Betterview

Leveraging Computer Vision & AI for Property & Risk Management

NAIC — CASTF Book Club

2022-0726

BV-SD2-220718

The Changing State of Insurance

$280

Billion

Total Severe Weather Losses in 2021

$120 billion of losses were insured[2]

1/3

Americans

Personally affected by extreme weather events in the past two years[2]

1. Munich Re: https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2022/natural-disaster-losses-2021.html
2. Gallup Pole: https://news.gallup.com/poll/391508/extreme-weather-affected-one-three-americans.aspx

You can Predict & Prevent losses to save homes & businesses

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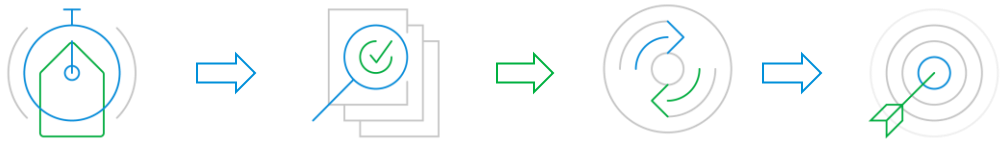
Property Intelligence & Risk Management Platform

Analyze Risk
Score Risk
Manage Risk
Monitor Risk

Across the policy lifecycle...

Quoting Underwriting Renewal Claims



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To Predict & Prevent we view Hazard x Vulnerability = Risk

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Analyze Roof Risk

Vulnerability Spotlights

- STRUCTURAL DAMAGE
- MISSING SHINGLES
- WORN SHINGLES
- TARP
- RUST
- PATCHING
- PONDING
- STAINING
- ROOF DEBRIS
- TREE OVERHANG

Visualize > Quantify > Understand

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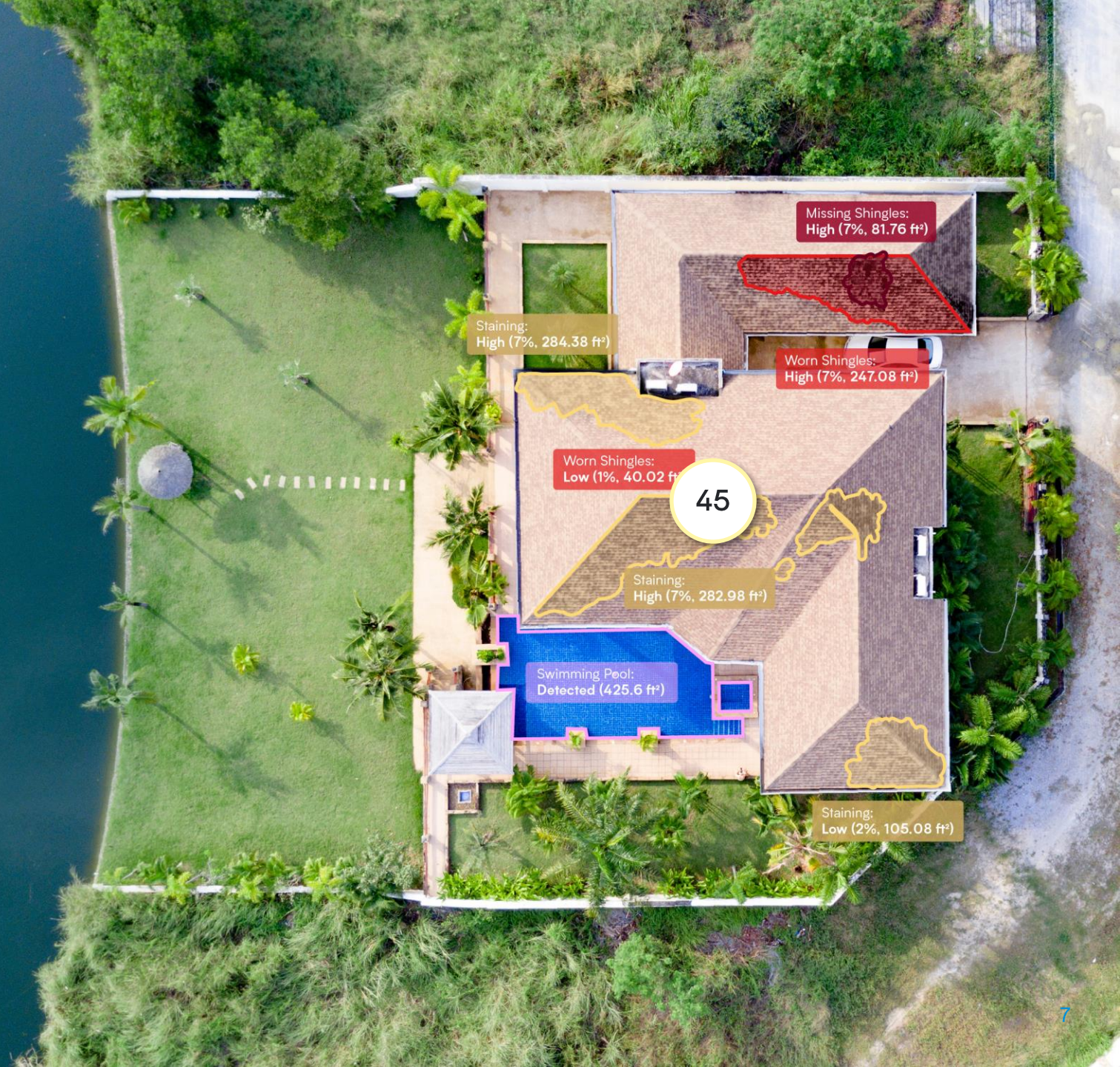
Score Roof Risk

Roof Spotlight Index

Missing Shingles	7%, 81.76 ft^2
Worn Shingles	9%, 206 ft^2
Staining	<1%, 446 ft^2
Pool	<1%, 51 ft^2



