THIS FISH

How AI-enabled Smart Cameras Can Revolutionize Seafood Inspection

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CEO, ThisFish Inc.

NILEENA THOMAS
Senior Data Scientist

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OUR MISSION

SOFTWARE + ARTIFICIAL INTELLIGENCE

To drive profitability and sustainability in the seafood industry through better data. Digital. Real-time. Actionable.

WWW.THIS.FISH

THIS
FISH


JOBY
TALLYVISION


ABCO
THIS FISH
TALLY


DOM
Wellington
Camera
Manual


TALLY
Raw Cutting
Sharla
Anasea
B & C
GNN
Kuterra
Diamond B Fishing
Marlson Industries
Quatsino
Smokey Pete
Comox Rotary
Tanya-Ray Fishing
Cheena
Victor
Wildly Canadian
Sysco
Hardy Sales
Intercity
HBSF
Seven Seas
Mad Dog
PAC Fresh
Weight (lbs)

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LEARNING GOALS

AI 101
How computer vision works

AI Use Cases
Understanding computer vision models

AI Future
Opportunities & Challenges

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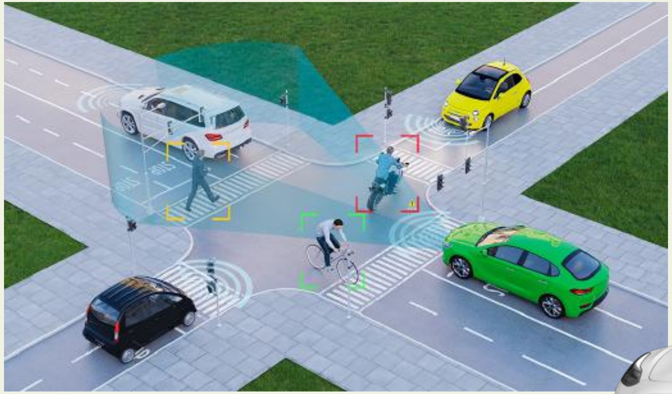
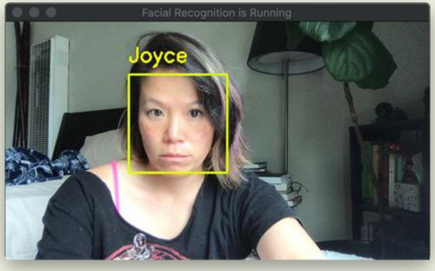
LEARNING GOAL

AI 101

How computer vision works

AI IS EVERYWHERE!





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INDUSTRIAL REVOLUTIONS

INDUSTRY 1.0

Mechanization
Steam power
Weaving loom

1784

INDUSTRY 2.0

Electrification
Mass production
Assembly Line

1870

INDUSTRY 3.0

Automation
Computers
Electronics

1969

INDUSTRY 4.0

Digitization
Machine Learning
Internet of Things

TODAY

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DATA SCIENCE

Artificial Intelligence

- AI is a subset of data science
- AI represents simulate intelligence in machines
- Aim is to build machines which are capable of thinking like humans

Machine Learning

- ML is a subset of AI & Data Science
- Machines making decisions without being programmed
- Aim is to make machines learn through data

Deep Learning

- Deep Learning is a subset of ML, AI & Data Science
- Artificial neural networks used to solve complex problems
- Aim is to build neural networks that discover patterns

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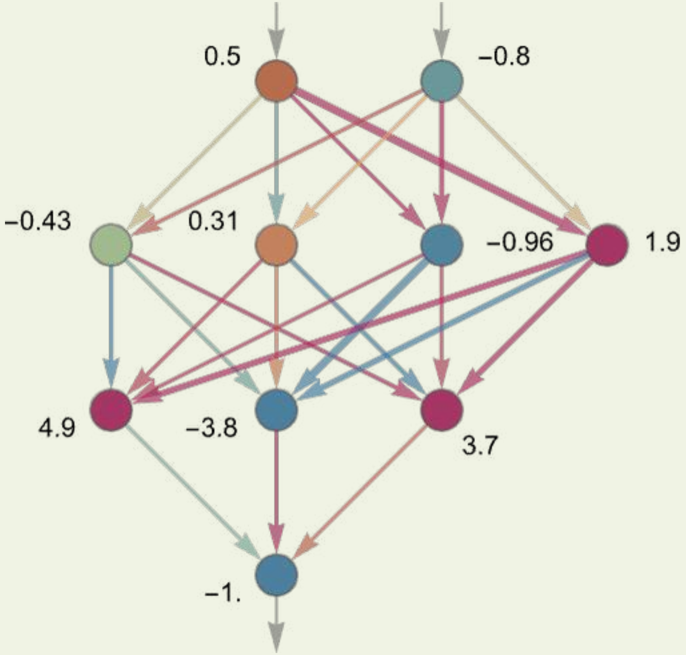
DEEP LEARNING -> GENERATIVE AI

Large Language Models (LLM)

DALL·E

ChatGPT



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MACHINE LEARNING

Can you predict the output?

A

X	Y	OUTPUT
5	7	75
3	4	43
6	9	96
2	5	?

ALGORITHM (MODEL)
X + (Y * 10) =
OUTPUT

B

X1	X2	X3	X4	OUTPUT
80.78	89.32	64.94	68.85	4353.0656
88.61	14.89	48.51	7.63	2385.2166
72.7	7.62	83.01	33.04	6925.7051
24.91	68.35	97.59	94.56	?

ALGORITHM (MODEL)
$0.15 * X1 + X2 + X3^2 + 0.5 * X4 =$
OUTPUT

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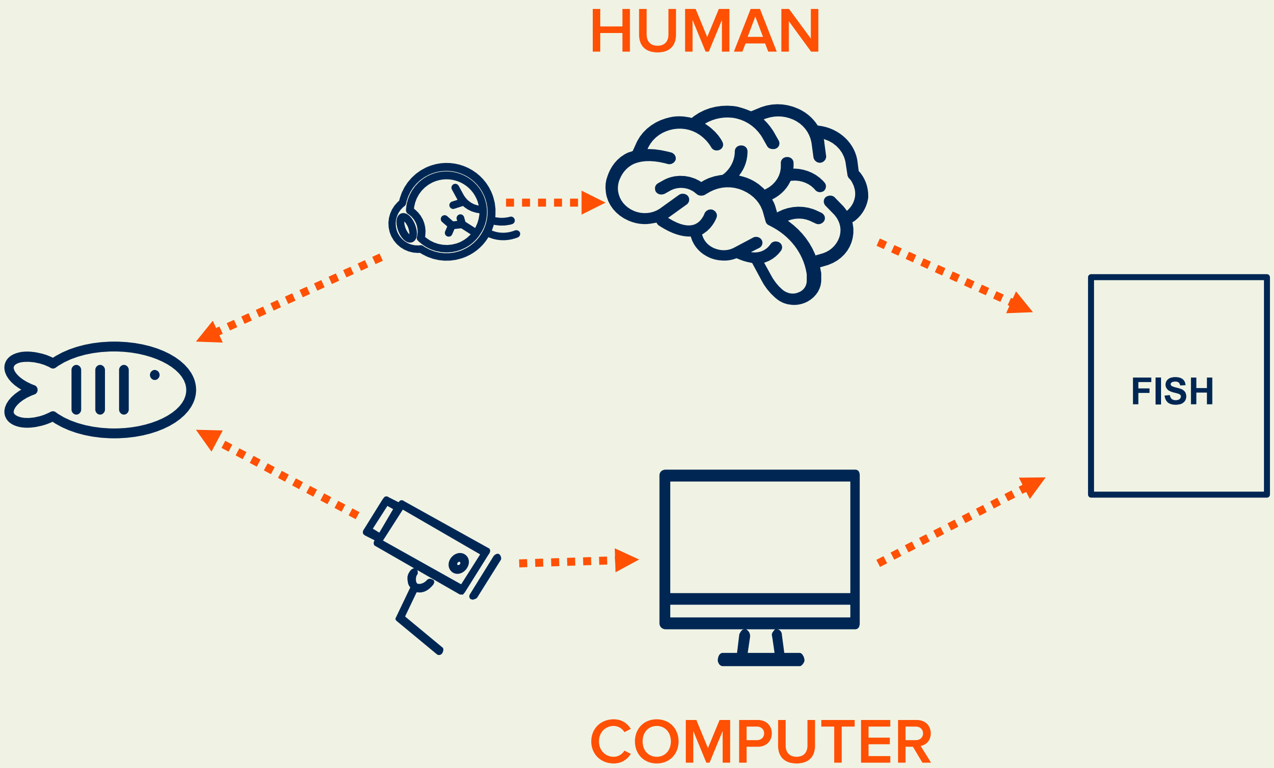
HOW IT WORKS



