SNIA | Data, Storage & Networking

From Data to Decisions: Understanding How AI Models Learn

Live Webinar
December 10, 2025
10:00 am PT / 1:00 pm ET


Cal Foshee
IBM


Eric Gamble
IBM


Erik Smith
Dell Technologies

Today's Presenters

Erik Smith
Distinguished Engineer
Dell Technologies
Moderator

Cal Foshee
Storage Procurement Engineering Manager
IBM

Eric Gamble
AI Technologist
IBM

 ©SNIA. All Rights Reserved.

The SNIA Community

200
industry leading organizations

2,000
active contributing members

50,000
IT end users & storage pros worldwide

 ©SNIA. All Rights Reserved.

SNIA | DSN A SNIA Community

SNIA | Data, Storage & Networking

What We Do

Drive the awareness and adoption of a broad set of technologies, including:

- Storage Protocols (Block, File, Object)
- Traditional and software-defined storage
- Disaggregated, virtualized and hyperconverged
- AI, including storage and networking considerations
- Edge implementation opportunities and factors
- Storage and networking security
- Acceleration and offloads
- Programming frameworks
- Sustainability

How We Do It

By delivering:

- Expert webinars and podcasts
- White papers
- Articles in trade journals
- Blogs
- Social Media
- Presentations at industry events

 ©SNIA. All Rights Reserved.

Logistics

- The slides are available under the attachments tab at the bottom of your console.
- Questions are welcome!
- Please rate the session and provide feedback!
- Want more sessions like this or other topics, let us know!
  - JOIN US! We meet on Thursday mornings at 11:00 AM eastern.
  - Email dsn-chair@snia.com if you have questions.

 ©SNIA. All Rights Reserved.

SNIA Legal Notice

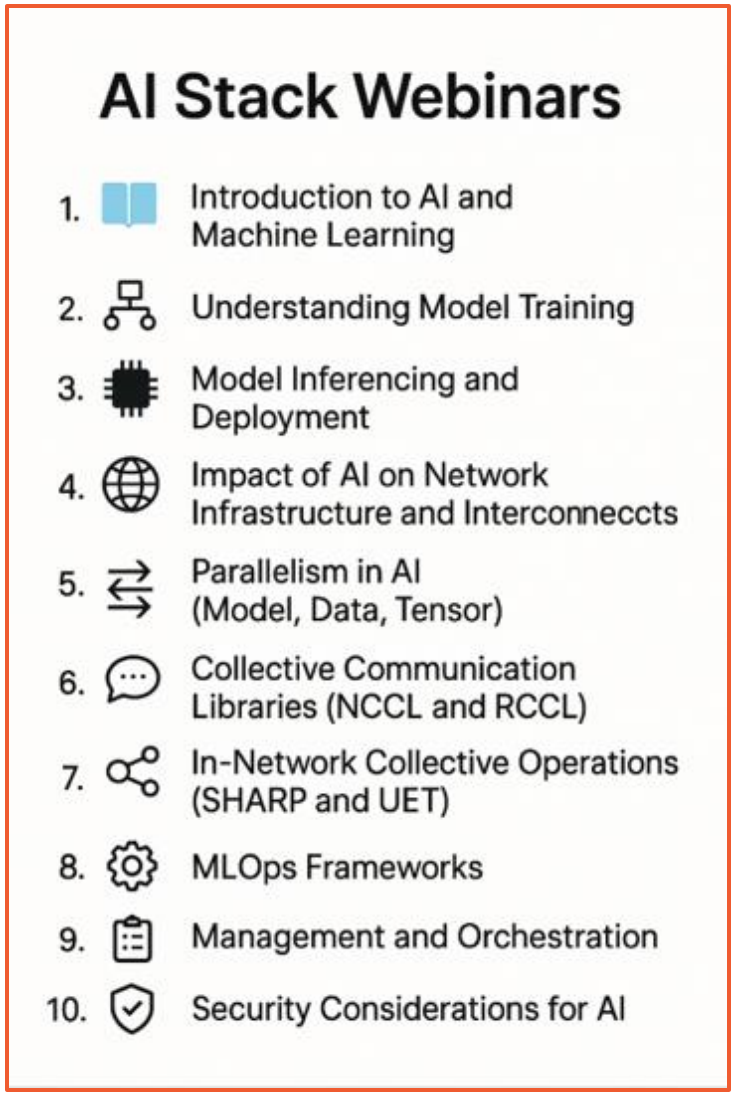
- The material contained in this presentation is copyrighted by SNIA unless otherwise noted.
- Member companies and individual members may use this material in presentations and literature under the following conditions:
  - Any slide or slides used must be reproduced in their entirety without modification
  - SNIA must be acknowledged as the source of any material used in the body of any document containing material from these presentations.
- This presentation is a project of SNIA.
- Neither the author nor the presenter is an attorney and nothing in this presentation is intended to be, or should be construed as legal advice or an opinion of counsel. If you need legal advice or a legal opinion please contact your attorney.
- The information presented herein represents the author's personal opinion and current understanding of the relevant issues involved. The author, the presenter, and the SNIA do not assume any responsibility or liability for damages arising out of any reliance on or use of this information.

  NO WARRANTIES, EXPRESS OR IMPLIED. USE AT YOUR OWN RISK.

 ©SNIA. All Rights Reserved.

The “AI Stack” Webinar Series

- Building a Strong Foundation for All Experience Levels:
  - Starting from the basics
  - Building steps-by-step
  - Connecting theory to practice
  - Demonstrations
  - Preparing for real-world challenges



 ©SNIA. All Rights Reserved.