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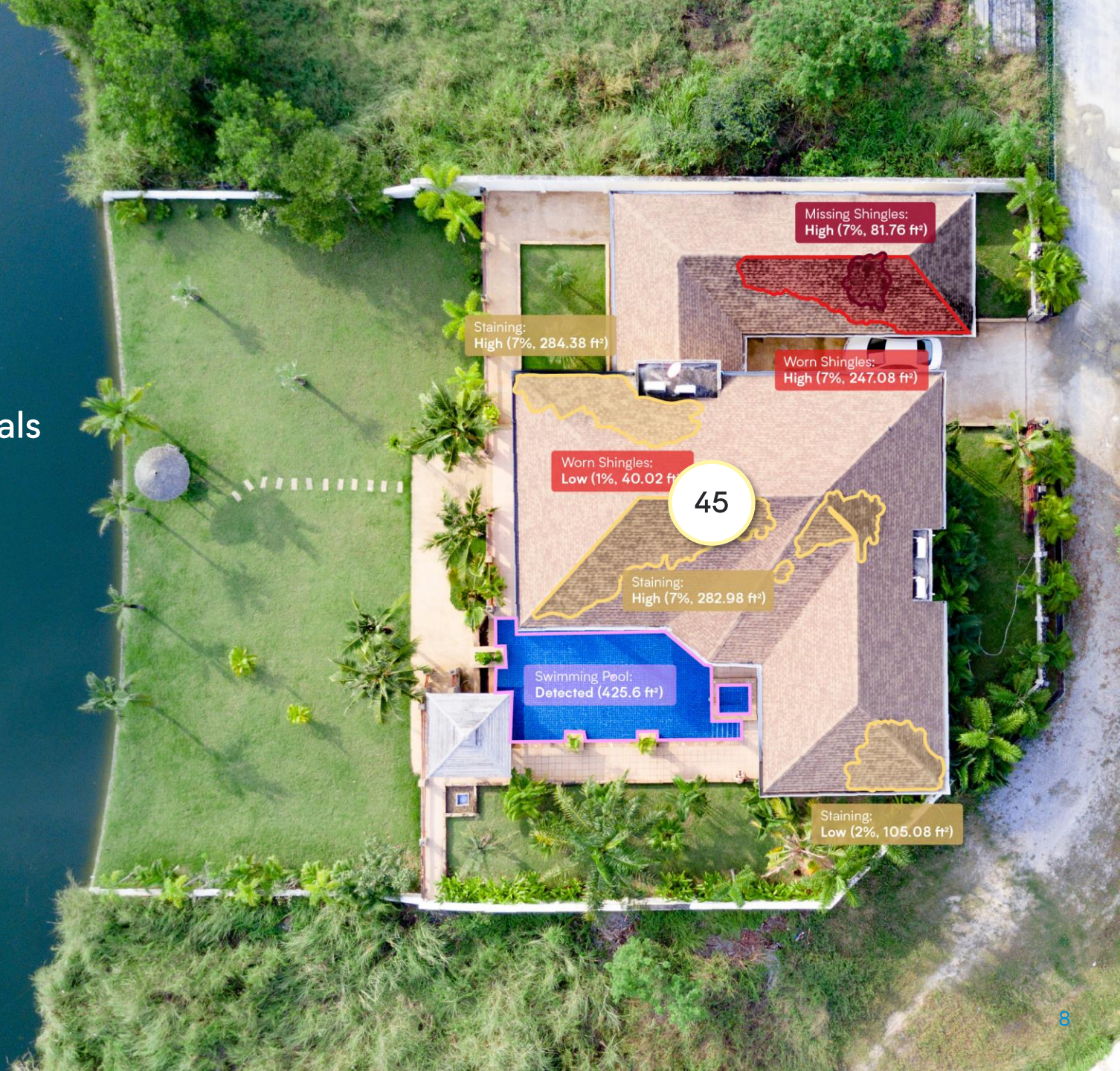
Manage Roof Risk

Roof Condition — New Business & Renewals

0 — 100

Avoid	Rate	Mitigate	Fast-Track
• Non-Renew • Decline	• Price • Exclude • Adjust	• Inspect • Notify	• STP • Automate



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Monitor Risk

Flag Changes Over Time

0 — 100

RAC	Roof Area Changed	12%, 350.04 ft^2
BCC	Building Count Changed	1 to 2
≈	Trampoline Detected	100 ft^2

BCC Building Count Changed — CLEAR
Flagged 09/6/21

CAUSE OF FLAG
- Additional Structure detected on the property.

Trampoline Detected — CLEAR
Flagged 01/14/22

CAUSE OF FLAG
- Trampoline detected on property.

RAC Roof Area Changed — CLEAR
Flagged 05/26/22

CAUSE OF FLAG
- Building 1 footprint has increased. Review Required.

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Analyze Wildfire Risk

Defensible Space

	ZONE 0	ZONE 1	ZONE 2	TOTAL
Defensible Space	58%	43%	46%	46%
Indefensible Space	42%	57%	54%	54%

Visualize > Quantify > Understand

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Score Wildfire Risk

Wildfire Vulnerability Score

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Manage Wildfire Risk

Wildfire Vulnerability

Avoid	Rate	Mitigate	Fast-Track
• Non-Renew • Decline	• Price • Exclude • Adjust	• Inspect • Notify	• STP • Automate

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Monitor Wildfire Risk

Flag Changes Over Time

Address	Flags	Total	External ID	Assigned To	Monitoring	Score	Updated Date	Order Date
12345 Somewhere Lane, Allen, VA 23059	HAIL DMG PAT PTC PND REV SCR SS WAHZ	10	An HOA Complex	-		4-100	3/16/2022	03/16/2022
9876 Nearby Blvd., Escondido, CA 92025	DMG PAT PTC REV HVAC SCR WAHZ	11	CL Property Sample	-		1-100	5/9/2022	05/09/2022
456 Outthere Road, Durant, OK 74701	HAIL PAT PTC PND REV HVAC SCR WAHZ	9	CL - Hotel/Casino w Equifax	-		29-96	4/26/2022	03/03/2022
555 Nowhere Avenue, Schaumburg, IL 60173	HAIL PAT PTC PND REV HVAC SCR WAHZ	9	Another HOA	-		29-88	3/16/2022	03/16/2022
1999 Partylikeits Circle, Los Angeles, CA 90068	FIRE DMG PAT PTC REV SCR WAHZ	9	A Restaurant in L.A.	-		29-97	5/11/2022	05/11/2022

High Wildfire Risk
Flagged 05/27/22

CLEAR

CAUSE OF FLAG
- A structure scored very low for Wildfire Vulnerability. Property needs review.