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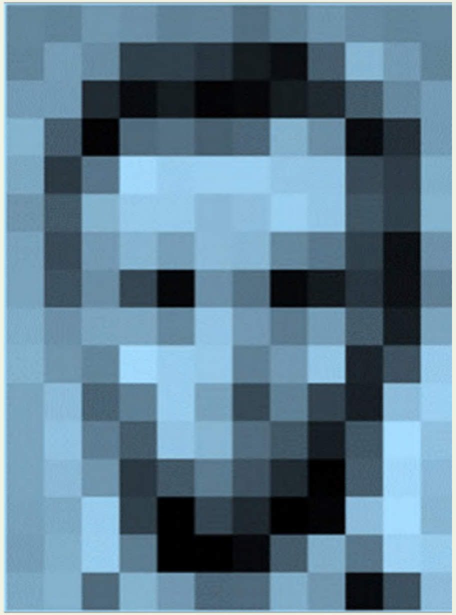
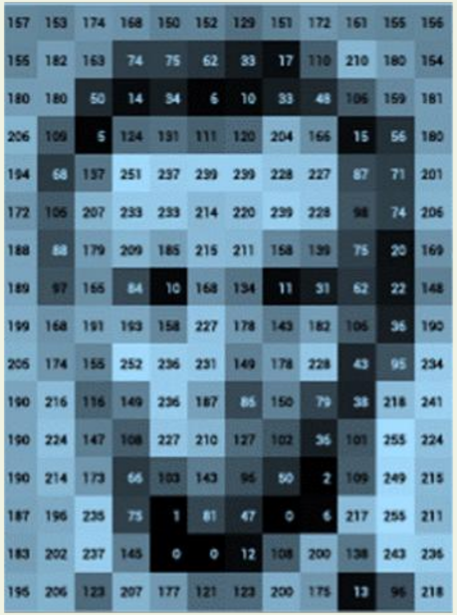
HOW IT WORKS

HUMAN



VISUAL PATTERN

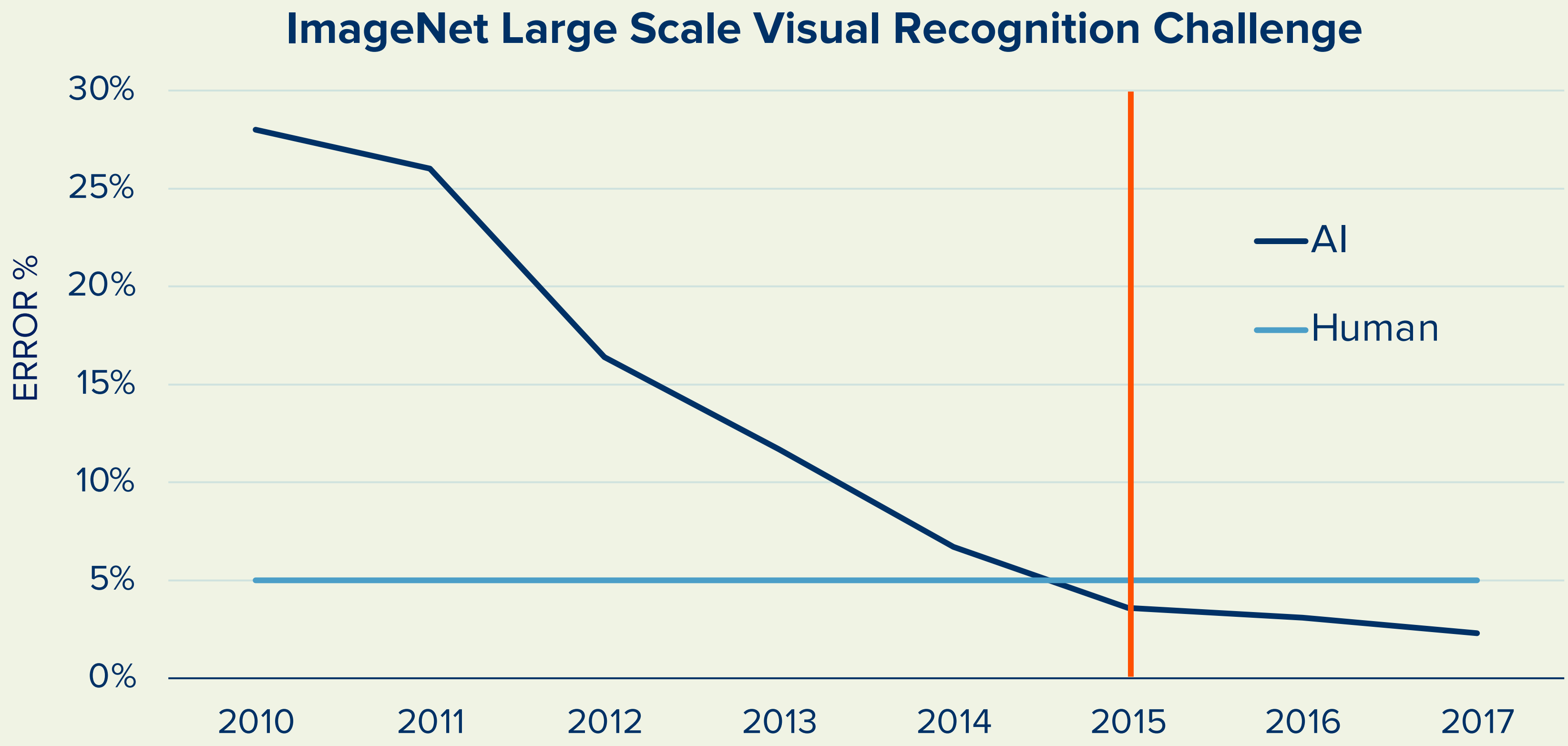


COMPUTER

157	153	174	168	150	152	129	151	172	161	155	156
155	182	163	74	75	62	33	17	110	210	180	154
180	180	50	14	34	6	10	33	48	106	159	181
206	109	5	124	131	111	120	204	166	15	56	180
194	68	137	251	237	239	239	228	227	87	71	201
172	105	207	233	233	214	220	239	228	98	74	206
188	88	179	209	185	215	211	158	139	75	20	169
189	97	165	84	10	168	134	11	31	62	22	148
199	168	191	193	158	227	178	143	182	106	36	190
205	174	155	252	236	231	149	178	228	43	95	234
190	216	116	149	236	187	86	150	79	38	218	241
190	224	147	108	227	210	127	102	36	101	255	224
190	214	173	66	103	143	96	50	2	109	249	215
187	196	235	75	1	81	47	0	6	217	255	211
183	202	237	145	0	0	12	108	200	138	243	236
195	206	123	207	177	121	123	200	175	13	96	218