Agenda

- What is Computer Vision
- Understanding Model Architectures
- Modeling Error & Minimization
- Computer Vision Workflow
- Collect/Create Model Data
- Train and Test Model
- System of Simple Models
- Functional Demo
- Learn from Model & Tune Model

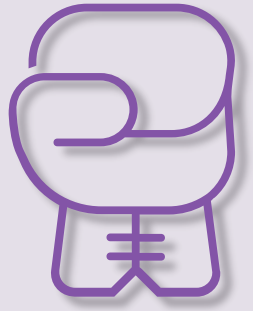
 ©SNIA. All Rights Reserved.

AI Modeling: Useful > Perfection

- **Useful = Outcome Based**
  - Time to Value
  - Cost ($)
  - Opportunity Cost
  - Risk
  - Adaptability

"Good Enough" Is a Thing!

"All models are wrong but some are useful." – George Box



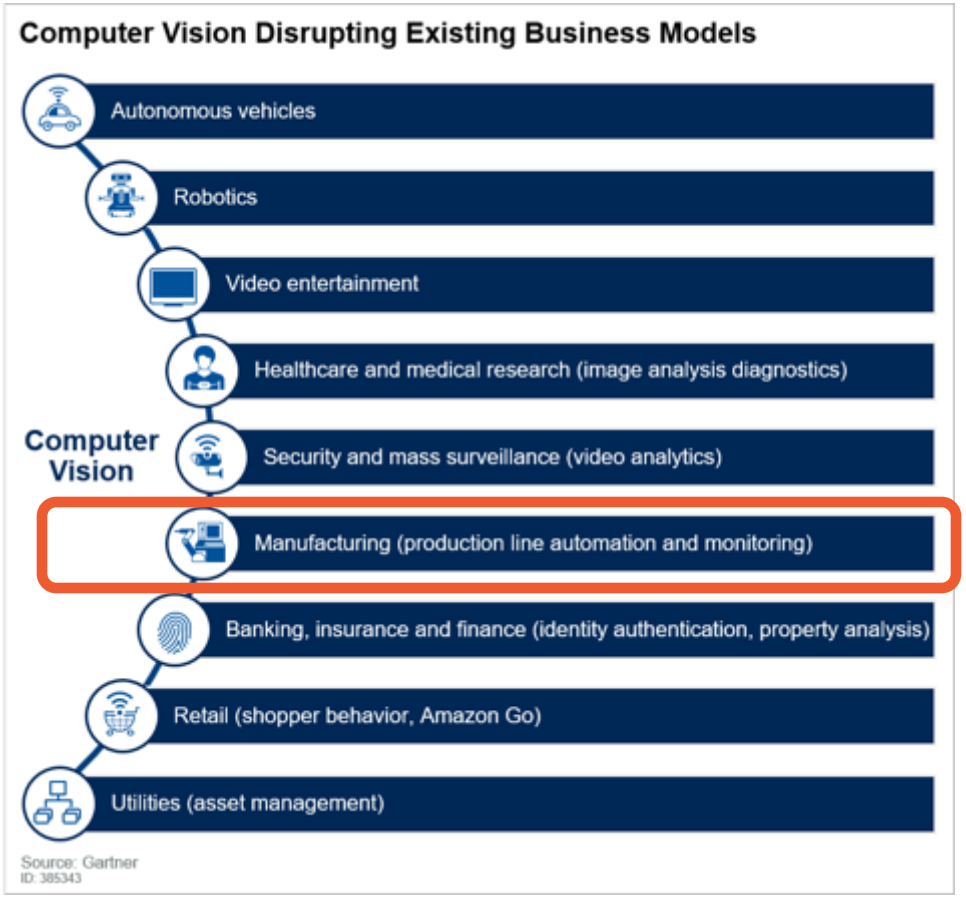
Statistics **vs.** **UFC Modeling**

 ©SNIA. All Rights Reserved.

Computer Vision Value Trends

Computer Vision Applications

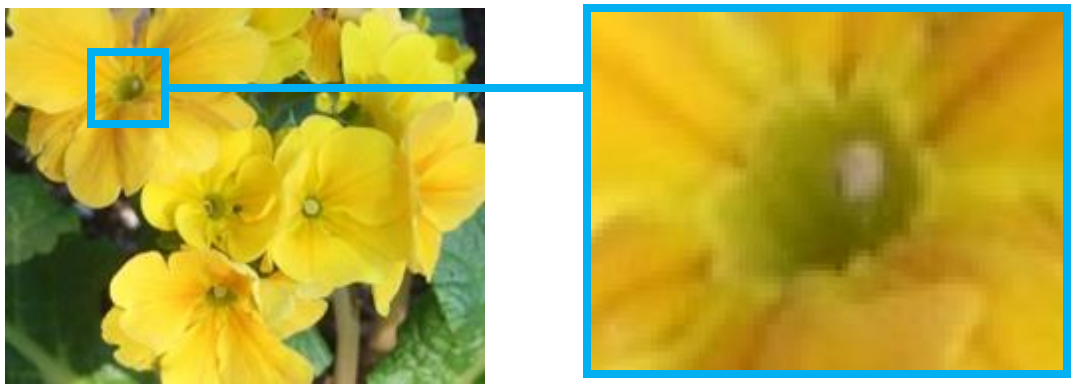
- Runs 24x7 with minimal breaks.
- Capable of “Transfer Learning”.
- Capable of detecting pattern changes as low as 4 pixels… but works much better with a larger number of pixels.
- Key enablement technology for Industry 4.0, Internet of Things (IoT).
- Not a replacement for humans; however, productivity gains and changes can create new value paths for employees.
- Can work with other AI models to accomplish more complex tasks.