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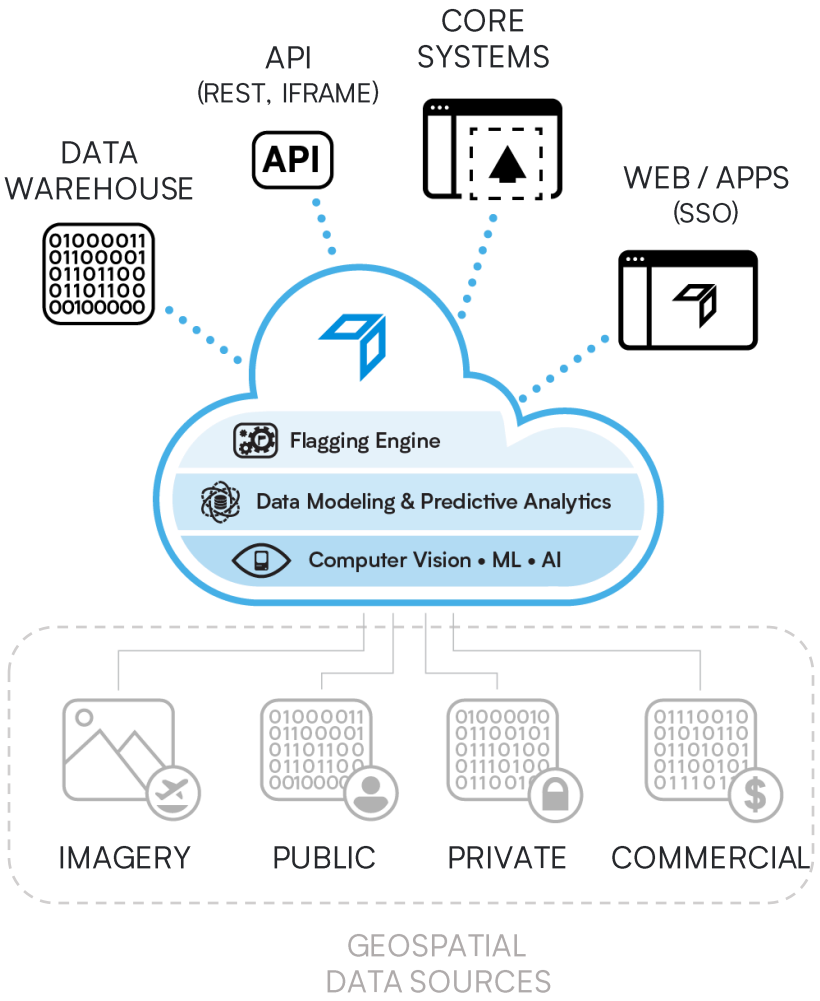
Property Intelligence & Risk Management Platform



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What makes Betterview different?

Transparency
Platform
PartnerHub & Flagging
Objective AI Techniques
More Coverage
Better Coverage

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Industry Trusted Partner Data in a single view of risk

Aerial Imagery	Commercial Geospatial	Public Geospatial

GIC GEOSPATIAL INSURANCE CONSORTIUM

HazardHub

RedZone When accuracy matters most.

Google

ReportAll

USGS

nearmap

LexisNexis

EQUIFAX

smartystreets

buildzoom

U.S. Fire Administration

HEXAGON

FIREWISE USA RESIDENTS REDUCING WILDFIRE RISKS

Tripadvisor

CANOPY

BARON Critical Weather Intelligence

County of Los Angeles California

e2Value

TRUE FLOOD RISK

melissa

National Register of Historic Places

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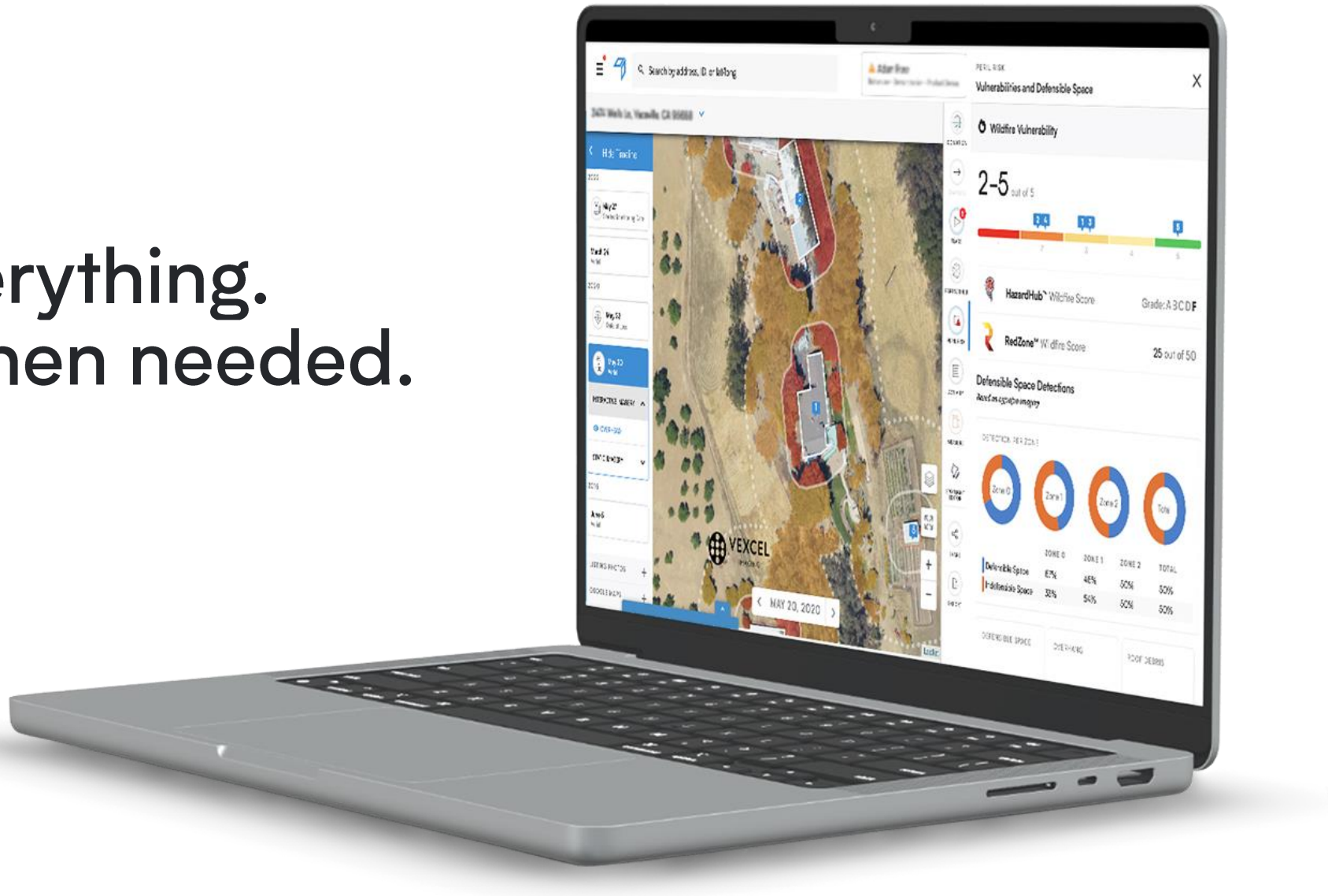
Automate everything.
Drill-down when needed.



