



Enhanced DataMatrix Reader in 2.7

General Information

- Main Instructor Greg Brauhn
 - DVT Product Trainer
- Guidelines
 - Ask Questions
 - Ask for Help

Class Summary

- Description
 - Description of commonly used Barcodes
 - Overview of how to use 2D Barcode SoftSensors
 - Emulator Exercises
- Class Level
 - Basic
- Prerequisites
 - Basic FrameWork Training

Class Summary

- Related Topics
 - Positioning / Tracking Part
 - Lighting
 - Focus/images

What You Will Learn

- What's new in readers
- How to set up the 2D barcode SoftSensor
- Selecting and setting Searching parameters

Training

- Parameters are trained when the DataMatrix Reader is initially drawn
- As with all other Sensors that work through training or learning, you should use a good part (code) when training
- When training there are some parameters and characteristics about the code that are not necessarily directly related to the parameters exposed in the User Interface

Training

- Trainable parameters (auto-detect once)
 - Symbol Type
 - Symbol Size
 - Module Type
 - Mirror Image
 - Threshold
 - Sample Size
 - Physical Size in pixels based on Scale set
- Trainable parameters can be set by the user instead if it can not read upon initial training
- Trainable parameters can be set to always stay in auto-detect

Searching

- Parameters not trained (but fed back to sensor)
 - Max Skew
 - Min Border Integrity
 - Min Quiet Zone Integrity
 - Max Axial Nonuniformity
 - Probe Width
 - Clean Area
 - Min Gradient
- These can be set by the user to improve performance and robustness when searching code
- Physical Size in pixels can be set by the user

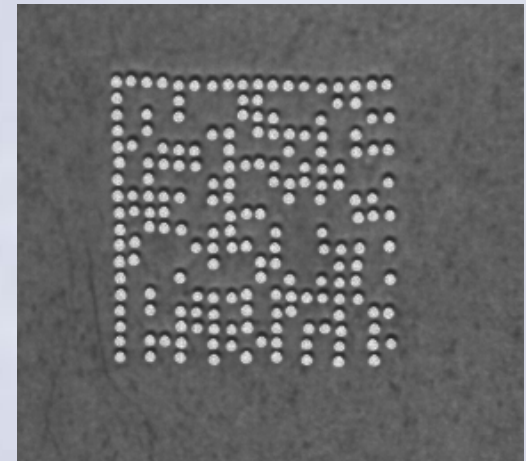
Searching

- Probing happens once in the middle of the searching area and then works its way down from the top
- Secondary probing is done to determine size and angle



Searching

- Increase Probe Width to avoid missing the code during initial probing (dot matrix codes)
- Decrease Clean Area when there is noise near the sides of the code
- Reduce Min. Gradient when contrast is not good



Searching

- If Fast Mode is selected only two sides will be probed and box will be determined based on learned size (this may go away)
- Set Max Skew when code seems to “lean” and the angles are not right angles anymore
- Lower Border Integrity when code is missing cells around the border, especially on the solid borders
- Increase Axial Nonuniformity when cells are not squared making one or more of the sides seemed more “compressed” or “stretched”

The screenshot shows the '2-D Reader Parameters: Sensor2' dialog box with the 'Advanced Parameters' tab selected. The dialog is divided into three main sections: Performance Options, Search Parameters, and Cell Sampling. The Performance Options section has a table with 'Modified Value' and 'Current Value' columns. The Search Parameters section includes a 'Trainable' checkbox and fields for 'Symbol Size' and 'Scale Variation'. The Cell Sampling section includes a 'Threshold Type' dropdown, a 'Sample Size' dropdown, and two 'Trainable' checkboxes. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Parameter	Modified Value	Current Value
Max Skew:	5 deg.	
Min Border Integrity:	70 %	
Min Quiet Zone Integrity:	85 %	
Max Axial Nonuniformity:	0.25	
Probe Width	3 pixels	
Clean Area:	10 pixels	
Min Gradient:	5.00 %	