NUMERIC PATTERN

AI IMPROVEMENT



COMPUTER VISION

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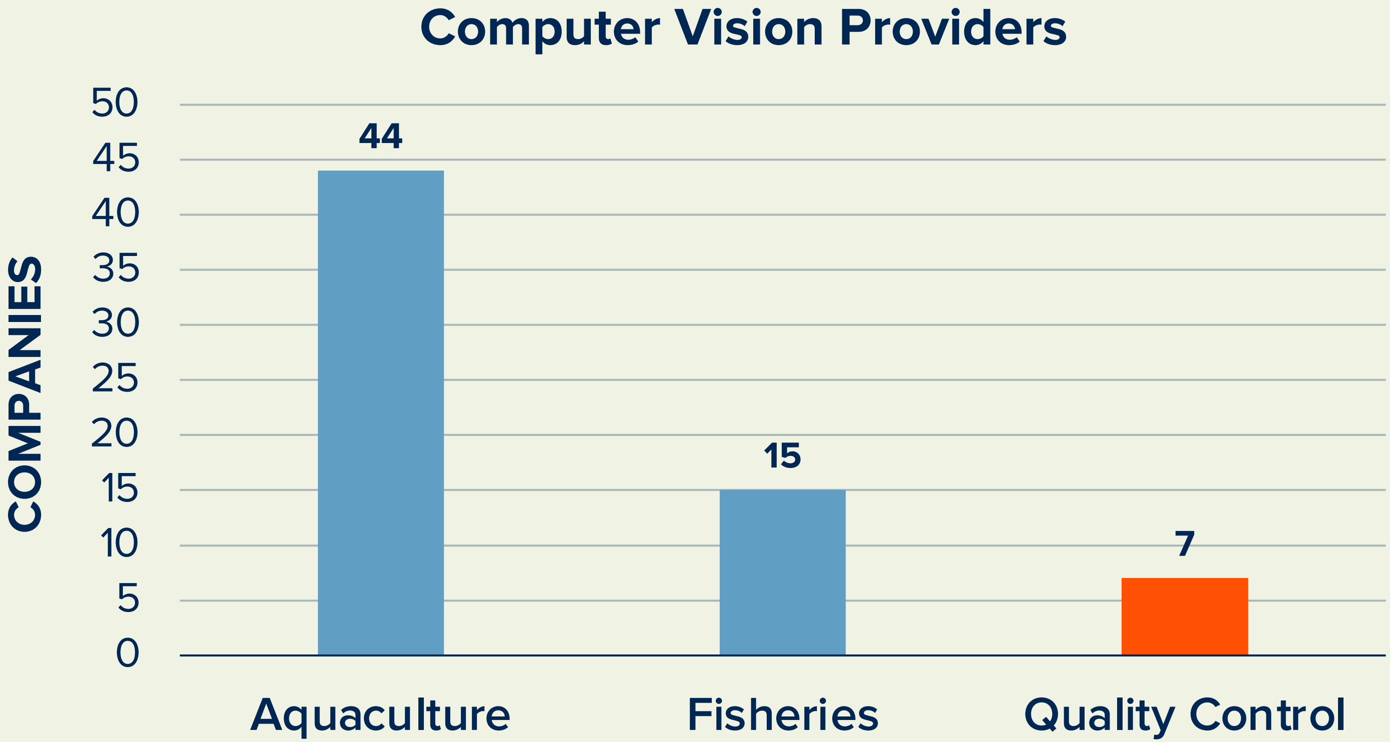
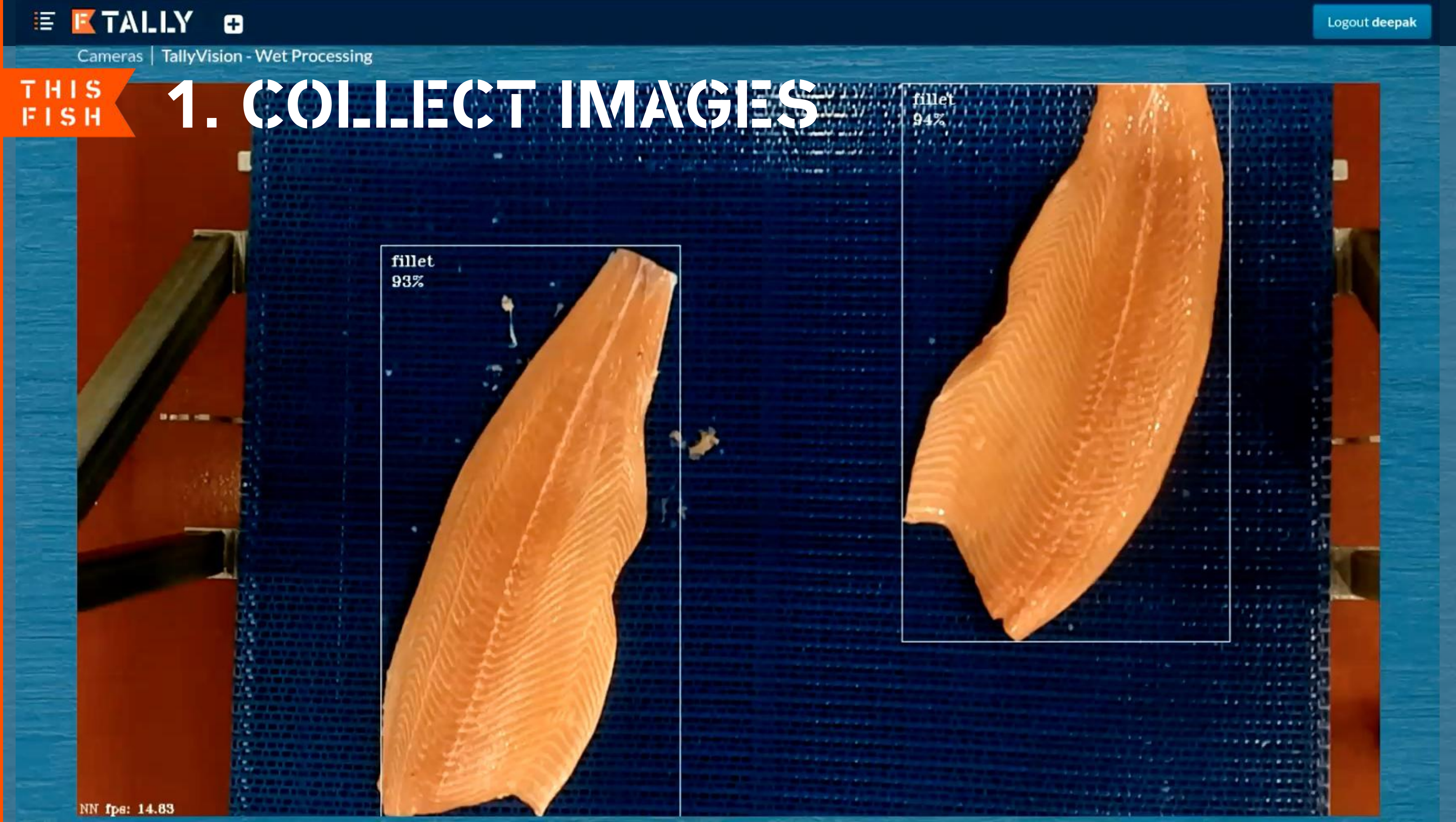
COMPUTER VISION



HOW IT WORKS

1. Collect Images
2. Prepare Data & Images
3. Choose a Model
4. Train the model
5. Test the model
6. Retrain & Fine Tune
7. Deploy

1. COLLECT IMAGES



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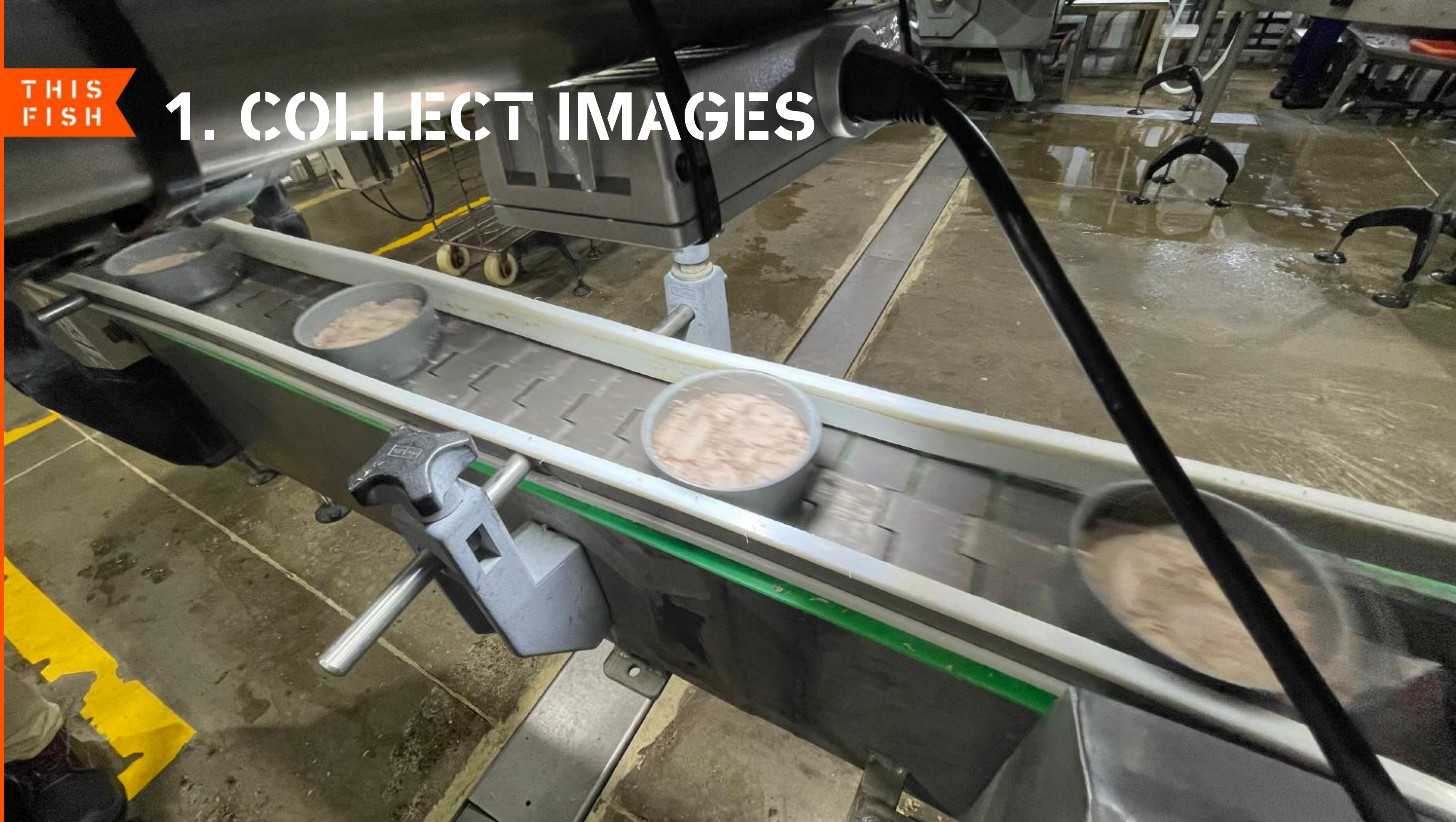
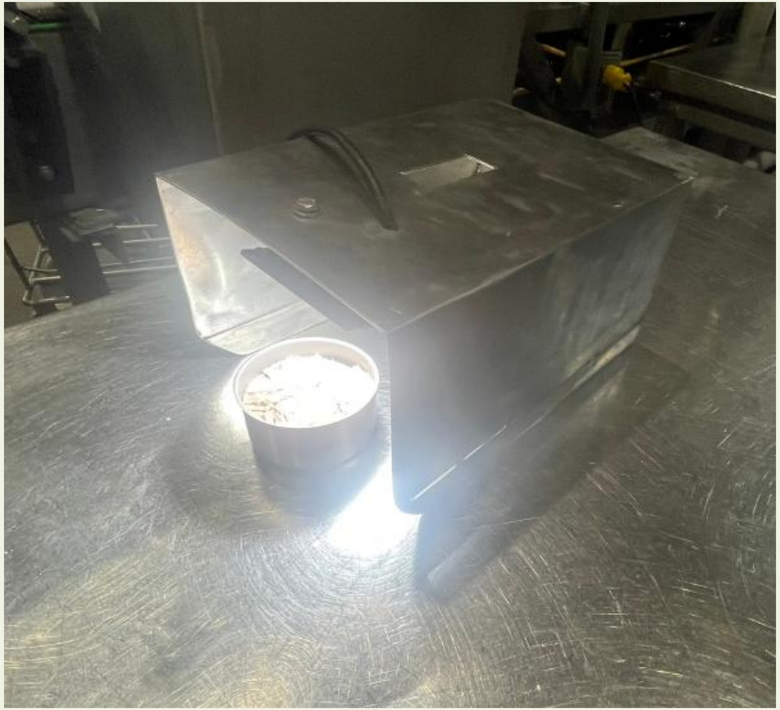
1. COLLECT IMAGES