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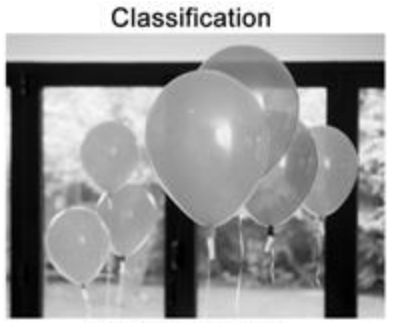
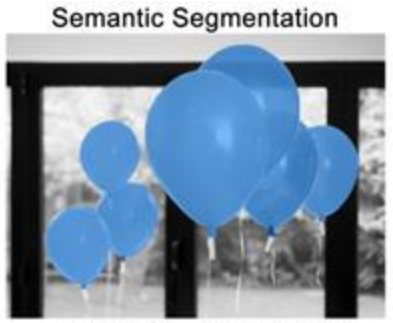
Computer Vision & AI
for Property & Risk Management

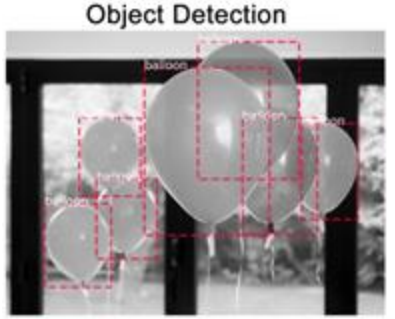
- Computer Vision Basics
- AI in Insurance
- Transparency in AI
- Examples of AI Transparency

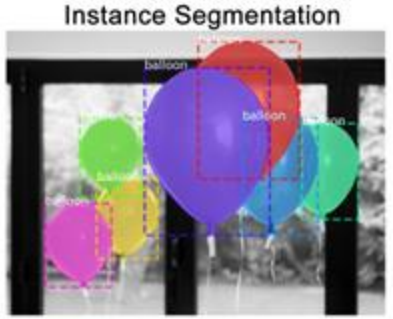
Computer Vision in Property and Risk Management

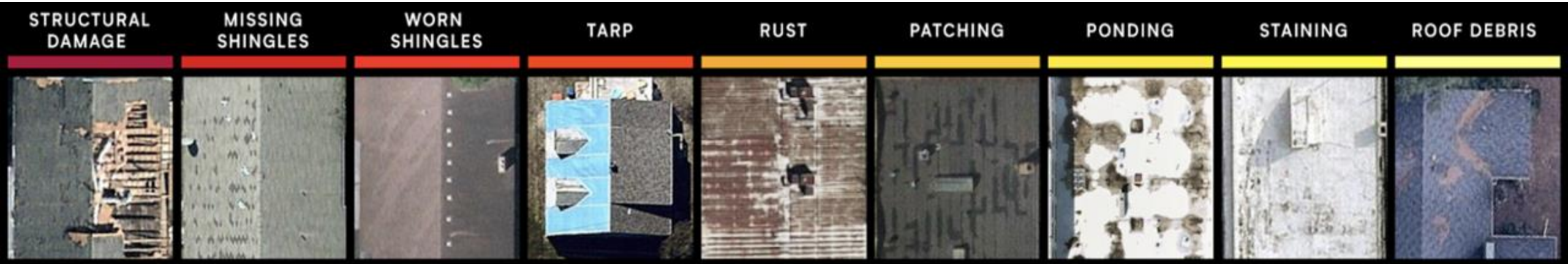
- Computer vision is the field of helping computers understand imagery
- Many tasks can be solved with computer vision
- Many property risk factors can be detected from aerial imagery using computer vision





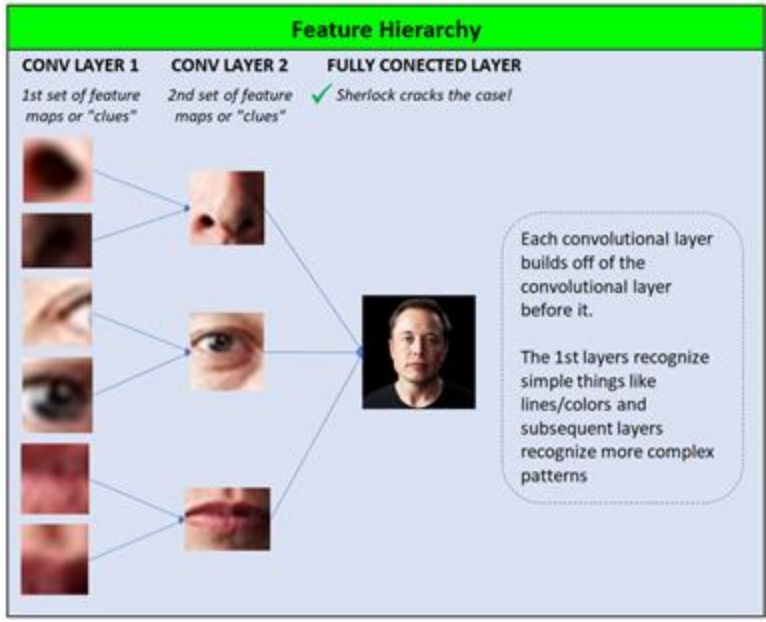






Computer Vision Basics

- Convolutional Neural Networks (CNN) and Vision Transformers (ViT) are modern tools for computer vision
- Convolutional neural networks scan through an image looking for certain features
- Those features are combined by the network to understand what objects are in the image
- Let's say we want to build a face detector
  - We can check if the image has two eyes, lips, and a nose all inside an oval
  - If so, we have a face!



