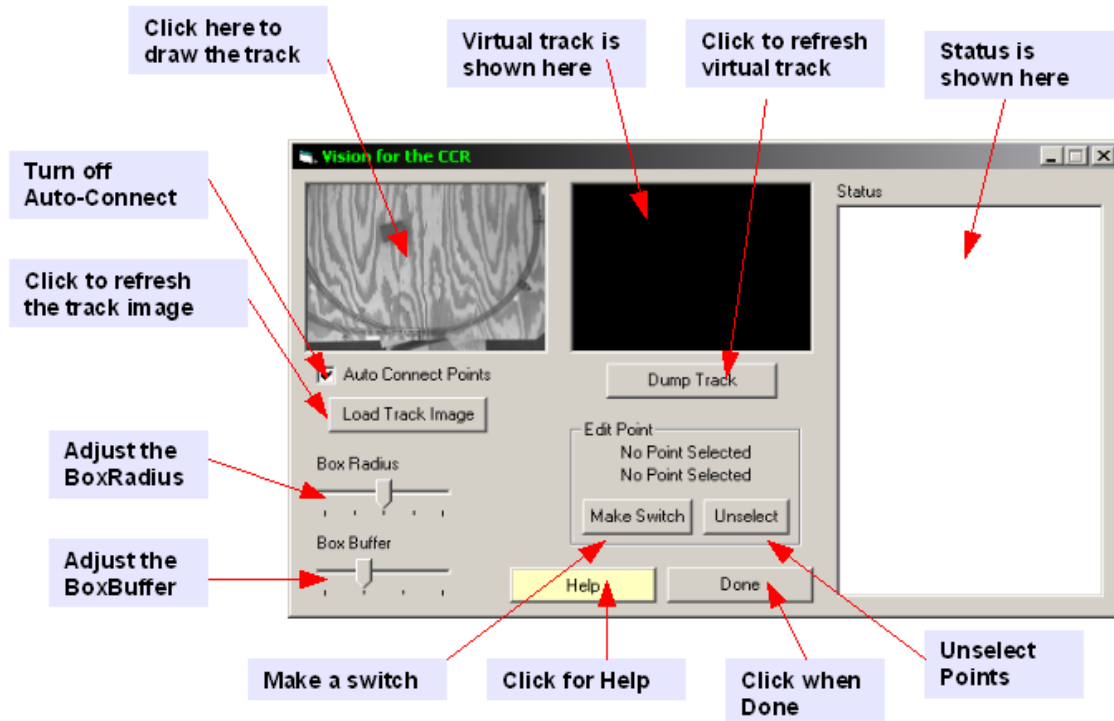
### 1.4 Launch the main program

After you define the track just click **'Start'** to launch the main program



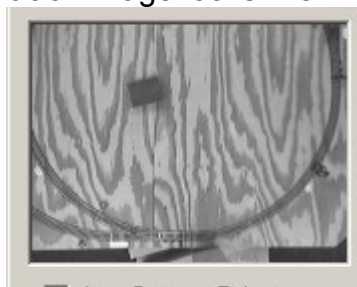
## Section 2 – Defining the Virtual Track

### 2.1 Learning the interface window

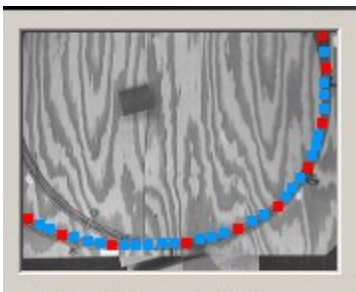


### 2.2 Defining Track Points

Make clicks in the track window to outline the track. You only need to click at points where the track shape changes (i.e. curves). The program will automatically connect these points with generated track points. Take care to draw the track in the direction that the trains will move. Here is what an undefined track image looks like.