 ©SNIA. All Rights Reserved.

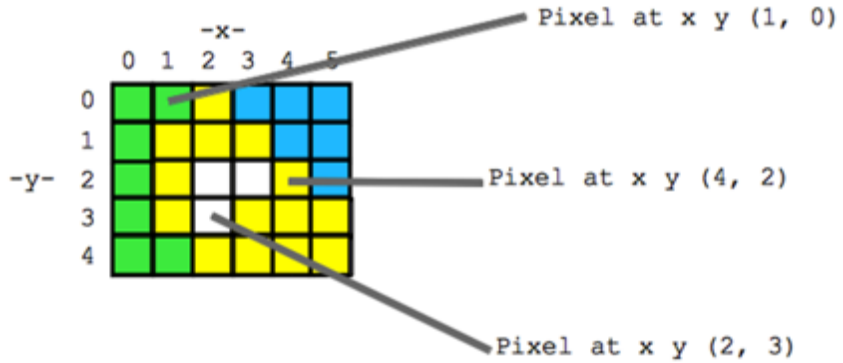
AI Models: Through the Eyes of AI

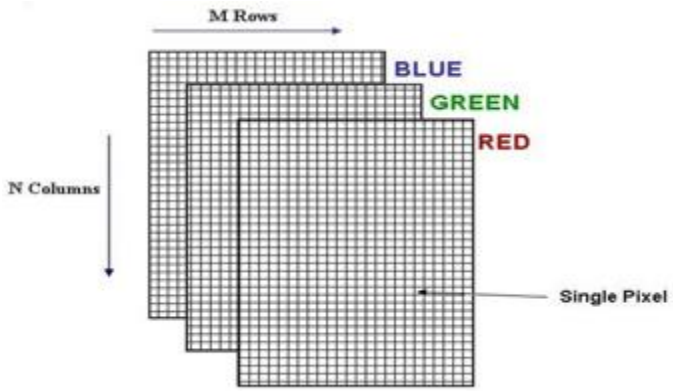
Computer Vision – Pixels to Predictions



Color	Red number	Green number	Blue number
red	255	0	0
purple	255	0	255
yellow	255	255	0
dark yellow	100	100	0
white	255	255	255
black	0	0	0

RGB Color Encoding





Pixel Color Arrays

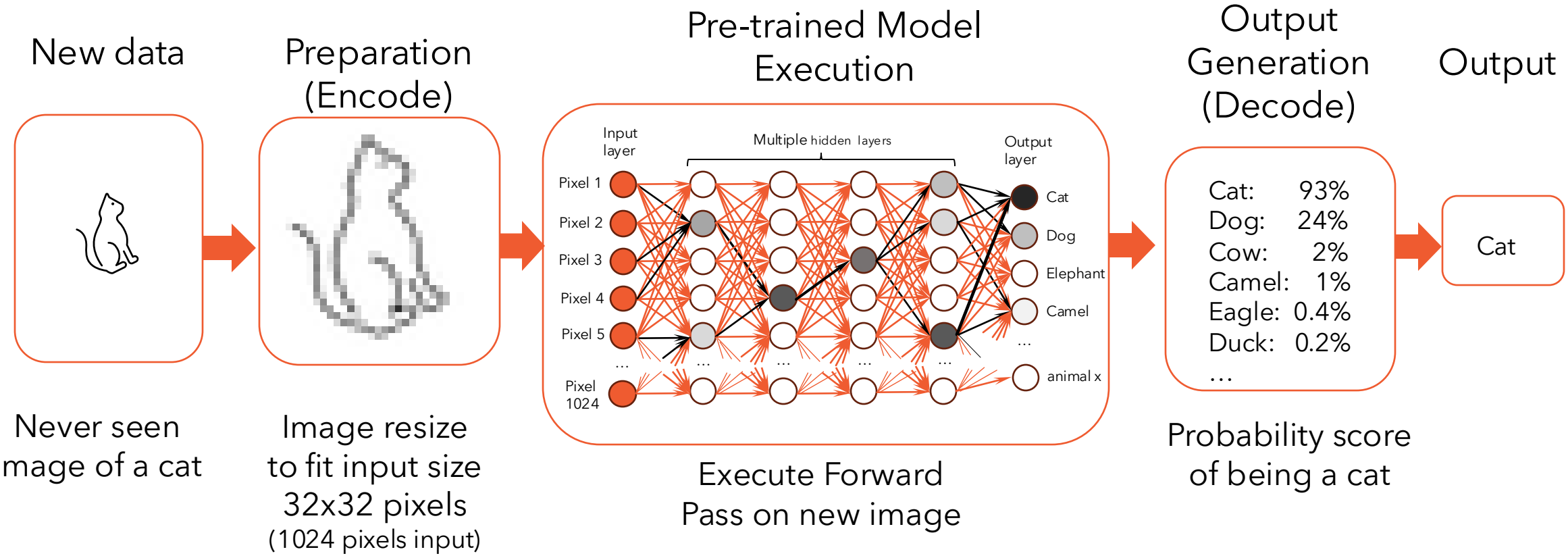
 ©SNIA. All Rights Reserved.