Images credit: Dave Smith

Artificial Intelligence in Insurance

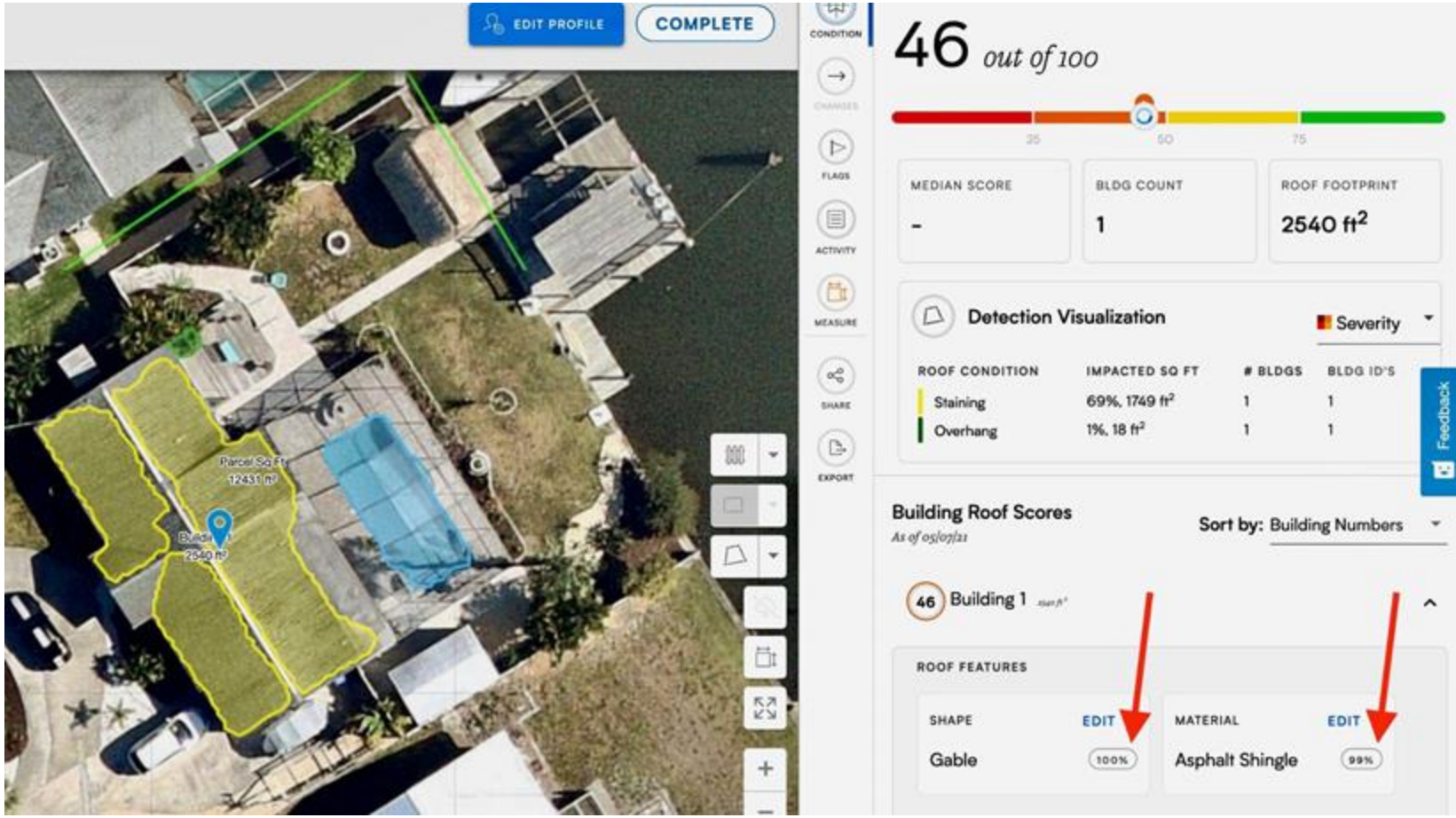
- AI applications can be incredibly powerful and provide tremendous value
- However, we need to be careful when using advanced forms of AI in important applications
- AI and humans sees the world differently
  - Humans have an underlying conceptual understanding of objects that AI does not
- The safest way to use AI in important applications is to demand transparency

Transparency in AI

- Transparency comes in many forms
- There are many questions to ask about models
  - What features are used?
  - Which features are most important?
  - What effect does a given feature have?
  - How much would the result change if a given feature changes?
  - How confident is the model?
  - How do we know that the model is right?
- No “one size fits all” solution to transparency
- The right way to do transparency will depend on the specific application