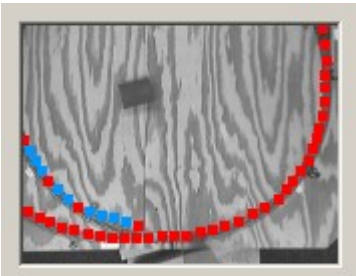


This is what it looks like after track definition. Note that the red points are user defined, the blue points are automatically generated by the program. You can monitor track point creation in the status window



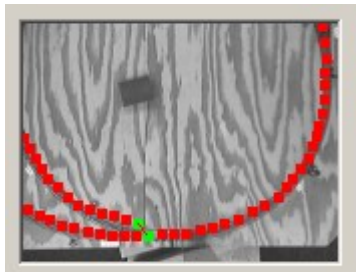
### *2.3 Defining separate sections of track*

First you must turn off auto connect. Then click to define the first point of the new section of track. Turn auto connect back on and continue to define the track as previously explained. In the following image a section of track was added the track we have been defining



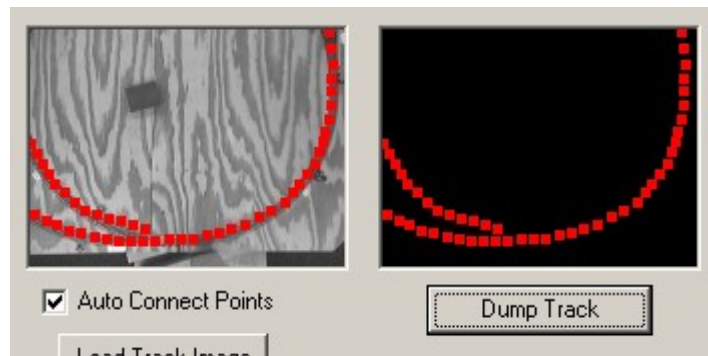
### *2.4 Defining track switches*

Select two track points by clicking on them. Again take care to preserve the direction of the switch. It goes from point one into point two. Selected track points will be drawn in green. After you have selected two points click '**Make Switch**' to establish a switch between them. In the following image a switch has been made to link the two sections of track.



## 2.5 Viewing the Virtual Track

The picture next to the track image will display the virtual track thus far. Click the picture itself or flick '**Dump Track**' to view the track you have defined thus far as demonstrated in this image.

