**Tracking**

**source**

video-dev/utilities/util-track.cpp

**description**

* traffic640x480.avi
* extract 200 x 200 region of interest
* post-process foreground blobs (see post-processing)
* function to display tracking results:   
  void printTrackUpdate(cv::Mat trackImage, std::list<Track>\* pDebugTracks)
* write frame image files to home/counter/segment-motion:  
  post processing result: debug\_<frame#>.png  
  tracking result: track\_<frame#>.png

|  |  |
| --- | --- |
| ***Error #1 (solved)* splitted blobs must be assigned to same track**  [../../../../Users/Holger/counter/360%20-%20392%20with%20trailer/track%20debug](file:///D:\Users\Holger\counter\360%20-%20392%20with%20trailer\track%20debug) | |
| debug\_372.png | track\_372.png |
| debug\_381.png | track\_381.png |
| **possible Solution (372, 381):**   * for each new rectangle (rc\_new) * calc area of rectangle intersection (rc\_new && rc\_old) * if area\_intersect >= 75% \*area\_new | |

|  |  |
| --- | --- |
| debug\_161.png | track\_161.png |
| debug\_162.png | track\_162.png |
| debug\_163.png | track\_163.png |
| **possible solution (161, 163):**   * reduce confidence to max 2 🡪 old tracks will be deleted faster * combine existing tracks, if they move into same direction and their areas intersect (> 20%) * assign track with shorter history to longer track * keep track with longest length | |

|  |  |
| --- | --- |
| ***Error #2 (solved)* two cars moving in opposite direction must be better separated**  [..\..\..\..\Users\Holger\counter\054 - 067 two cars opposite\track debug](../../../../Users/Holger/counter/054%20-%20067%20two%20cars%20opposite/track%20debug) | |
| debug\_61.png | track\_61.png |
| debug\_62.png | track\_62.png |
|  | track\_63.png |
|  | track\_64.png |
|  | track\_65.png |

|  |  |
| --- | --- |
| debug\_384.png | track\_384.png |
| debug\_385.png | track\_385.png |

**possible solution:**

* maintain size and speed of rc1
* detect new vehicle rc2 (opposite) before separation

|  |  |
| --- | --- |
| ***Error #3 (solved)***  **new blobs must be assigned to spatially close track (error in 392)**  [..\..\..\..\Users\Holger\counter\360 - 392 with trailer](../../../../Users/Holger/counter/360%20-%20392%20with%20trailer) | |
| debug\_391.png | track\_391.png |
| debug\_392.png | track\_392.png |

***Requirement #4 (solved)***

**update only with newBlob, not with intersection of newBlob and lastTrackEntry**

|  |  |  |
| --- | --- | --- |
|  | **wrong**  \improve\_intersect | **right**  \wrong\_separation |
| debug\_61.png | track\_61.png | track\_61.png |
| debug\_62.png | track\_62.png | track\_62.png |

***Requirement #5 (solved)***

if **multiple newBlobs fit into lastTrackEntry** (see example below), then assign

* rightmost blob, if track moves to right
* leftmost blob, if track moves to left

Parameter: intersection area: 0.5 (does not work well with 0.75)

|  |  |  |
| --- | --- | --- |
|  | **wrong**  \ 2018-12-8\_16h\_1m\_18s | **right**  \2018-12-8\_16h-9m-27s |
| debug\_385.png | track\_385.png | track\_385.png |
|  |  |  |

***Requirement #6 (solved)***

if **track has left the scene** partially, then assign

* rightmost blob, if scene has been left on the right
* leftmost blob, if scene has been left on the left

|  |  |  |
| --- | --- | --- |
|  | **wrong**  \2018-12-8\_19h-50m-57s | **right**  \ 2018-12-9\_15h\_55m\_45s |
| debug\_62.png | track\_62.png | track\_62.png |
|  |  | **right**  \ 2018-12-9\_16h\_3m\_52s |
| debug\_385.png |  | track\_385.png |

***Implementation #6***

**Track::checkLeavingRoi**

* private enum: leavingRoiTo {none, left, right}
* trackHistory >= 4
* moving direction: right -> right edge of lastTrackEntry >= 95% \* roiWidth
* moving direction: left -> left edge of lastTrackEntry <= 5% \* roiWidth

***Requirement #7 (closed)***

track leaving roi AND inversing direction must be assigned as new track

intersection of two cars at the edge of roi can only be determined by velocity inversion

|  |  |  |
| --- | --- | --- |
|  | **wrong**  \2018-12-9\_17h\_1m\_36s | **right**  \ 2018-12-15\_16h\_21m\_34s |
| debug\_542.png | track\_542.png | track\_542.png |
| debug\_545.png | track\_545.png | track\_545.png |
| debug\_546.png | track\_546.png | track\_546.png |

***Implementation #7***

**Track::isReversingX**

* true if signBit(avgVelocity) != signBit(prevAvgVelocity)

**SceneTracker::deleteReversingTracks**

* check tracks that are leavingRoiTo left or right for reversing direction
* delete those tracks --> blobs will be assigned to new track in next update step