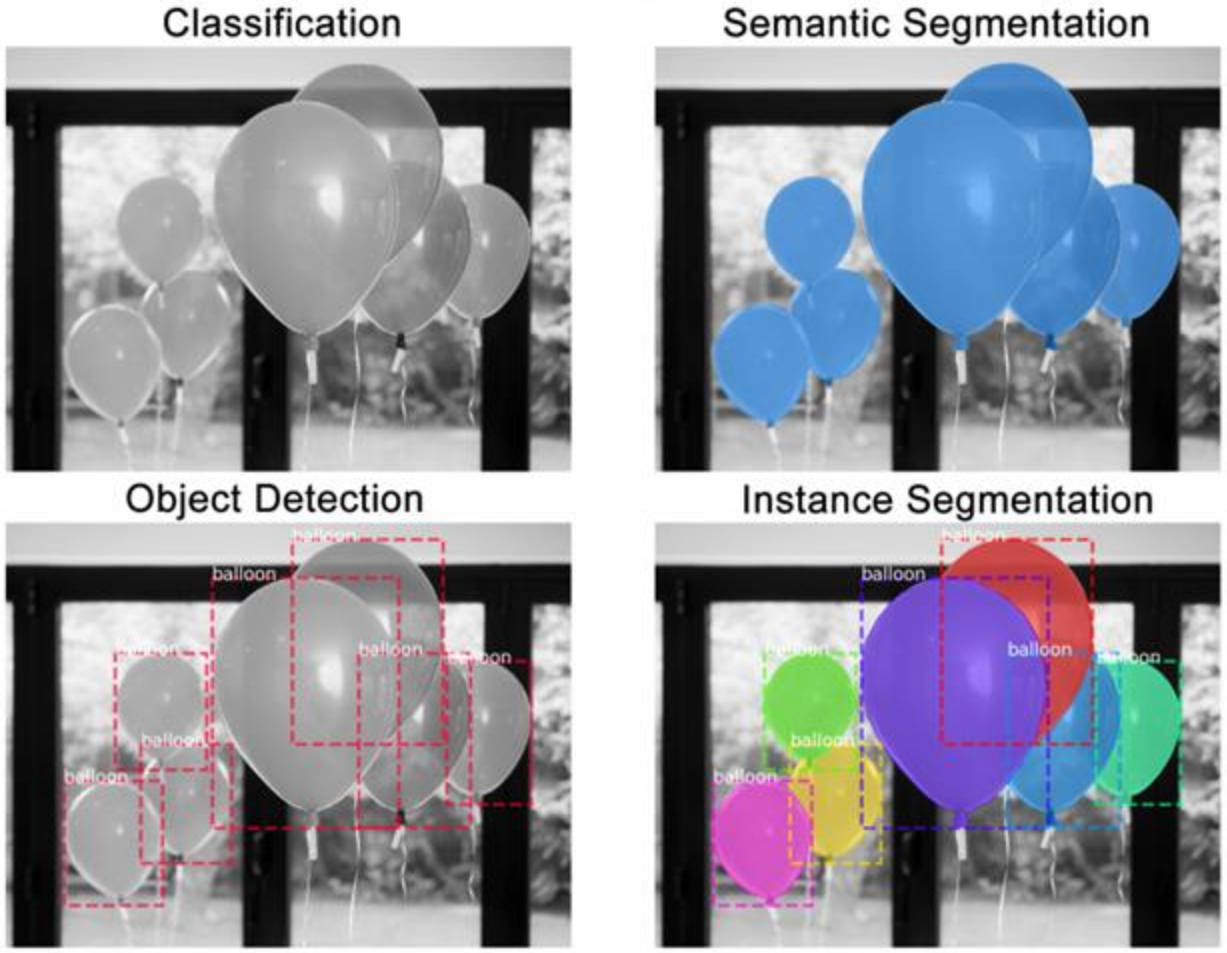
Model Confidence

- One method of providing transparency is displaying model confidence
- Works well for image classification models
  - Requires calibration