SNIA DSN A SNIA Community

Previous Webinar... What is Inference – Computer Vision

Inference in Artificial Intelligence is the process where a pre-trained AI model uses its learned knowledge to analyze new, unseen data to generate predictions or conclusions.

Let's use image classification as an example.



 ©SNIA. All Rights Reserved.

SNIA | DSN A SNIA Community

Common Detection Model Types

Image Classification has an input image and output class label to which the image belongs to.

Object Detection similar, and with localization to locate classes (via bounding boxes for classes).

 ©SNIA. All Rights Reserved.

Become a Great Golfer

- **AI Tools vs. Modeling Skills**
  - Evaluate/Understand Shiny New Clubs
  - YOLO v3, YOLO v8, YOLO v11
  - Consider Licensing Fees
  - Error Exists – Always Will
  - We Can Minimize Error
  - We Can Redirect Error
  - Accelerate & Expose “Hallucinations”
  - Anticipate & Seek “Blindspots”

A Bad Golfer with Shiny New Clubs…
Just a Fancier Bad Golfer.

 ©SNIA. All Rights Reserved.

Learn to “See” Like the Models

Assumptions vs. Reality

ORIGINAL

YOLO v3

Matrix Fitting:

True Geometry vs. Pixel Stretching

YOLO v8

 ©SNIA. All Rights Reserved.

What Do the Algorithms "See"?

Down-Sampling

ORIGINAL

OBJECT DETECTION
640px X 640px

CLASSIFICATION
224px X 224px

 ©SNIA. All Rights Reserved.

SNIA | DSN A SNIA Community

What Happens to a 12MP Image?

Full Inspection Image

Full Resolution

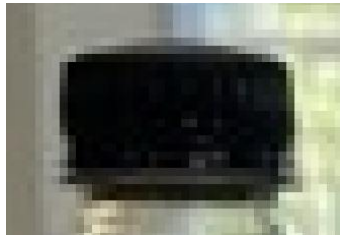
3024 pixels

YOLOv3

608 pixels

Classification

224 pixels



 ©SNIA. All Rights Reserved.

Now You See It, Now You Don't

Limitations of Pixel Up-Sampling – Information Gain or Loss?

608 pixel original

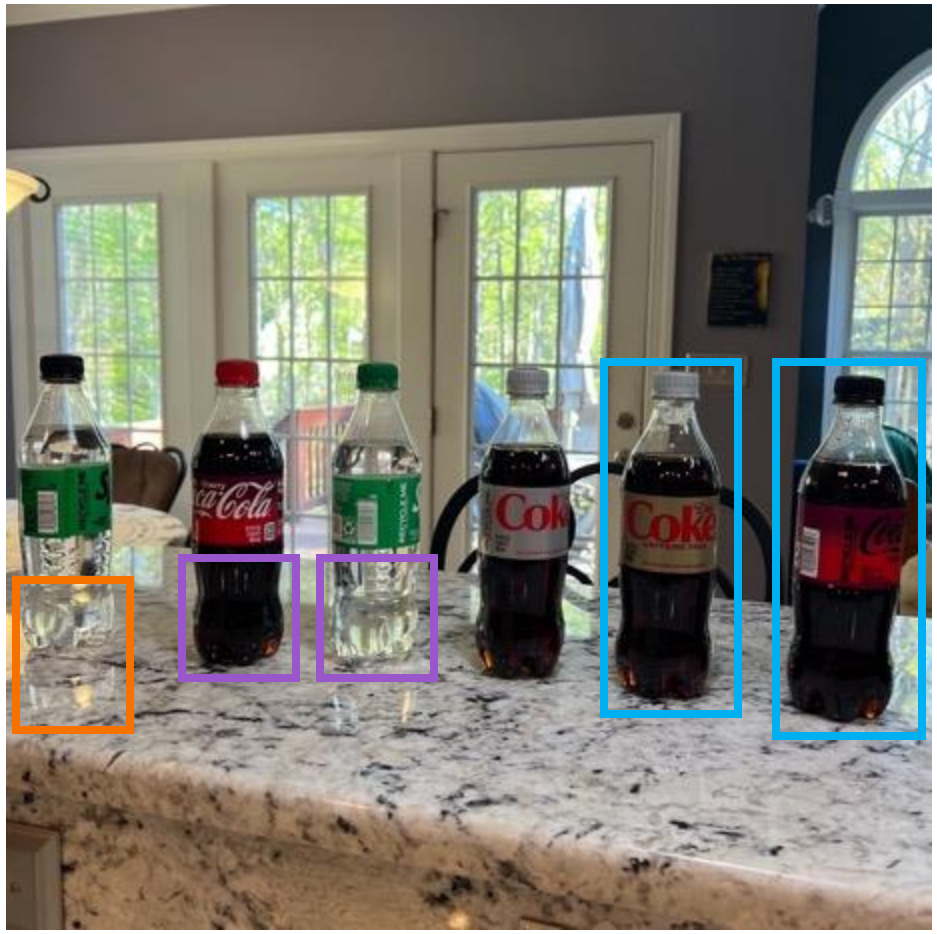
Down-Sample to 224 pixels

Restore to 608 pixels

 ©SNIA. All Rights Reserved.

AI Models: Thinking in Patterns

- **Signal vs Noise – Selecting Patterns**
  - Localization (Isolation)
  - Margining
  - Pattern Reinforcement
  - Pattern Confusion
  - Anticipating Potential Error



 ©SNIA. All Rights Reserved.