1. COLLECT IMAGES



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3. CHOOSE A MODEL

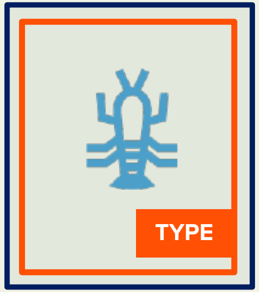
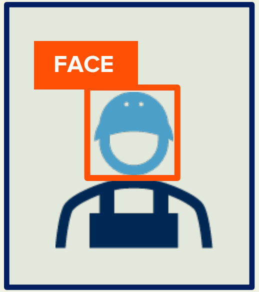
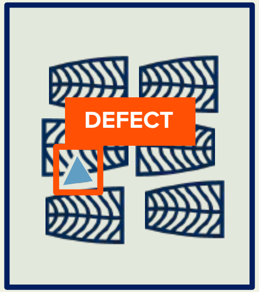


IMAGE CLASSIFICATION

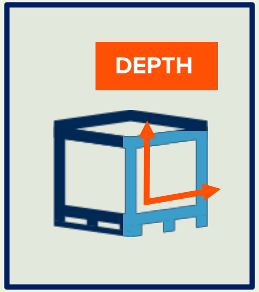
OBJECT DETECTION



FACIAL RECOGNITION

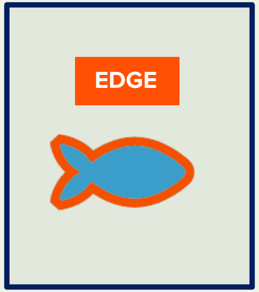


ANOMALY DETECTION



DEPTH / WEIGHT ESTIMATION

OPTICAL CHARACTER RECOGNITION



EDGE DETECTION

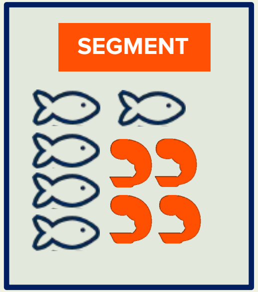
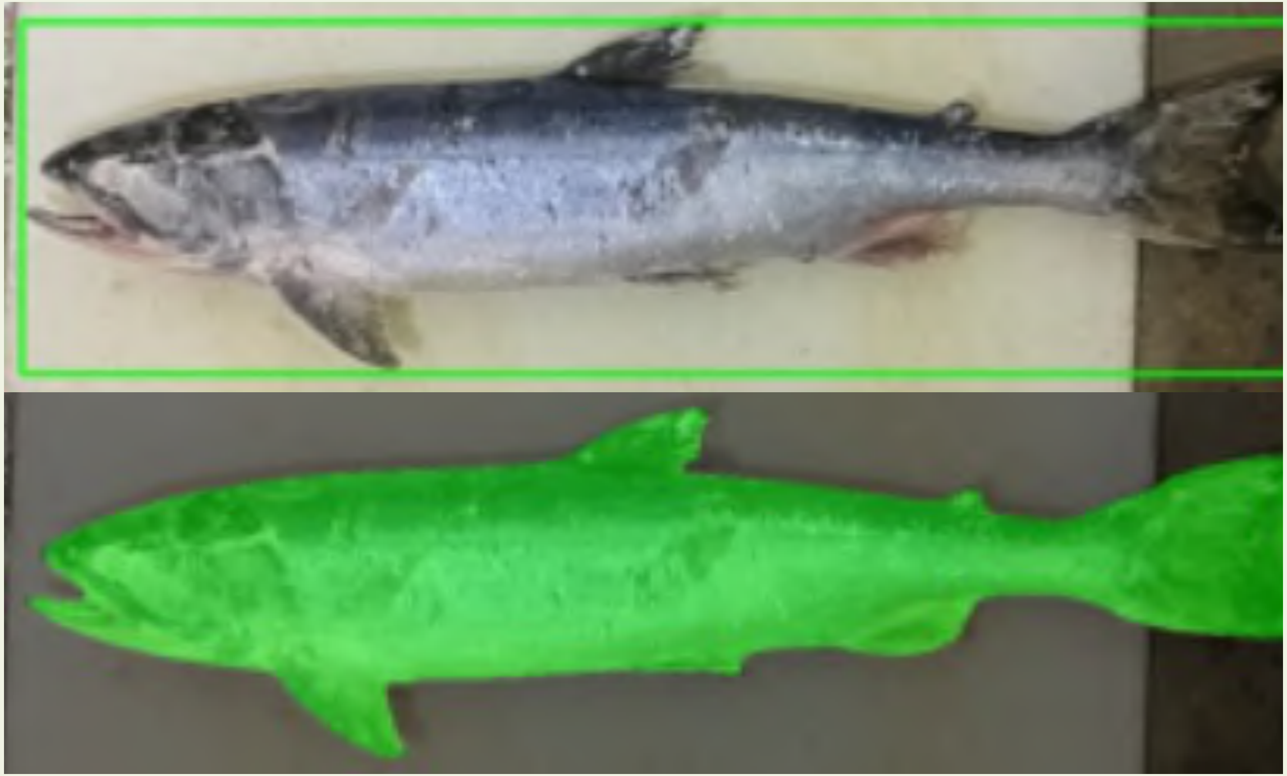


IMAGE SEGMENTATION

SEGMENTATION MODEL



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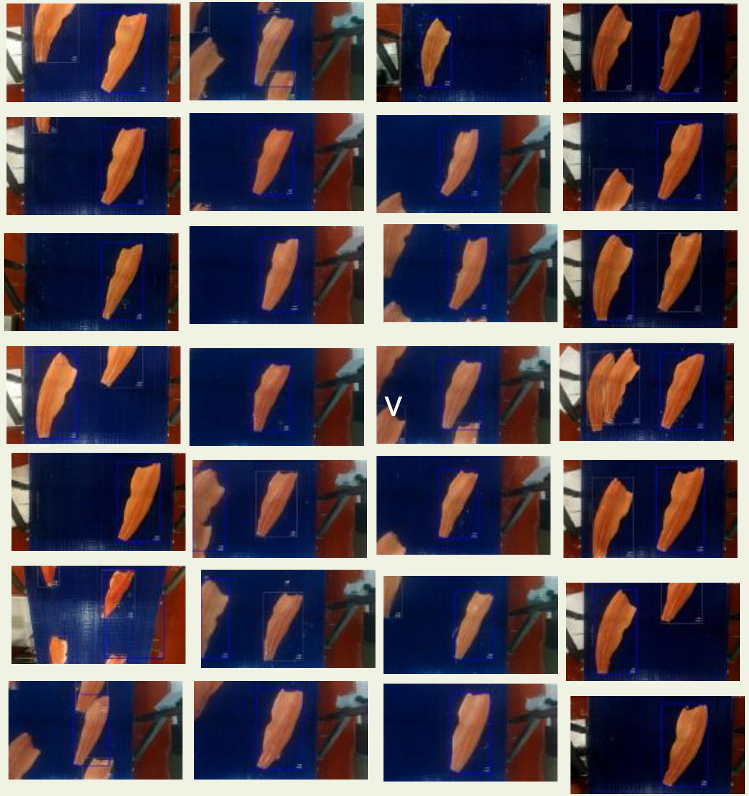
4. TRAIN THE MODEL