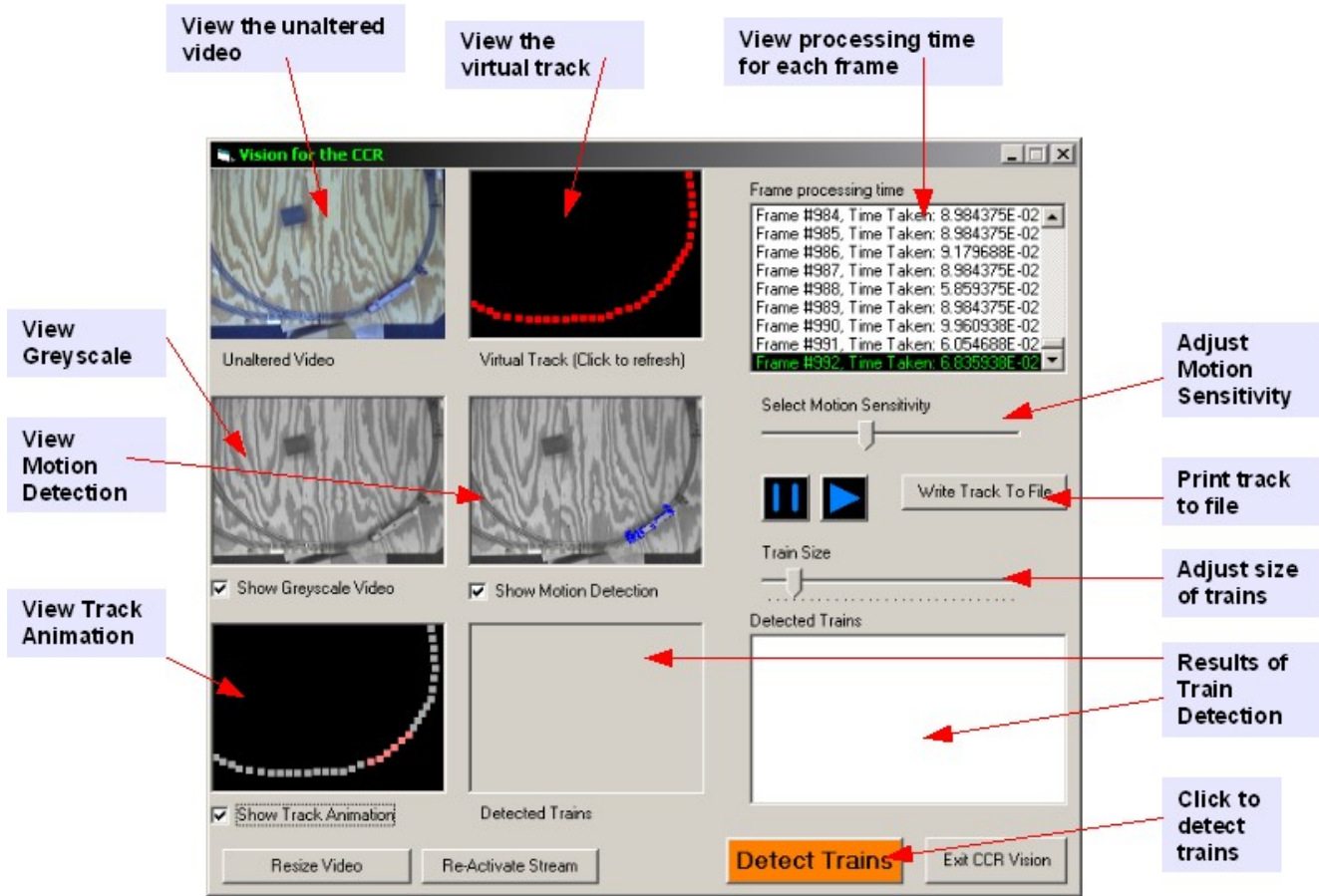


## 2.6 Finishing the track

When you are through defining the virtual track you may click '**Done**'

## Section 3 – Detecting Trains

### 3.1 Familiarize yourself with the interface



### 3.2 Turning Displays on and off

By clicking on the appropriate check boxes you can turn off the displays for greyscale, motion detection and track animation. This will improve performance. It is recommended that these displays be turned off if frame processing is too slow (less than .25 seconds) or if you do not need to view the information in those displays.

### 3.3 Status Display

The status display shows information on how efficiently frames are being processed. In the example frames are being processed in about  $8 \times 10^{-2}$  (0.08) seconds. Any time under 0.25 seconds is good.

### 3.4 Writing the track to a file

Click **'Write Track to File'**. This will open a standard windows save file box. Choose the path and type a filename for the track file. Track files use the .ccr extension.

### 3.5 Understanding and adjusting motion detection

The motion detection display shows all the motion detection in the image. Motion is displayed as blue pixels. The motion sensitivity needs to be set to a value that eliminates blue pixels when no actual motion is present (this is called noise). To calibrate the motion detection, make sure the motion detection display is turned on. Then set the motion sensitivity slider to zero. Move the slider up until no random blue pixels are seen in the image. When you reach this point the motion sensitivity is calibrated. The default value will work fine in most situations.

Note: if the program will not see trains as motion decrease sensitivity until it will.

### 3.6 Understanding and adjusting train size

Train size determines how many track points big a train is. This means any motion that does not meet this size will be discarded as not a train by the program. To adjust this move the train slider until an acceptable value is reached. The default of four works fine in most situations.

### 3.7 Play and Pause

You can click pause to stop the video stream and play to resume it.

### 3.8 Detecting Trains

Simply click 'Detect Trains' to detect any trains present. The results will be displayed in the results list box by showing the beginning and ending track point of the train. The motion that was used to detect these trains is displayed in the picture box next to it. Here we can see that one train was found