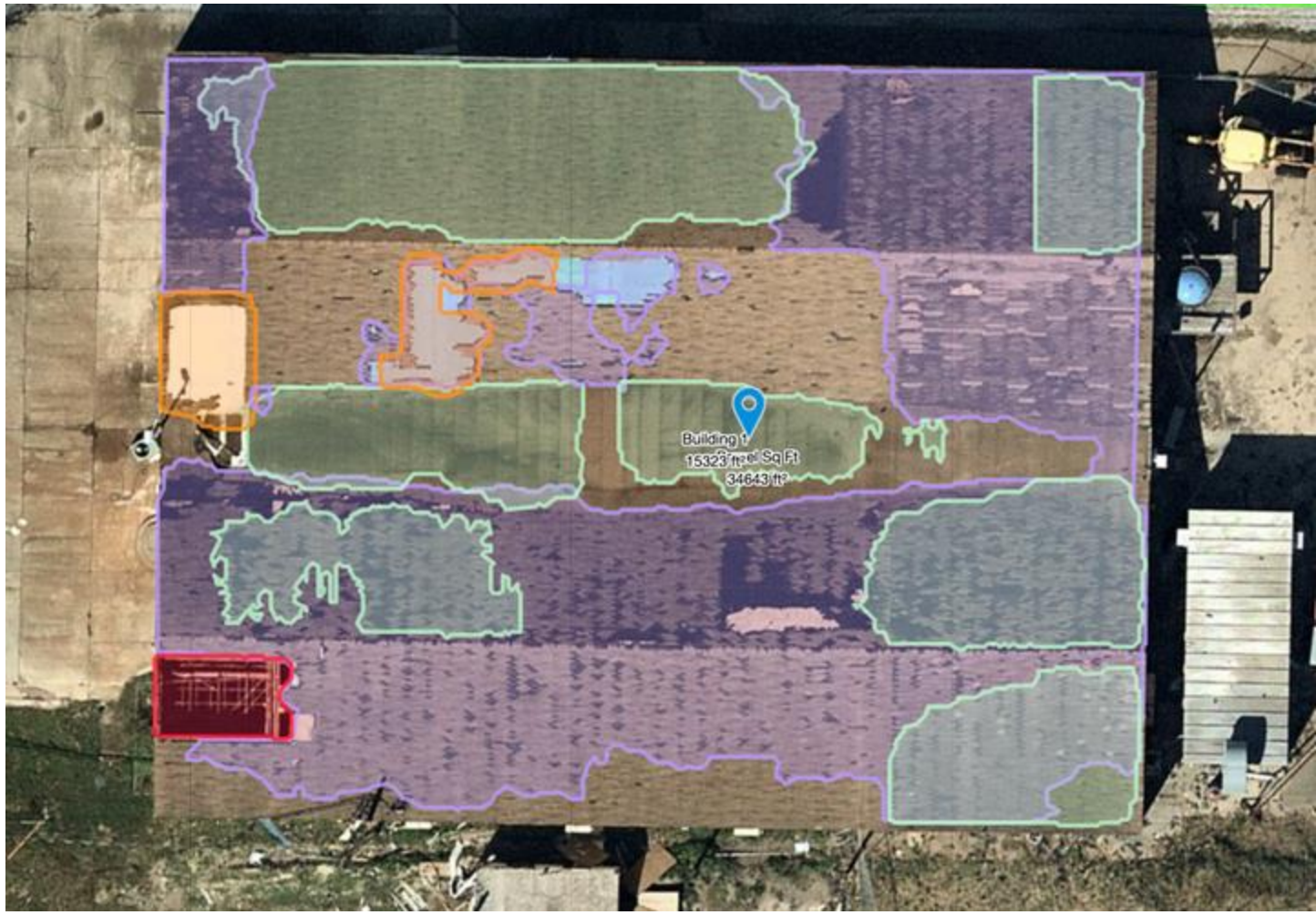
Beyond Image Classification

- It's possible to be more transparent simply by choosing a different task
- Instead of saying, "It's an image of balloons," say, "Here is where all the balloons are"
- Instead of saying, "This property is in bad condition," say, "Here are the problems with this property"
  - Easier to check if it is accurate



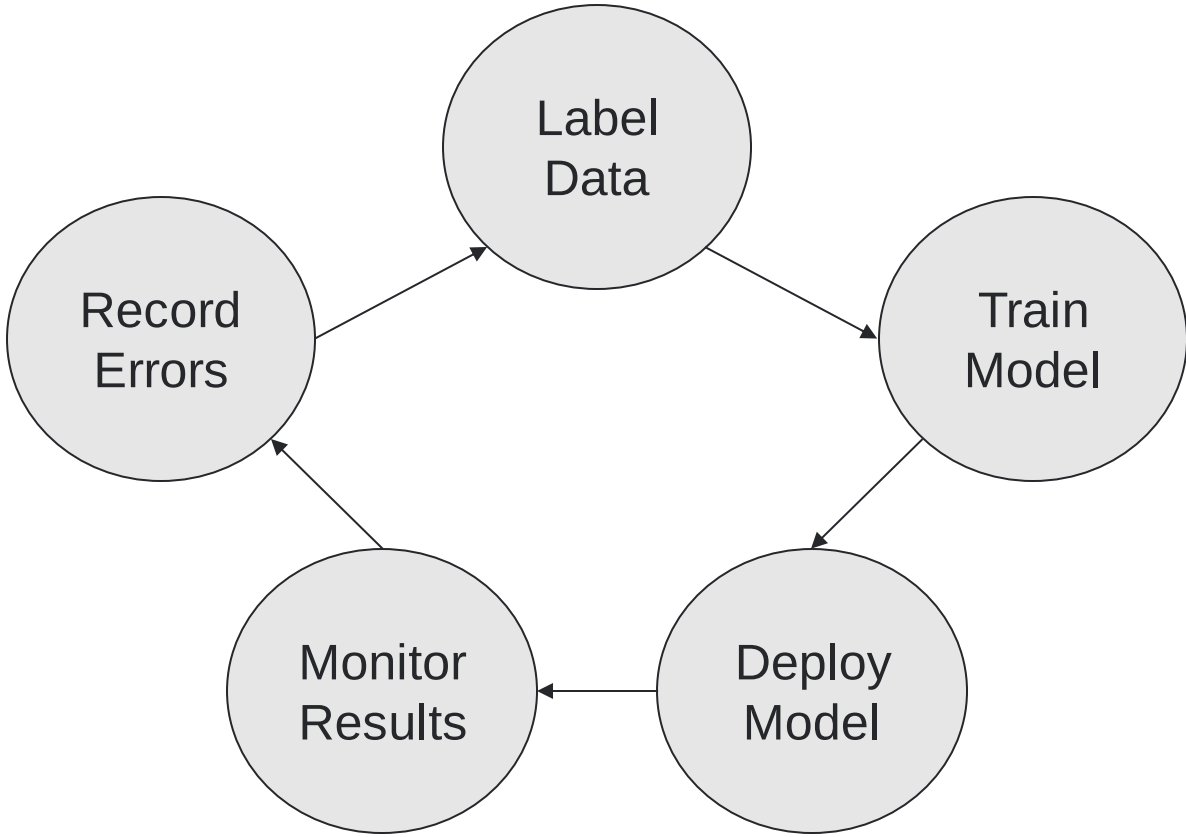
Showing Your Work

- Semantic segmentation is a more transparent way of determining property risk
- A process that shows exactly why it makes a determination is more valuable than one that hides it



Transparency and Performance

- What is the relationship between transparency and performance?
- A key to improving the performance of neural networks is to find data that represents the entire diversity of the target class
  - For example, most tarps are blue, but some are black or green
  - A tarp detector trained only on blue tarps is unlikely to perform well on tarps of other colors
- Without transparency, these failure cases will never be caught
- This optimal strategy is to have a continuous loop
- Transparency engenders greater performance