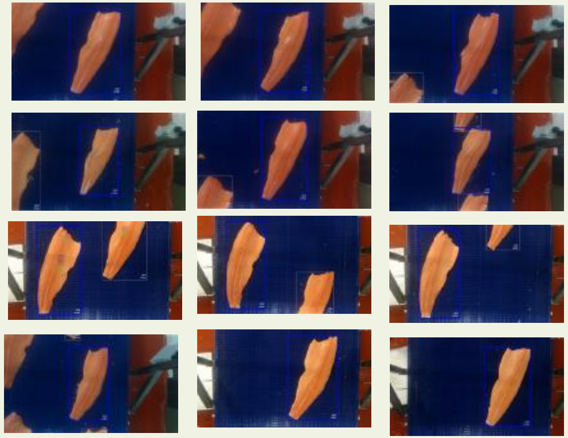
THIS FISH

4. TRAIN & TEST MODEL



70% TRAINING SET

30% TESTING SET

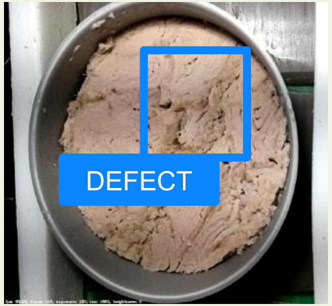


MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE

FALSE POSITIVE



TRUE NEGATIVE

1. ACCURACY
2. PRECISION
3. RECALL

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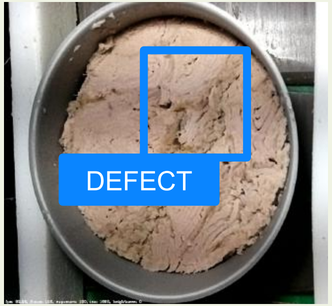
MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE

FALSE POSITIVE



TRUE NEGATIVE

$$\text{ACCURACY} = \frac{\text{CORRECT PREDICITIONS}}{\text{ALL PREDICTIONS}}$$

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MODEL EVALUTATION

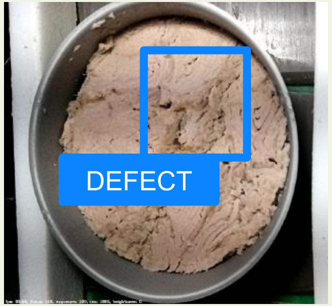
TRUE POSITIVE

FALSE NEGATIVE

ACCURACY = 50%

$$\frac{2}{4}$$

FALSE POSITIVE



TRUE NEGATIVE

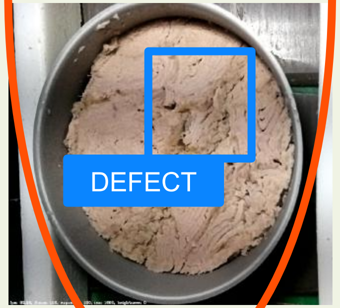
THIS FISH

MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE

FALSE POSITIVE



TRUE NEGATIVE

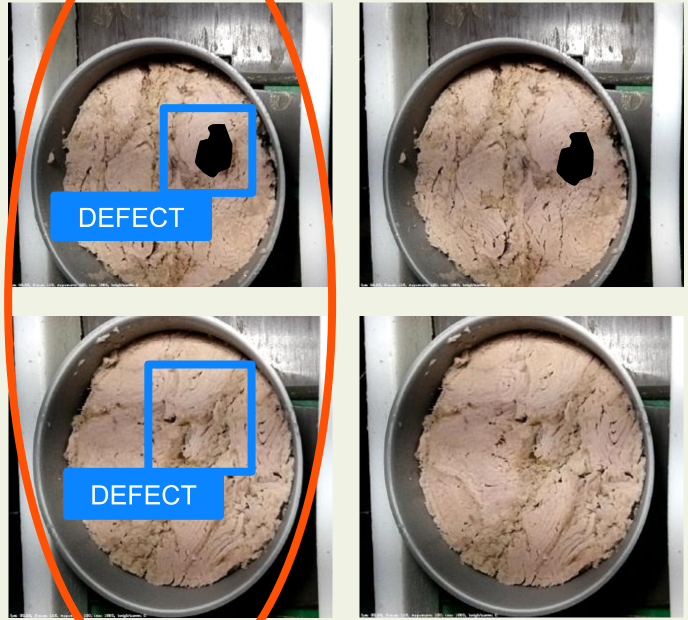
$$\text{PRECISION} = \frac{TP}{TP + FP}$$

