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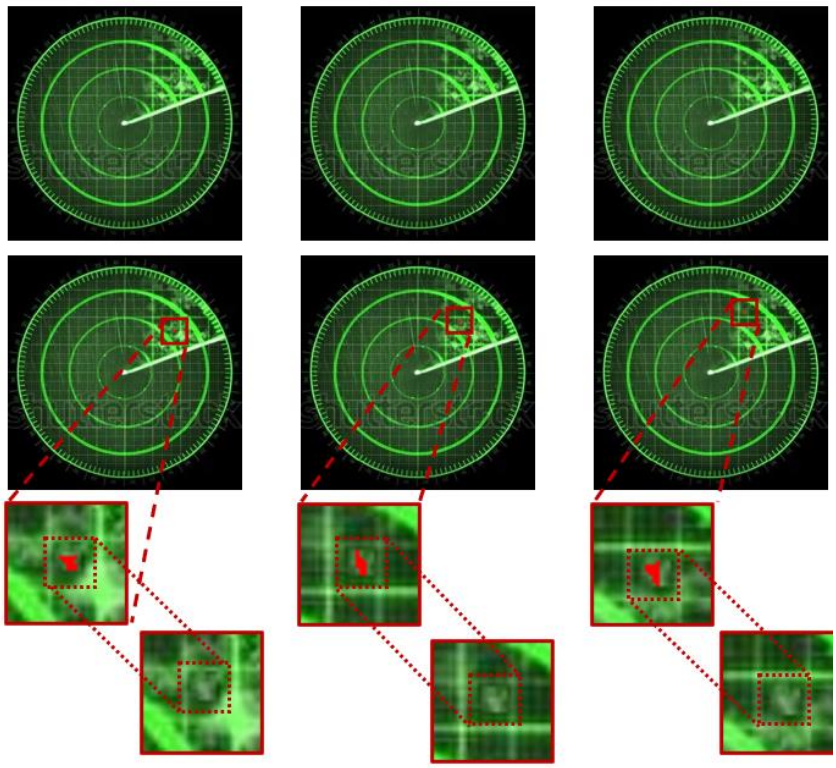
# PixMin Anomaly Detection from Displays: a case study

Sensor measurements routinely get presented as display readings to operators, who may not have time to find important but subtle changes in them. Monitoring display readings continuously with PixMin could alert operators with limited mind share to subtle changes, in time for them to take preventive action. Here are results from a pertinent case study based on radar displays.

The figure shows how we used PixMin to detect a subtle anomaly in a radar display. The top row shows snapshots from three consecutive radar scans with a target embedded in each snapshot. The middle row shows three resulting automatic target detection "discovery maps" that PixMin produced. The bottom row shows "discovery chips" that PixMin produced as well. As you can see, PixMin not only produced timely anomaly alerts; PixMin also showed where the anomalies occurred and how they looked.



In this and other applications, PixMin's unique edge machine learning (EML) continuously adapts to changing and differing background conditions, in ways that can be readily and transparently configured. Unlike cloud-based machine learning (CML), PixMin configuration requires no prior training from cloud servers and large training datasets. In this case, PixMin required no prior training at all. Unlike "hidden layer" models determined by CML training, PixMin EML models can be readily and transparently configured. Unlike CML-based event detection, we have specifically designed PixMin detection to a) run on edge-based processors with substantial speed, weight, and power (SWaP) limitations, and b) automatically adapt to changing conditions during continuous operation. Automatic adaptation ensures more precise detection with higher target hit rates and fewer false detections, which can occur too often in operational event detection applications. We have also designed PixMin to run quickly using low-level code that can readily run on low SWaP processors if necessary. In this case, PixMin detected the above anomalies in less than 10 msec per scan, running on a Pentium 5 laptop. If you have related needs, feel free to contact us.