Search Parameters

☒ Trainable

Symbol Size: Min 25 · Max 1000 pixels

Scale Variation: 10 % ☐ Fast Mode

Cell Sampling

Threshold Type: Histogram Thresh ☒ Trainable

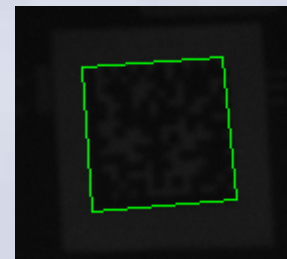
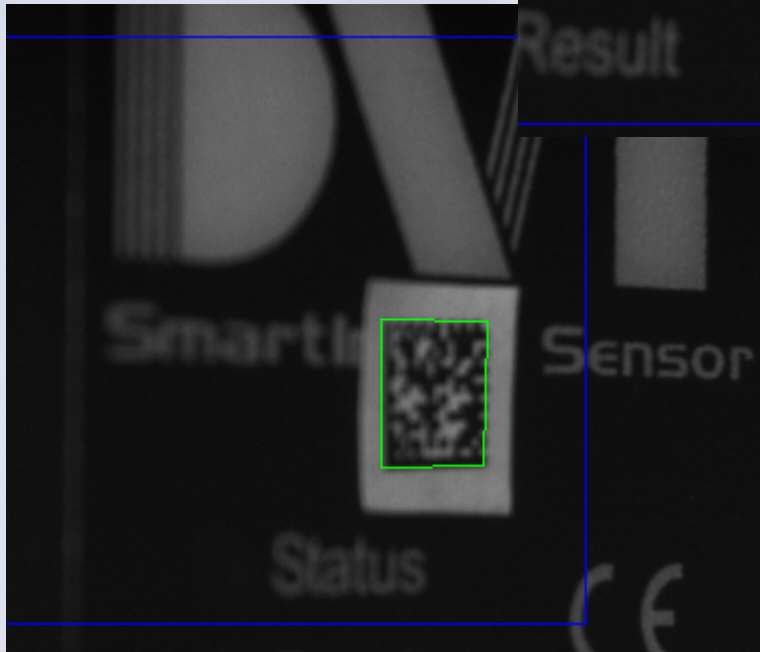
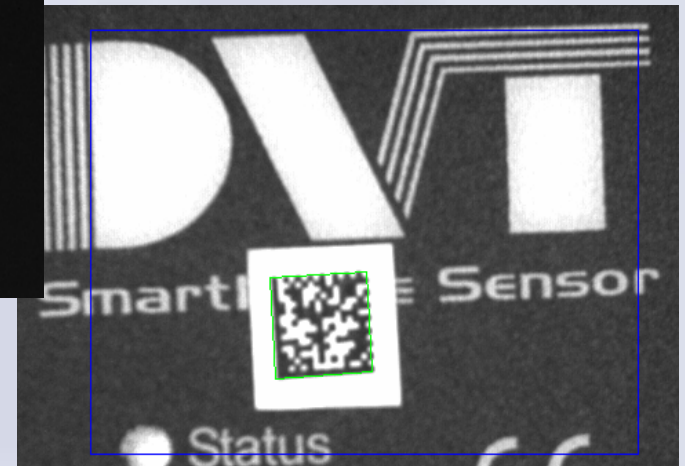
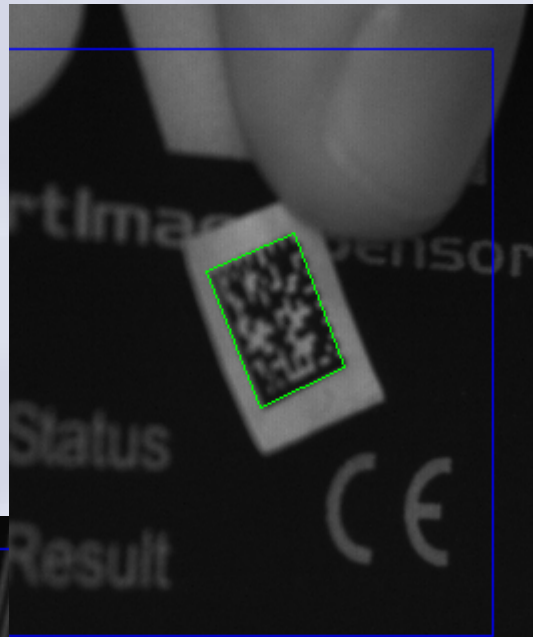
Sample Size: 3x3 ☐ Trainable