Context Is a Function of Modeling

Machine Learning Doesn't Know Good, Bad, Right, Wrong…

Doesn't Know Left, Right, Up, Down

Easily Confused by Similar Pixel Patterns

 ©SNIA. All Rights Reserved.

SNIA | DSN A SNIA Community

AI Models: Context (BYOC)

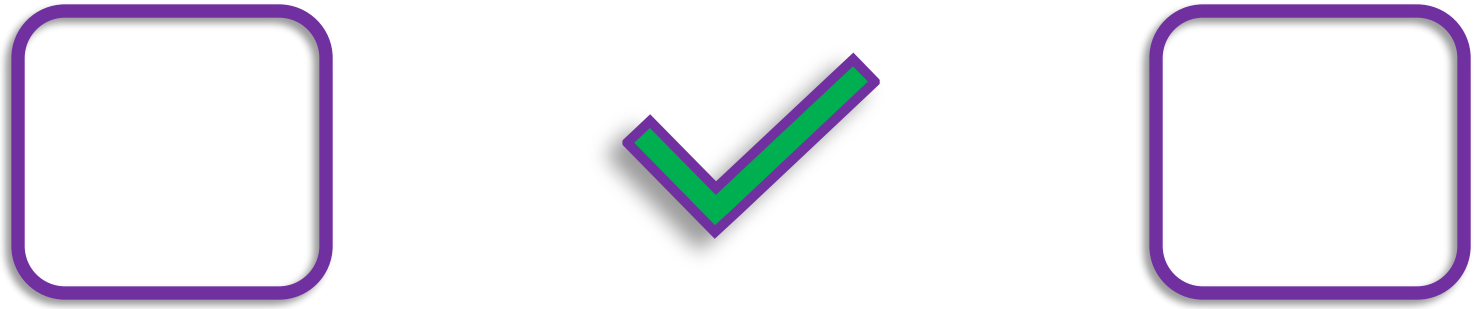
- **Modelers, Bring Your Own Context**
  - Don’t Jump the Shark with Assumptions
  - Simplify Your Thinking (Much Lower)
  - Create Context in Your Model Patterns
  - Don’t Cling to Bad Patterns, Adjust & Pivot
  - Models Don’t Know “Good”, “Bad”, “Right”, “Left”, “Should”, “Should Not”…

Patterns and Context Need to Pass the “Dog Test”.

 ©SNIA. All Rights Reserved.

Team of Specialists vs. One Big Brain

- **Survey for Those Who Code (Including "Light Coders”)**



Many Modular Pieces of Code, Joined Together in a System

One Big Code Stack

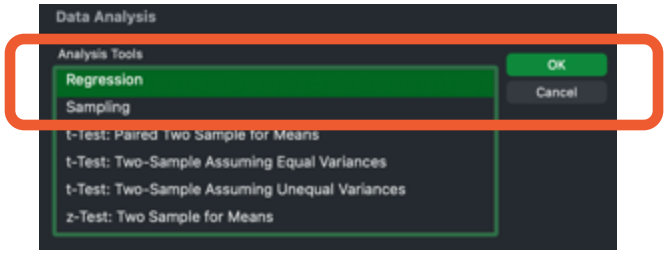
- Includes Creation, Collaboration with Others.
- Includes Testing, Debug, Version Control.
- Includes Maintenance, Management, Release Updates.

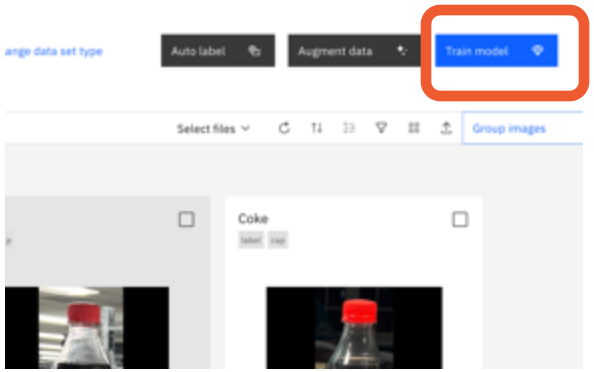
 ©SNIA. All Rights Reserved.

Beware… The “Easy Button”

- **Anyone Can Click "The Button"… Train a Model**
  - Will it be a good model?
  - Will it be a useful model?
  - How do we interpret the training metrics?
  - Can "The Button" transform a bad golfer?

Don’t Train a Model Without a Use Case Strategy.



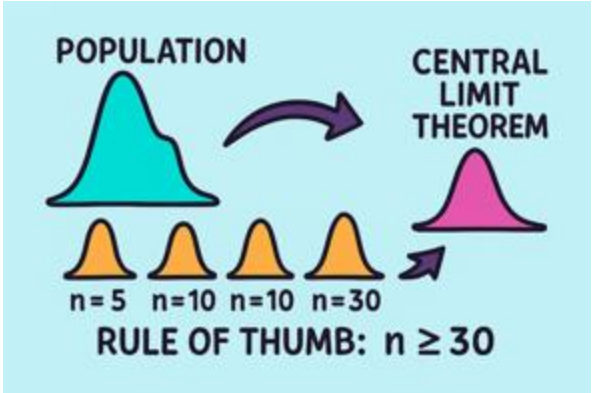


 ©SNIA. All Rights Reserved.

