Computer Vision for the Built Environment

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VIRTUAL | MAY 25-28

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About Nomad Go

Founded in 2016

50 Years of Experience in Computer Vision

100+ deployments

Partner Sales Focus

amazon   Microsoft

Industry-Leading Computer Vision Solution

Easy to Deploy

Lightweight Infrastructure with Scale & Privacy

Trained on 20M+ Real-World Images

Venture-Backed

FLYING FISH

FITZ GATE VENTURES   VULCAN Capital

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What is the Built Environment?

EPA United States Environmental Protection Agency

The built environment touches all aspects of our lives, **encompassing the buildings we live in, the distribution systems that provide us with water and electricity, and the roads, bridges, and transportation systems** we use to get from place to place.

It can generally be described as the **man-made or modified structures** that provide people with living, working, and recreational spaces.

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Buildings are the #1 Global Polluter

Buildings are one of the five Grand Challenges
identified by the Bill Gates Climate Change Initiative

"Buildings account for 40% of energy use in the United States and 36% globally."

Dean Allen

CEO, McKinstry

Top Challenge in the Built Environment

What are people doing inside buildings?

Back to the Office:

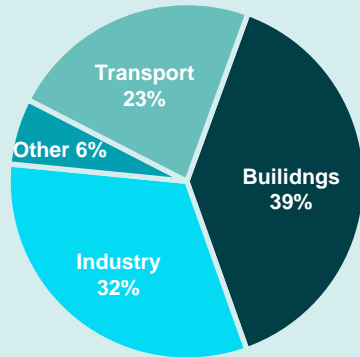Building Operations Efficiency (Health, Cleaning)

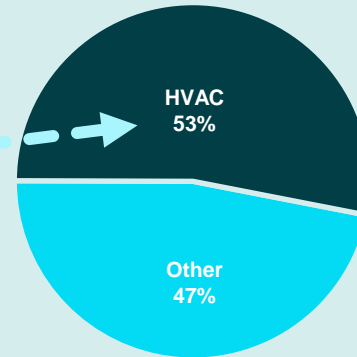**Visual Intelligence:**

How & When Spaces Are Used

Efficiency & Sustainability:

Reducing Energy Costs and Carbon Emissions

(HVAC)

The Lack of Building Occupancy Data is Wasting the World's Energy and Over 100M Tons of CO_2 Emissions a Year

▶ **Building operations generate 39% of global GHG emissions**

Transport 23%
Other 6%
Buildidngs 39%
Industry 32%

▶ **Over 50% of this comes from HVAC**

HVAC 53%
Other 47%

▶ **Up to 23% HVAC is wasted without occupancy data – DOE***

Waste 23%
Use 77%

Degrees

6 8
6 2

Scheduled On
Scheduled Off
Scheduled Off

12:01 AM   6AM   12PM   6PM   12PM
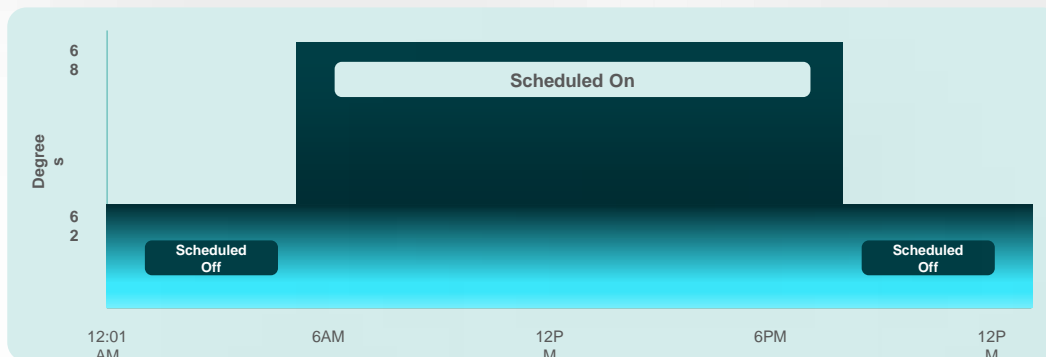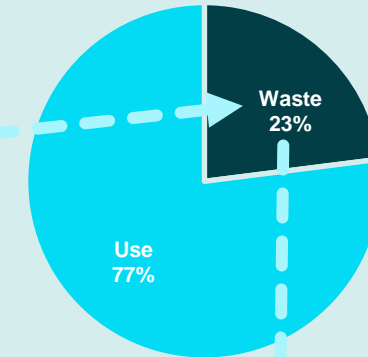
Most buildings heat, cool & ventilate with schedules, *regardless if anyone is occupying the spaces!*