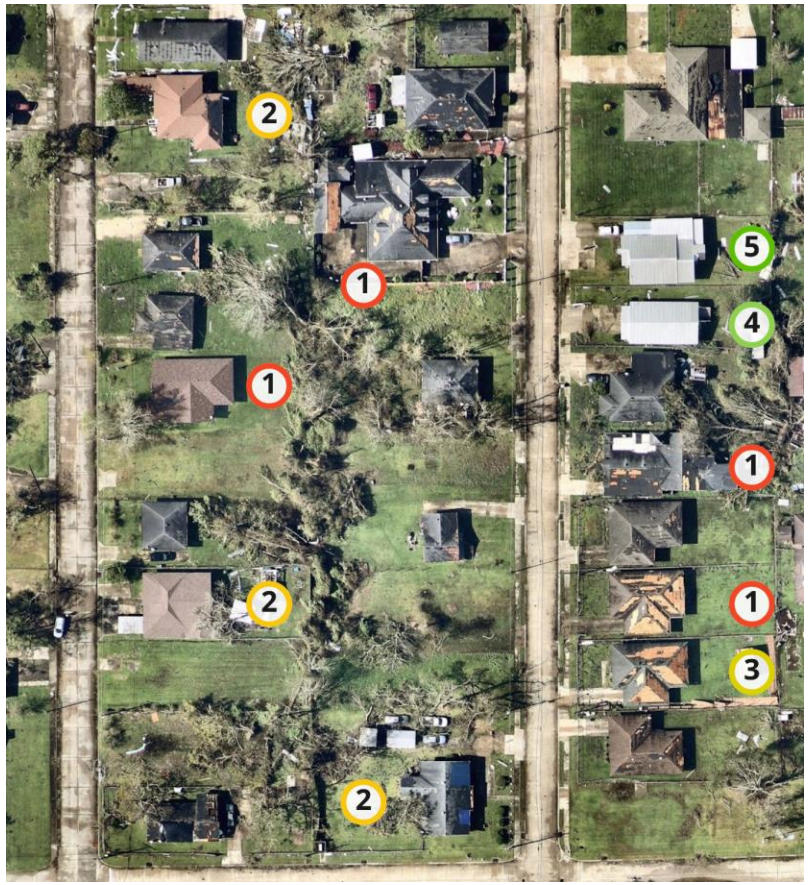


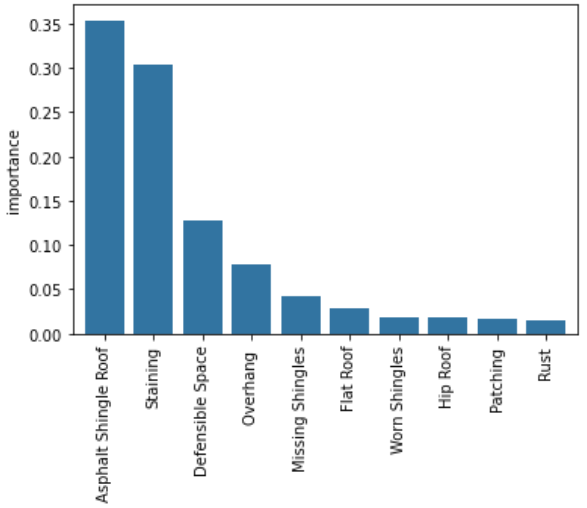
Risk Management Models

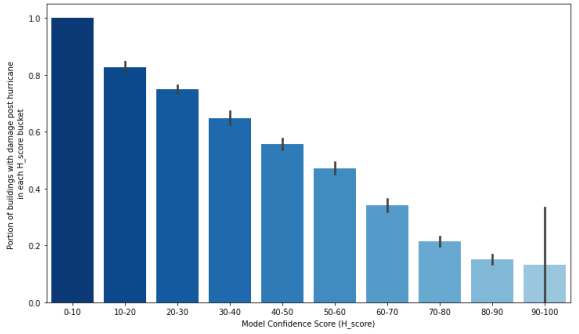
- Computer vision results can also be used as features for risk management models
- Can be combined with other features to create powerful and transparent models
- Models can target specific concerns
  - Overall property score
  - Roof condition score
  - Claims score
  - Catastrophe score

Disaster Modeling

- AI can also be used to perform disaster modeling
- Transparency will depend on the exact model, but we have the building blocks for transparency
- Important to understand what the model is paying attention to and why it matters
- Confidence scores for sophisticated rating models may require additional nuance because they combine information from many sources

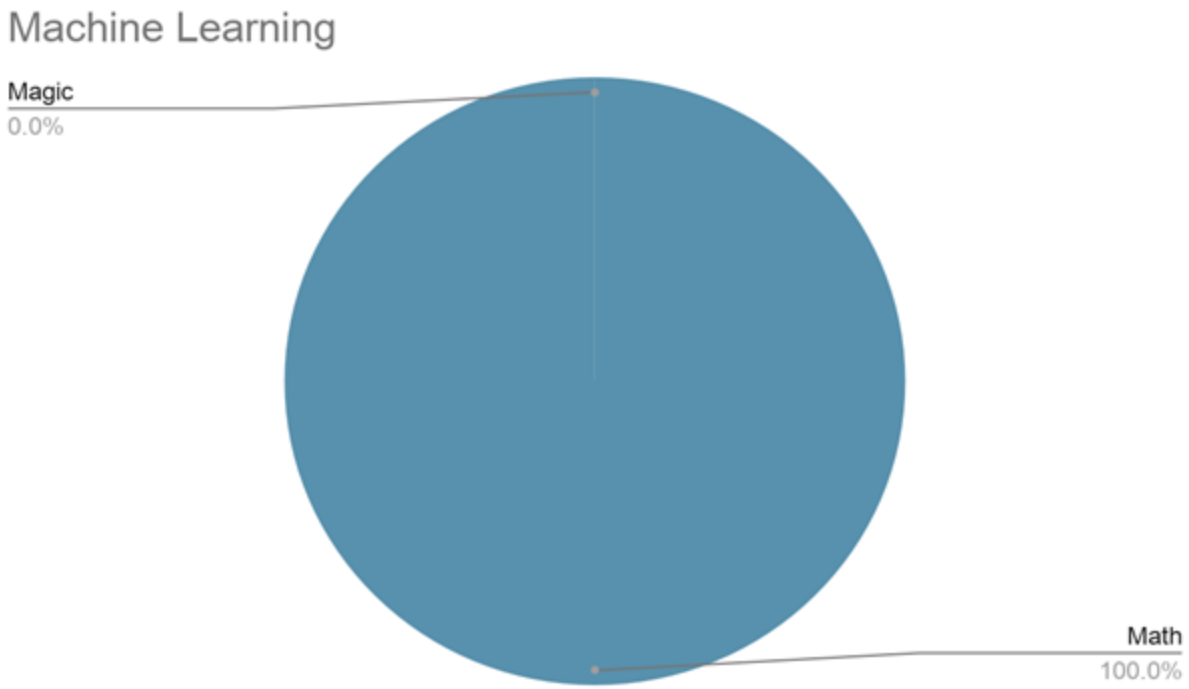






Conclusion

- Computer vision can play a vital role in property and risk management
- When used in important applications like insurance, it's necessary to demand transparency
- The mechanism of transparency will be different for different applications
- We can and must do better than black box explanations
- It's all math, no magic
    - Let's show our work



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Betterview Product Demo

Thank you.
Questions?

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