SNIA | DSN A SNIA Community

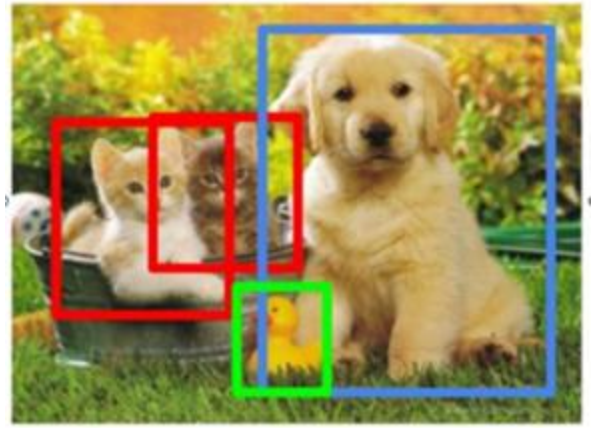
How Much Input Data?

- **"In Theory"...** 5 images inclusive of each object label.
- **"In Reality"...** more is better.
- **"In Practicality"...** process representative, balanced, and consider the cost of getting images... and central limit theorem concepts still hold on sampling.



Recommendation: 15 to 30 images inclusive of each object label, balanced if possible.

- 16 cats, 20 ducks, 22 dogs (balanced enough)
- Lighting, background color, multiple objects per image
- Capture angle, object variations (color, size, shape), reflections.



Input Data Planning is Important to Use Case Strategy.

 ©SNIA. All Rights Reserved.

Computer Vision Workflow

- Select a Use Case
- Select a Camera

Modify as Needed

- Capture Images
- Train a Model
- Test the Model

Iterate as Needed

- Deploy the Model
- Learn from the Model

Monitor and Tune as Needed

 ©SNIA. All Rights Reserved.

Use Case Selection & Prep:

- **Select an Actual Need or a Problem Situation.**
  - Can I physically see what I want to inspect?
  - Can I clearly define an Inspection Strategy for this?
  - Is there a clear business value in doing this inspection?
- **Determine an Imaging Strategy.**
  - What are the camera mounting & placement options?
  - How much variation is normal in the field of view (FOV)?
  - What obstructions or background issues are present?
  - Take many images: vary angles, position, zoom, lighting.
  - Identify all workable options; prioritize the simplest.
- **Collect Sample Images Following Imaging Strategy.**

✓ **Image collection should be process representative.**

 ©SNIA. All Rights Reserved.

Inspection Strategy & Design:

- **What Are the Inspection Requirements?**
  - Presence Detection? Counting?
  - Configuration Correct (Correct/Incorrect Part, Color)?
  - Assembly Correct (Position, Orientation)?
  - Unwanted Objects (Scratches, Packaging)?

- **Inspection Output?**
  - How do we want Inspection results to appear?
  - What Inspection alert behavior do we want?

✓ **Inspection Strategy** is how we assign context to the ML.

✓ Before modeling, we need an **Inspection Design**.

✓ We can **reduce iterations** with extra planning here.

 ©SNIA. All Rights Reserved.

Computer Vision Example: Part 2

Selecting the CES 2020 Demo

- Object Detection Model Type
- Simulate an Assembly Defect
- Multiple Defect Types
- Introduce Counting
- Stage for Rapid Implementation

 ©SNIA. All Rights Reserved.

Computer Vision Workflow

- Select a Use Case
- Select a Camera

Modify as Needed

- Capture Images
- Train a Model
- Test the Model

Iterate as Needed

- Deploy the Model
- Learn from the Model

Monitor and Tune as Needed

 ©SNIA. All Rights Reserved.

Capturing Images:

- **Things to Consider**
  - Capture enough images to be representative of the variations typically seen
  - What are the failure modes? What does "good" look like?
  - Are there different sizes, colors, positions?
  - Does the lighting change during the day?
  - What is happening in the background?

- ✓ Before Training the model, **hold a few images to test** it with after it's trained.
- ✓ We can **save time** with extra planning here.

 ©SNIA. All Rights Reserved.

Training and Testing Models:

- **Steps for Training a Model**
  - Select your model type
  - Set your model parameters (iterations, training partition, etc)
  - Let it train

- **Steps for Testing a Model**
  - Look at the application's internal metrics
  - Deploy the model and test it with the image held from the Image Capture Phase
  - Look for missed inferences
  - Look for incorrect inferences
  - Look for low-confidence inferences