OK Cancel Apply Help

Robustness

- Threshold Types (this is for thresholding the code once a candidate has been found and determining which cells are on or off)
 - Histogram: A threshold is selected so that it divides the histogram in two halves
 - Local Comparison: Takes intensity values of 24 surrounding cells and calculates a threshold
 - Combination: It tries to combine two previous methods so that at different areas, different methods could be used
 - All Three: (Usually gives best result although it will increase processing time)
- Increase Sample Size when cells are small (e.g. dot peened) (Default of 3x3 should be enough for most cases)

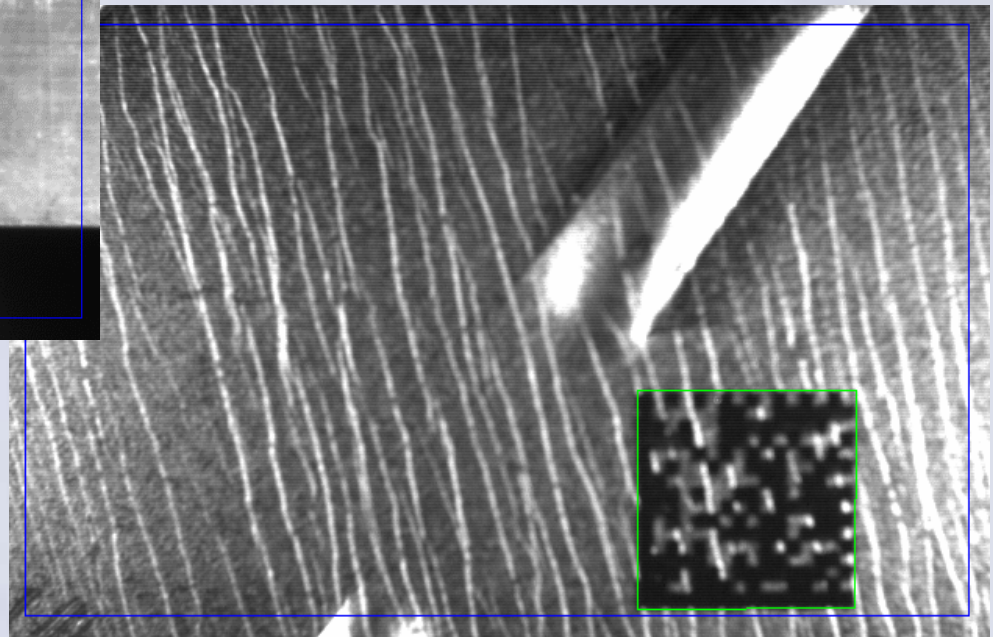
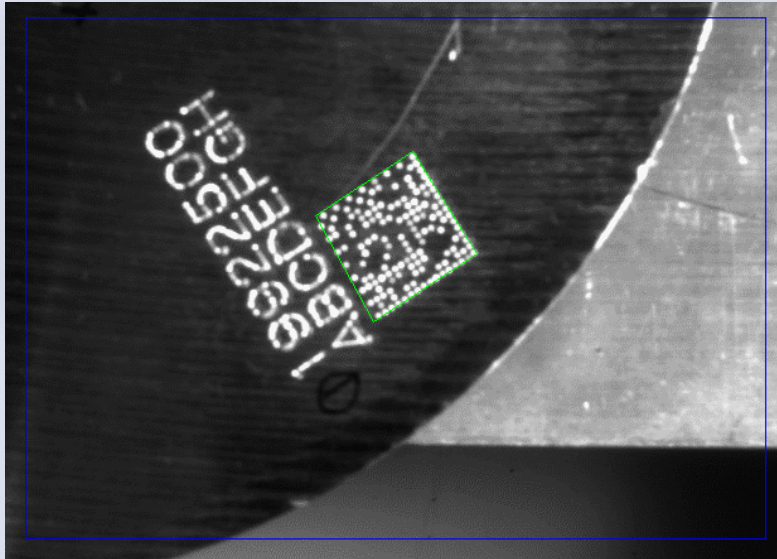
- Examples



Conclusions

- Most of the “Noise” In the search area, is ignored
- Able to read in a wide range of light intensities, and low contrast values
- Changing parameters, Min Gradient and Sample size enhances the readability of the SoftSensor

2D Readers Workshop



Questions?