THIS FISH

MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE



FALSE POSITIVE

TRUE NEGATIVE

PRECISION = 50%

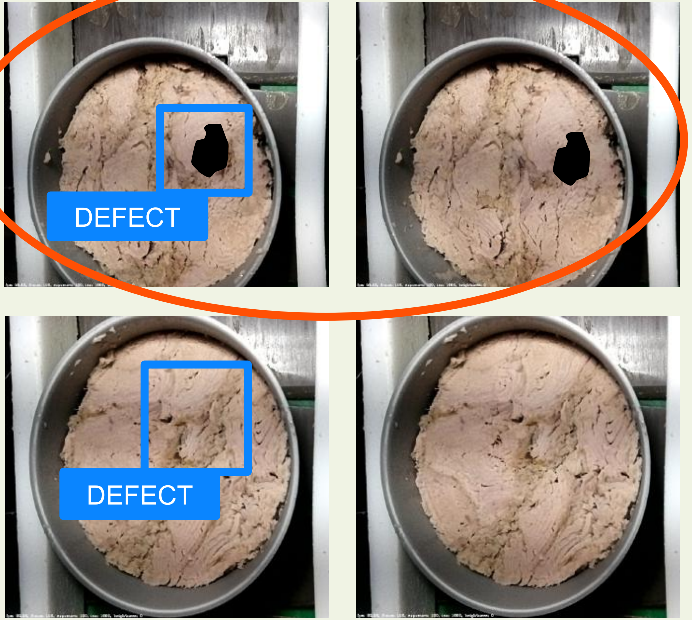
$$\frac{1}{1 + 1}$$

THIS FISH

MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE



FALSE POSITIVE

TRUE NEGATIVE

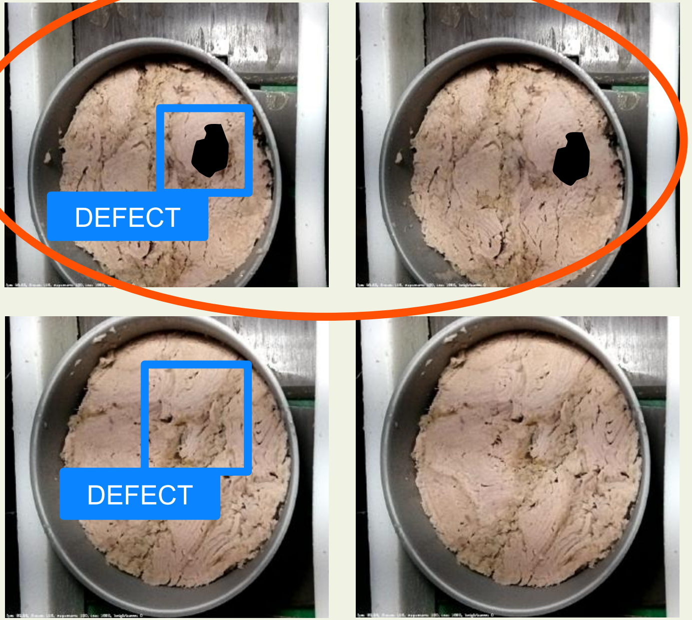
$$\text{RECALL} = \frac{TP}{TP + FN}$$

THIS FISH

MODEL EVALUTATION

TRUE POSITIVE

FALSE NEGATIVE



FALSE POSITIVE

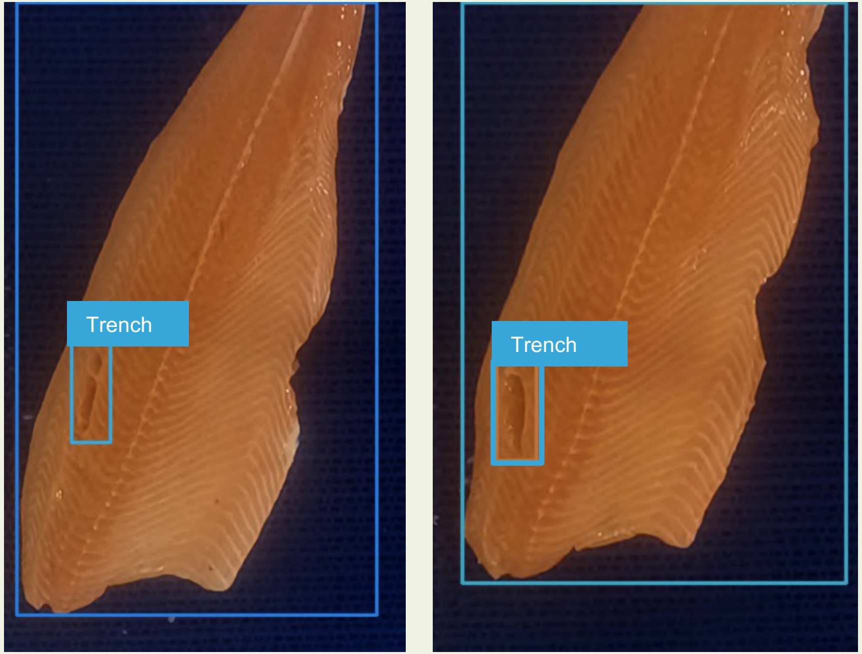
TRUE NEGATIVE

RECALL = 50%

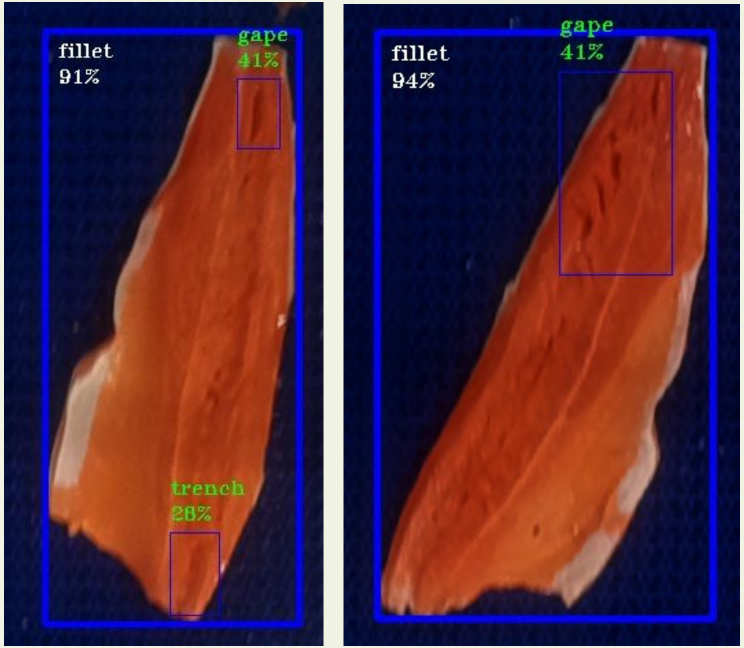
$$\frac{1}{1 + 1}$$

RETRAIN & FINE TUNE MODEL

FARMED SALMON



WILD SALMON

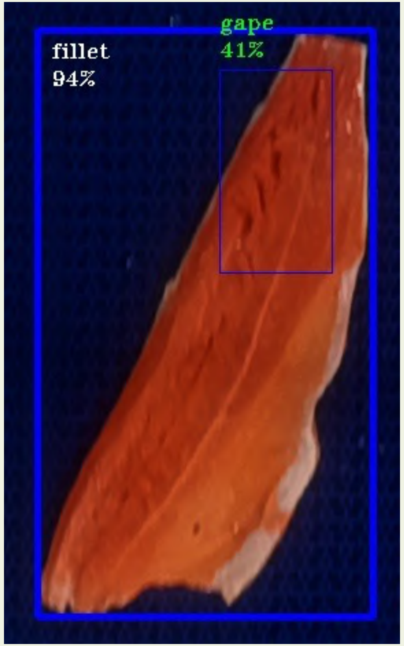


THIS FISH

RETRAIN & FINE TUNE MODEL

FARMED SALMON

WILD SALMON



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LEARNING GOAL

AI Use Cases

Understanding computer vision models

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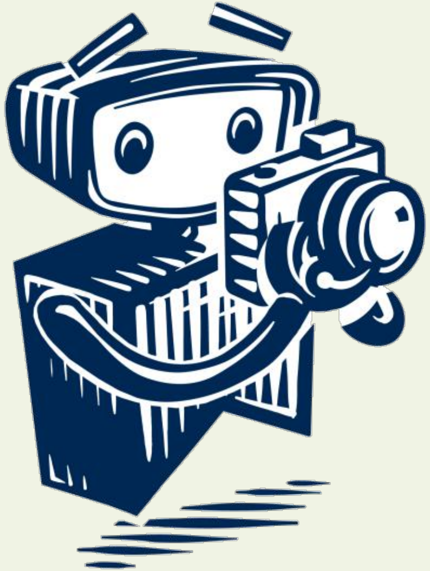
AI USE CASES



RAW MATERIAL

- Count pieces
- Measure Size
- Identify Species
- Classify Quality

SEMI-FINISHDED

- Count pieces
- Measure Size
- Classify Colour
- Visual Seam
- Detect Defects
- Classify quality

FINISHED PRODUCTS

- Count pieces
- Detect Defects
- Labeling
- Compliance

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COMPUTER VISION MODELS

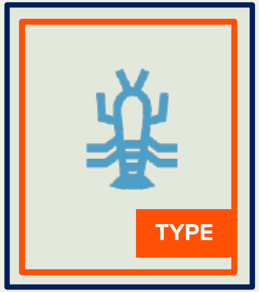
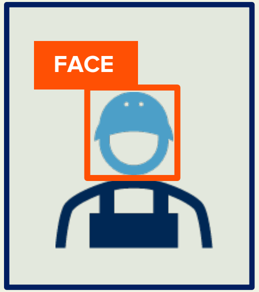
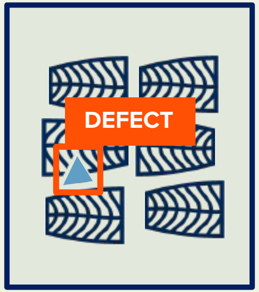


IMAGE CLASSIFICATION

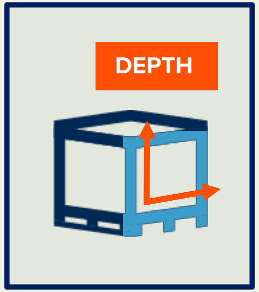
OBJECT DETECTION



FACIAL RECOGNITION



ANOMALY DETECTION



DEPTH / WEIGHT ESTIMATION

OPTICAL CHARACTER RECOGNITION

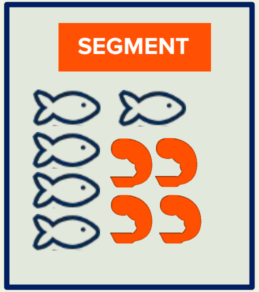
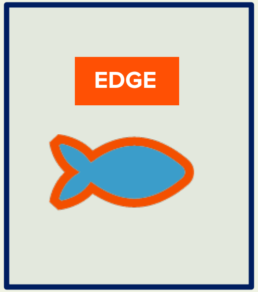


IMAGE SEGMENTATION



EDGE DETECTION

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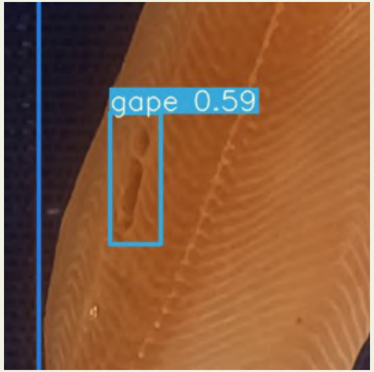
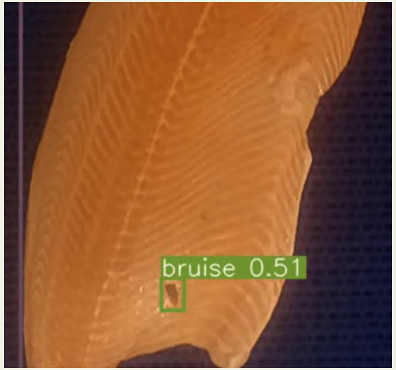
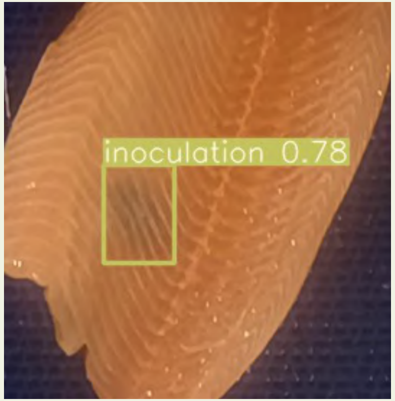
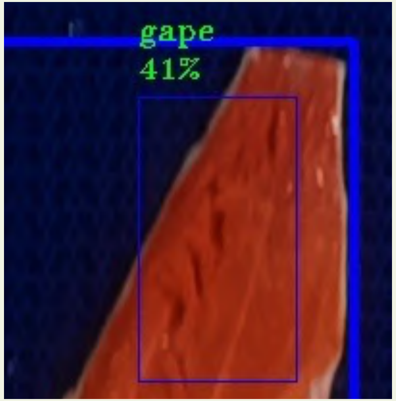
FILLET DEFECTS