✓ **First Pass Models are rarely Final Pass Models;** Don't be against iterating

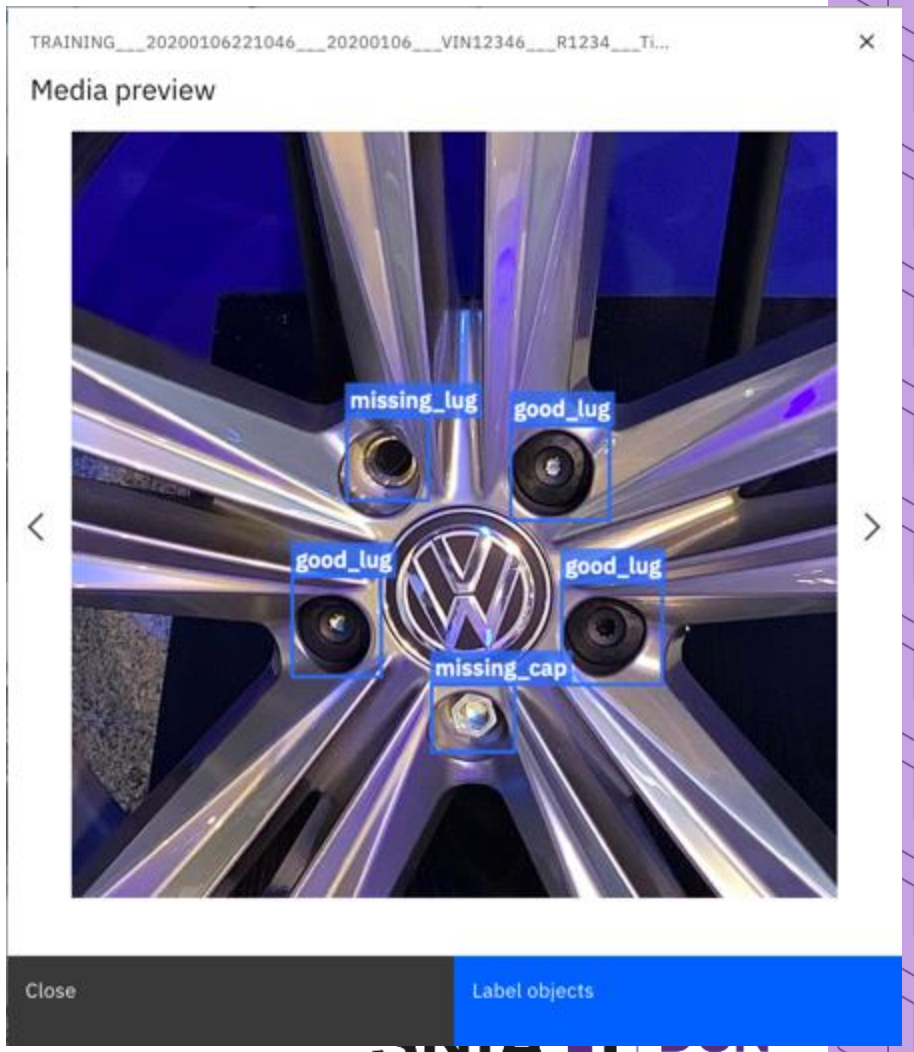
✓ Deploy an imperfect model for **real-world testing**

 ©SNIA. All Rights Reserved.

Computer Vision Example: Part 3

Building the CES 2020 Model

- Collected 68 images on site.
- Varied the “defects”.
- Included “good” images.
- Varied the camera angle, rotated wheel.
- Trained 3 “Object Types” using Object Detection algorithm.
- Model was prepared and deployed ~2 hours, demo for 5 days at CES 2020 in Las Vegas.



 ©SNIA. All Rights Reserved.

Computer Vision Workflow

- Select a Use Case
- Select a Camera

Modify as Needed

- Capture Images
- Train a Model
- Test the Model

Iterate as Needed

- Deploy the Model
- Learn from the Model

Monitor and Tune as Needed

 ©SNIA. All Rights Reserved.

Deploying and Learning From Models:

- **Deploying the Model**
  - Deploy your model in the real-world to test it
  - Let it run long enough to get a wide range of possible scenarios
  - Check through the data to determine misses and errors
  - Decide on inspection rules to compliment the models outputs

- **What You Can Learn**
  - Are there unaccounted for events or failure modes?
  - Do defects cluster?
  - Are there patterns that were previously overlooked?
  - What needs to be adjusted for the next iteration?

✓ Keep an eye out if the model and inspection **can do more**

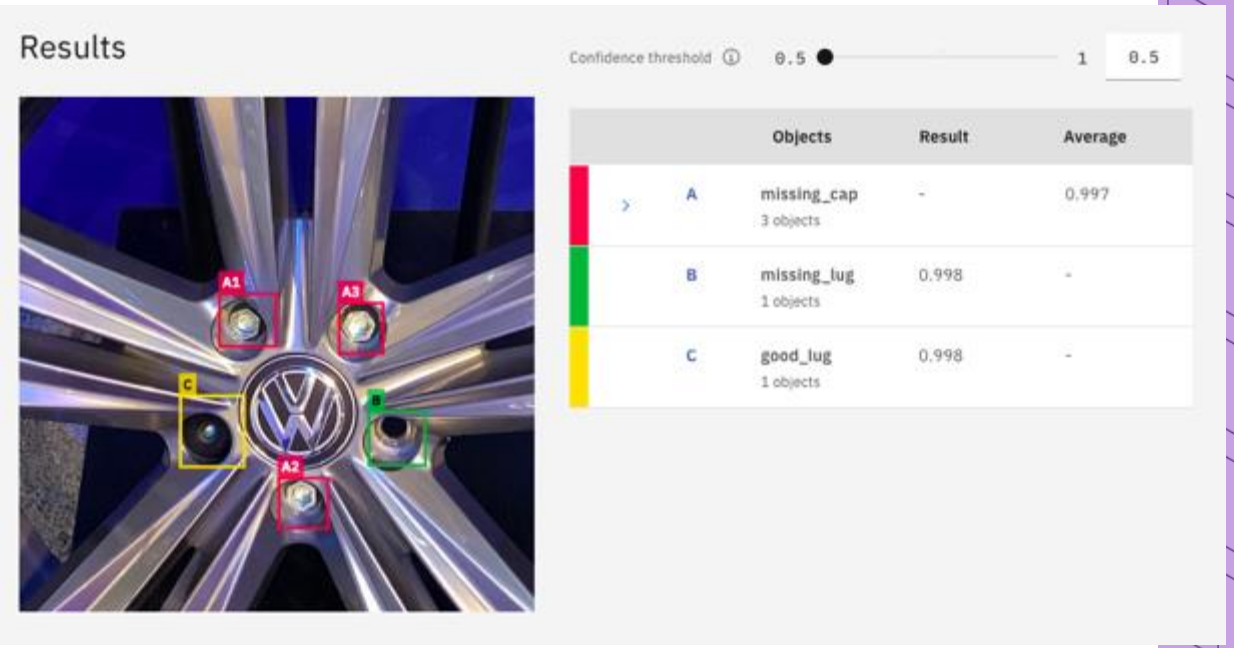
✓ Even **"Final Pass"** models should be re-evaluated after a period of time

 ©SNIA. All Rights Reserved.

