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SENSOR PROCESSING & DISPLAY SOLUTIONS

Technical Note

Tracking from Video in SPx Server

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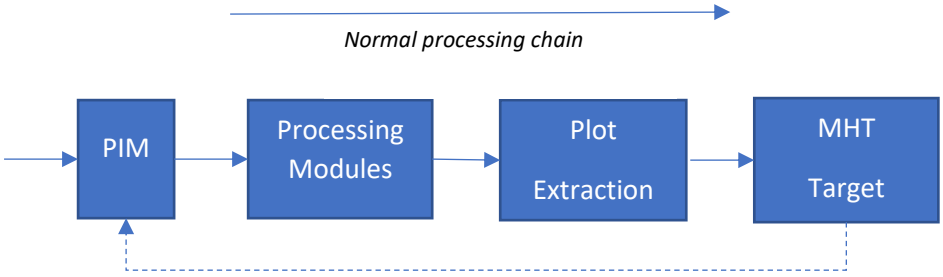
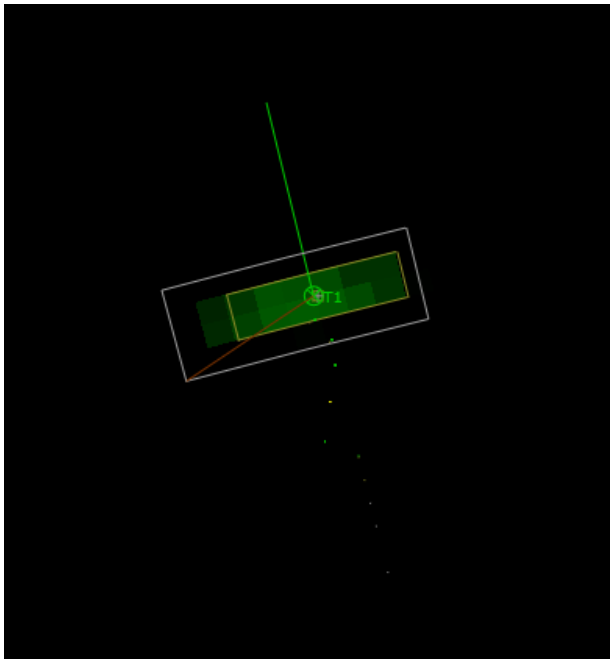
This note summarises a new feature in SPx Server V1.82, whereby tracking can be performed directly on the video without using a plot.

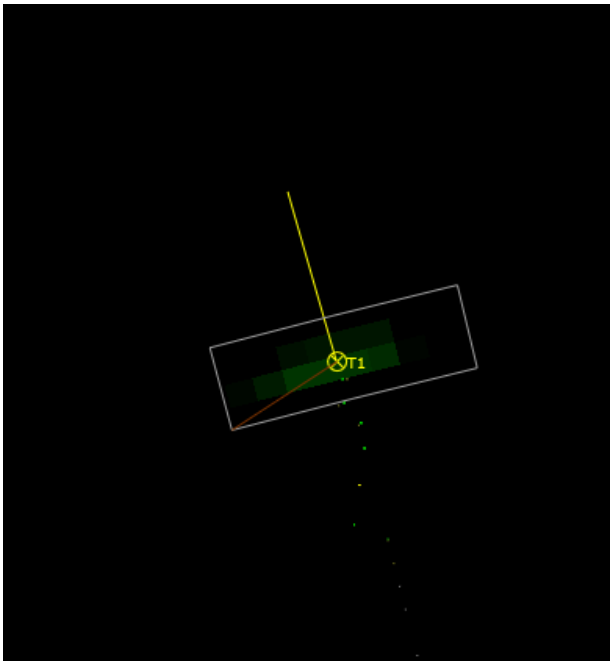
The normal behaviour of the MHT tracker is to update tracks using extracted plots. If no suitable plot is observed the track would be coasted, which means predicting the new position and speed based on the previous position and dynamics. Another mode of operation is now available to permit tracks to be updated directly from the radar video, without the use of plots. This can offer a useful enhancement to the tracking when the target becomes too small or weak to be reliably detected as a plot. Although the plot extraction process is defined by a set of parameters and those parameters can in principle be used to accept a plot of any size, there is typically a lower limit to the size of the plot that should be sensibly extracted. This avoids creating too many plots that would have performance implications. When the target becomes so weak that it is unable to create a plot it is still possible that the target is observable in the video as a small, low intensity signal. It is this signal that can then be used to update the track. This is Tracking From Video (TfV). The processing flow is summarised by the diagram below:



In TfV, the tracker goes back to the input PIM to read the raw radar video. This occurs when the TfV mode is enabled and no plot is received through the normal processing chain

In the examples show below, the left image shows a normal update of a track from a plot. In the right image there is no plot extracted, although there is clearly some target video in the search gate. With TfV enabled, the centroid of the video inside the track's gate is computed and this is used to update the position of the track. The updated track is shown in Yellow for a Video update instead of the normal Green for normal plot update.





One application of TfV is to extend the time of tracking of a target by permitting updates after plots are lost. However, the success of this depends on there being some low-level, intermittent target video present. If there is no video present then TfV will have no affect and the track will coast as normal. In this situation there is nothing lost by enabling TfV.

A more difficult situation arises when there is residual noise in the image and TfV might find *some* video above the mean and hence keep tracking even when that video cannot be sensibly related to the target. The danger of this is that a target continues to be "tracked" using noise, whereas without the TfV enabled the target would be correctly lost when it becomes indistinguishable from the background noise. It is this potential problem that is the reason why the processing will automatically raise the required video density after a TfV measurement. If it is background noise that is driving the update, the slow increasing of this threshold (demanding a more compact video pattern in the gate) will eventually force the rejection of the video updates. Conversely, if the TfV continues to be driven by a small, but compact target-like signal, the increasing of the threshold will have less effect.

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