OBJECT
DETECTION





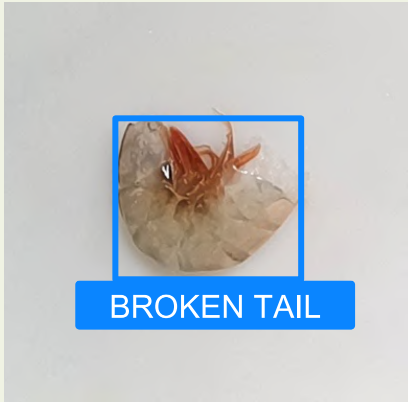




THIS FISH

SHRIMP DEFECTS

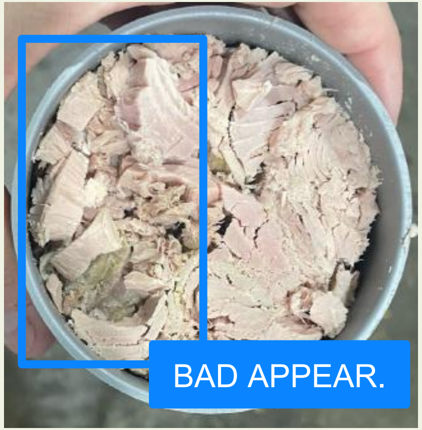
OBJECT DETECTION



THIS FISH

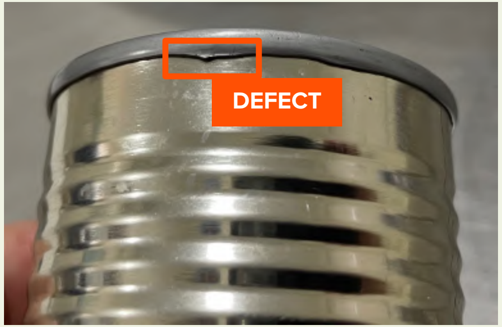
CAN TUNA DEFECTS

OBJECT DETECTION



CAN DEFECTS

OBJECT DETECTION



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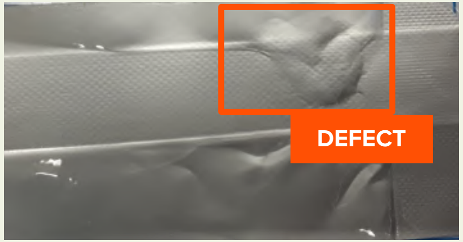
POUCH SEAL DEFECTS

OBJECT DETECTION

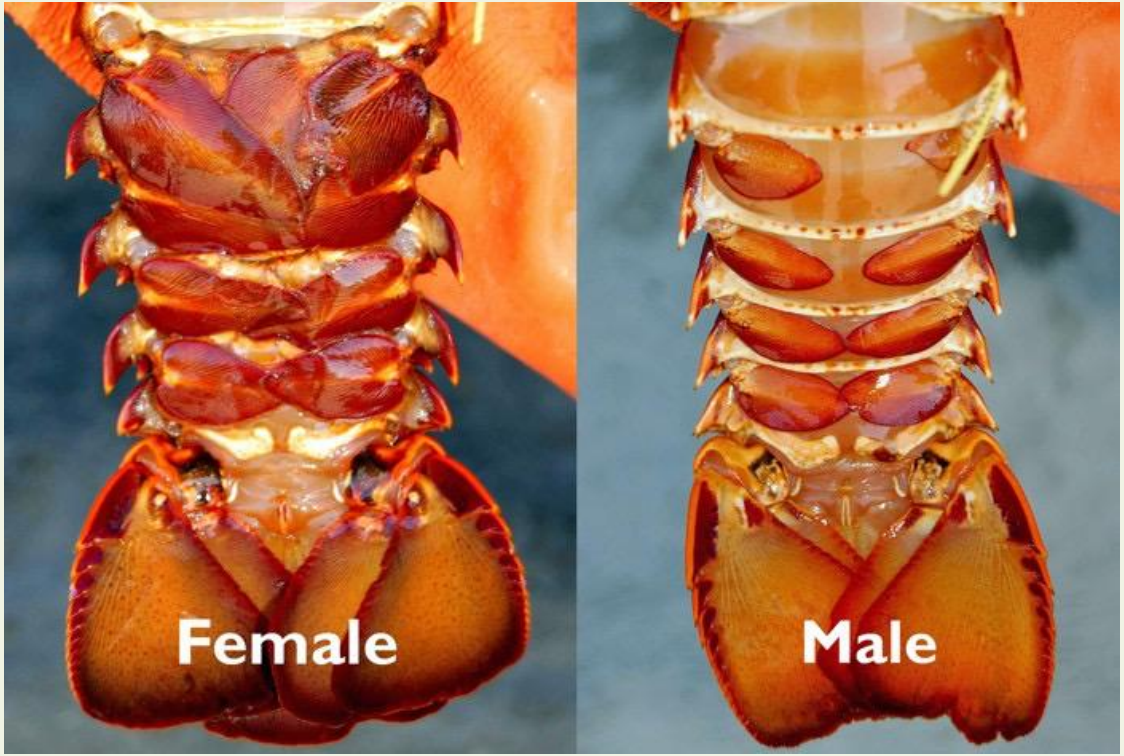


THIS FISH

CLASSIFY SEX

TYPE

IMAGE CLASSIFICATION



THIS FISH

COLOUR CLASSIFICATION

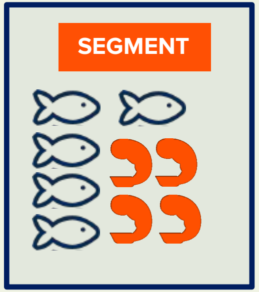
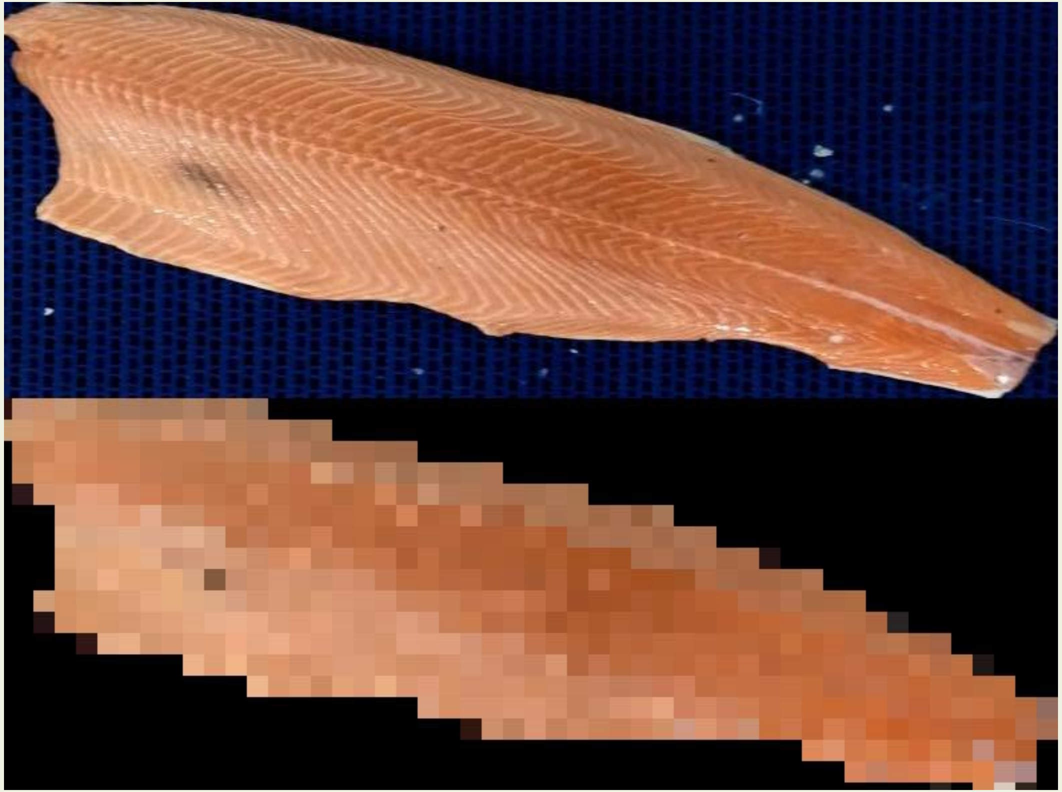


IMAGE SEGMENTATION



FISH WEIGHT ESTIMATOR

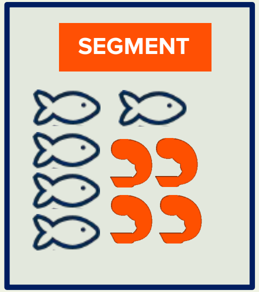
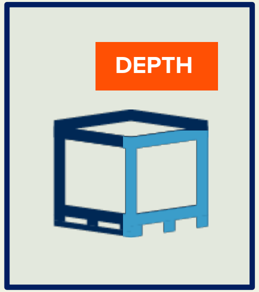