Computer Vision Example: Part 4

Deploying the CES 2020 Model

- Images taken on iPhone.
- Images are “scored” 1 at a time.
- Objects are identified with a confidence for each object.
- Results are shown on the User Interface.
- Results are sent as an API response to the iPhone and iPad using IBM’s app.



 ©SNIA. All Rights Reserved.

SNIA DSN A SNIA Community

System of Simple Models

What is a System of Simple Models?

- Multiple models that each do 1 or 2 things and are linked together
- Some models can be turned on or off as needed
- More models can be added to expand the scope of the inspection

 ©SNIA. All Rights Reserved.

System of Simple Models

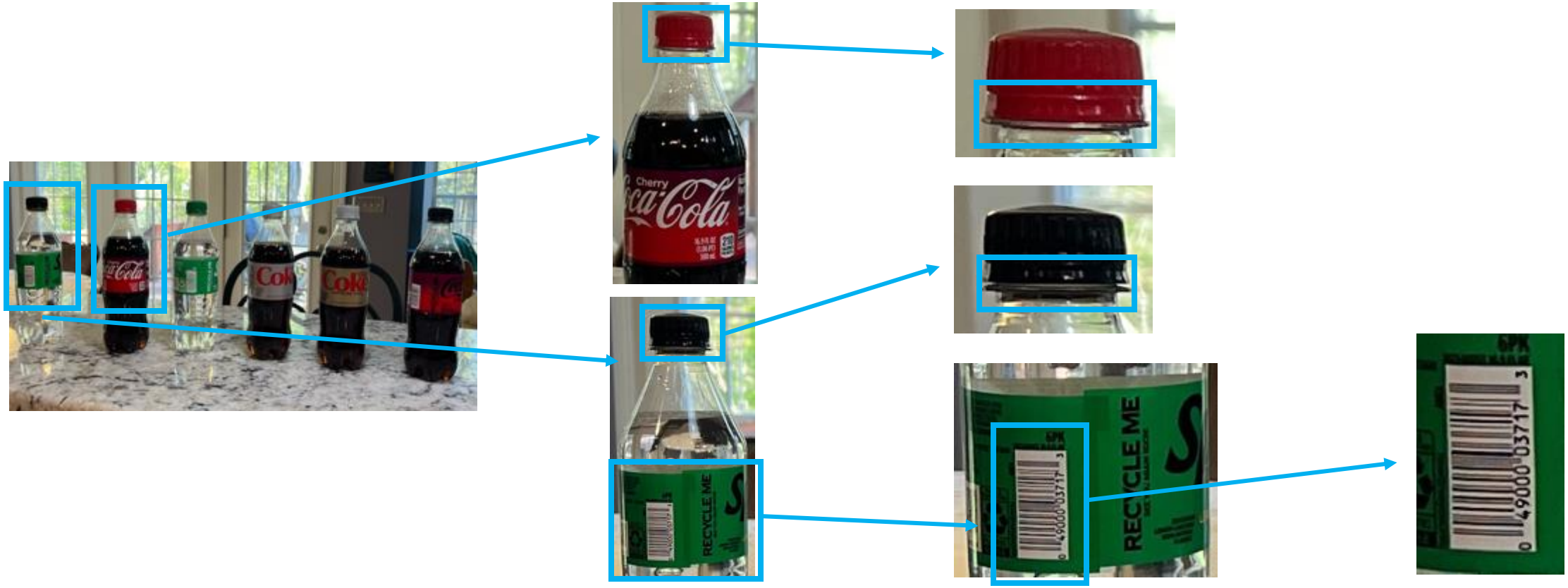
Why a System of Simple Models?

- It's easier to have multiple models that do one thing well, than one model that does multiple things well
- Modularity = Flexibility
- Faster Iterations
- Better Scalability
- Reduction of Noise and Increase in Signal

 ©SNIA. All Rights Reserved.

Systems of Model Example

- Build AI inspections with systems of simple models.
- Each AI stage has a specific task that it becomes really good at.
- Each AI stage is simpler to build, tune, and maintain.



 ©SNIA. All Rights Reserved.

“AI Stack” Webinars

- On-Demand:
  - Introduction to AI and Machine Learning
  - AI Model Inferencing and Deployment Options
- Upcoming:
  - Jan 29, 2026: Accelerating AI Infrastructure: The Role of 400G and PCIe 8.0 in Next-Gen Interconnects
  - Feb 4, 2026: AI Meets Storage: Comparing On-Prem, Cloud, and Hybrid Architectures Across the AI Lifecycle

 ©SNIA. All Rights Reserved.

After this Webinar

- Please rate this webinar and provide us with your feedback
- This webinar and a copy of the slides are available at the SNIA Educational Library snia.org/educational-library
- A Q&A from this webinar, including answers to questions we couldn't get to today, will be posted on our blog at sniablog.org
- Follow us on LinkedIn and X @SNIA

 ©SNIA. All Rights Reserved.

SNIA | DSN
A SNIA Community

Thank You