IMAGE SEGMENTATION



DEPTH / WEIGHT ESTIMATION

FLAKE % ESTIMATION




FLAKE % ESTIMATION

THIS FISH

FLAKE % ESTIMATION

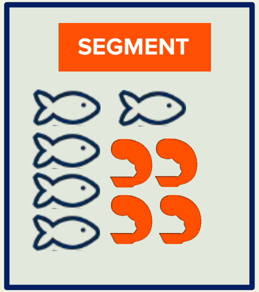
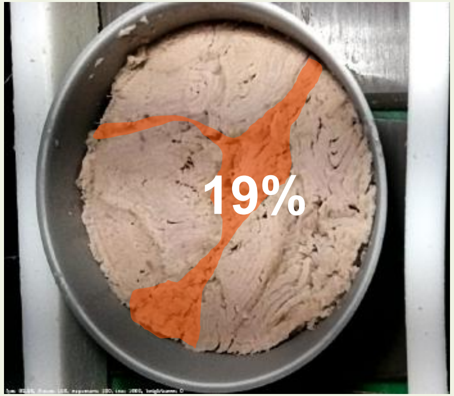
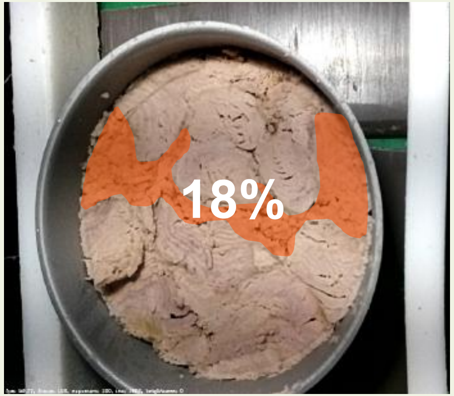


IMAGE SEGMENTATION





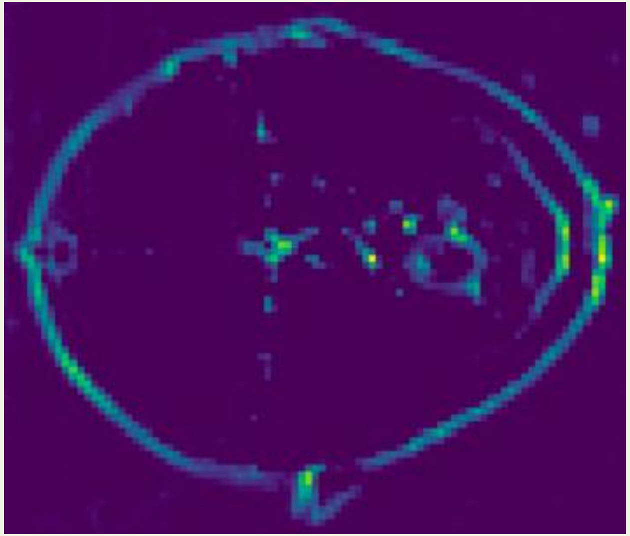
RAPID SALINITY TEST

THIS FISH

RAPID SALINITY TEST

EDGE

EDGE DETECTION



THIS FISH

CAN CODE READING

OPTICAL CHARACTER RECOGNITION

THIS FISH

PRODUCTIVITY

THIS FISH

OVERALL EQUIPMENT EFFECTIVENESS

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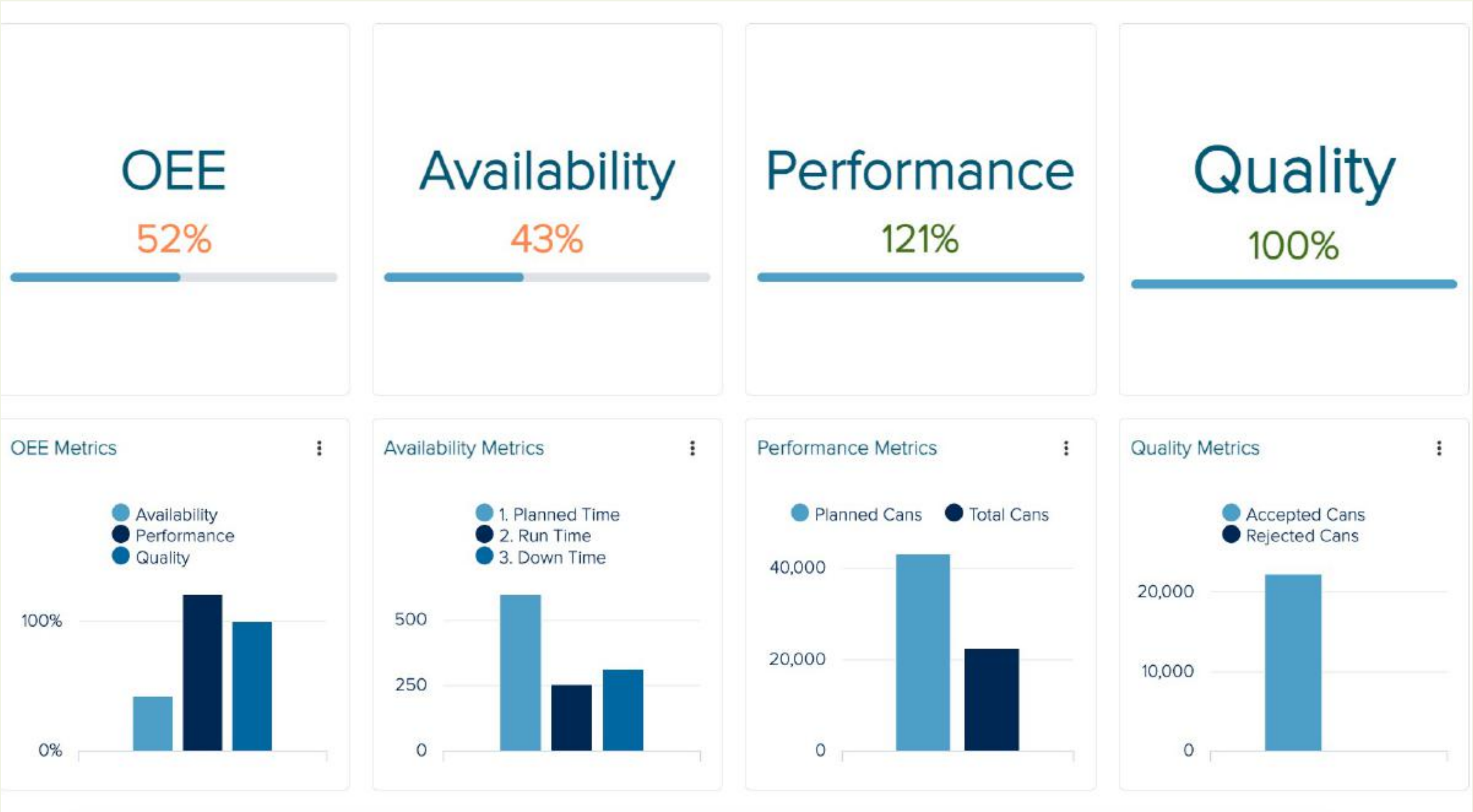

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OVERALL EQUIPMENT EFFECTIVENESS

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PRODUCTIVITY

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PRODUCTIVITY

- Track number of workers & time in production area
- Count units produced
- Calculate productivity

PRODUCTIVITY

- Monitor workers for quality and/or efficiency

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COLD STORAGE BINS

OPTICAL CHARACTER RECOGNITION

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LEARNING GOAL

AI Future

Opportunities & Challenges

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PARADIGM SHIFT

Random → Continuous

Inconsistent → Consistent

Biased → Unbiased

Slow → Fast

Manual → Automated

FUTURE ROLES

Oversight

- Define standards
- Review Outputs
- Handle edge cases
- Refine models
- Monitor Bias
- Continuous Improvement

Inspection

- Repetitive
- High-speed
- Autonomous
- Multi-modal AI, combing production, vision and sensor data
- Predictive analytics

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DATA DELUGE

Generative AI

- Large Language Models, such as ChatGPT, can analyze large volumes of data
- Hidden insights and patterns may be found in the data

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R&D PARTNERS

BOLTON
Food & Tri Marine

CALIDAD DESDE 1887
Isabel

Seafman

ORCA
SPECIALTY FOODS

Circle Seafoods

CANADA'S OCEAN SUPERCLUSTER

CANADIAN FOOD INNOVATION NETWORK

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BLOG POST

GET DEMO

Revolutionizing Seafood Visual Inspection with AI-enabled Smart Cameras

March 10, 2025 • 6 min(s) reading time

Eric Enno Tamm
Co-Founder and CEO of ThisFish

A picture is worth a thousand words and that's certainly true for quality and food safety inspection. In seafood processing plants, quality control

THANKS

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