* Department of Energy, "Energy Savings for Occupancy- Based Control (OBC) of Variable- Air-Volume (VAV) Systems"
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22072.pdf

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Current Solutions are Outdated & Ineffective

Motion Detectors

Binary. Only tells if someone is there – **not how many.**

Not real-time (15-30 mins lag) & needs calibration every 6 months

CO2 Sensors

Beacons

Only count the **number of devices**, not the number of people
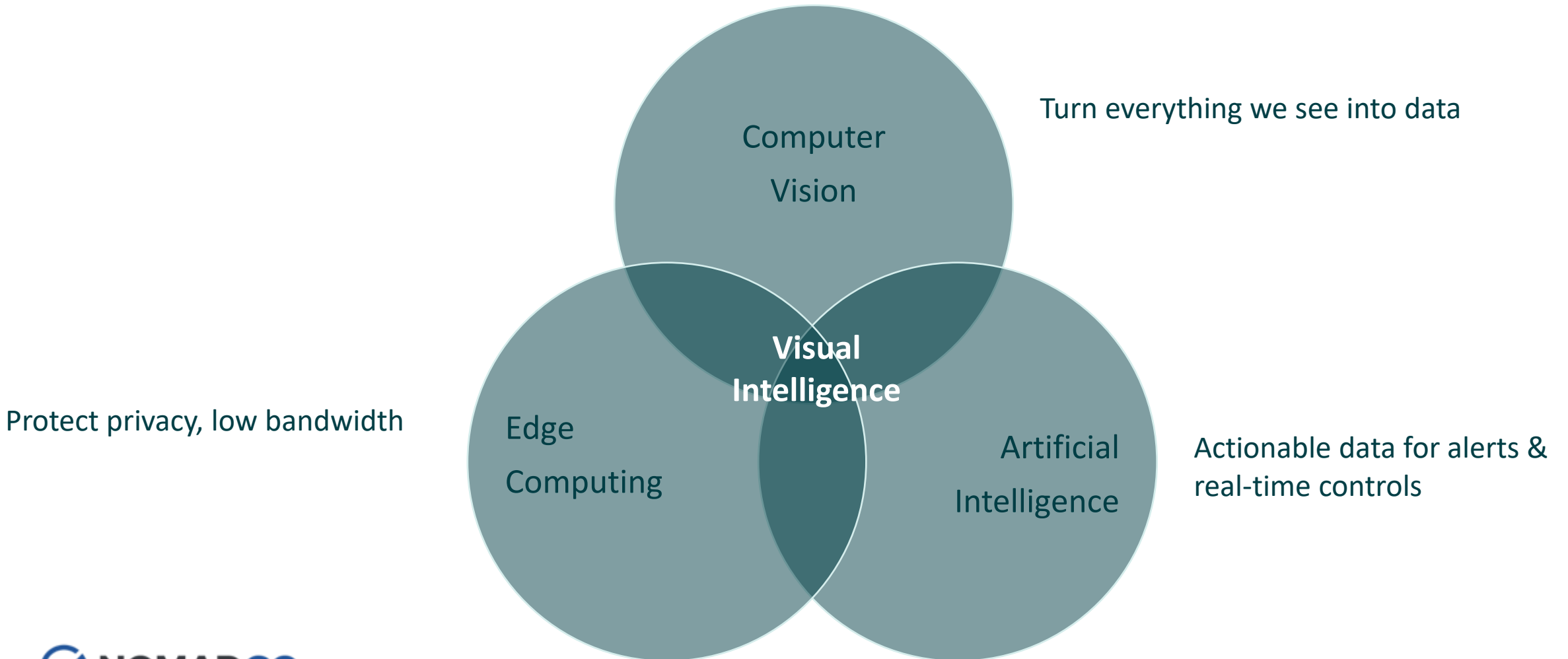
Only count **entries and exits with accumulated errors**

People Counters

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Solving these Challenges with Computer Vision

Accurate • Real-time • Privacy • Extensible

Turn everything we see into data

Computer Vision

Visual Intelligence

Protect privacy, low bandwidth

Edge Computing

Artificial Intelligence

Actionable data for alerts & real-time controls

Why Smartphones and Tablets?

World's Best Sensor

Powerful camera, built-in security and networking, highly durable, flexible and extensible
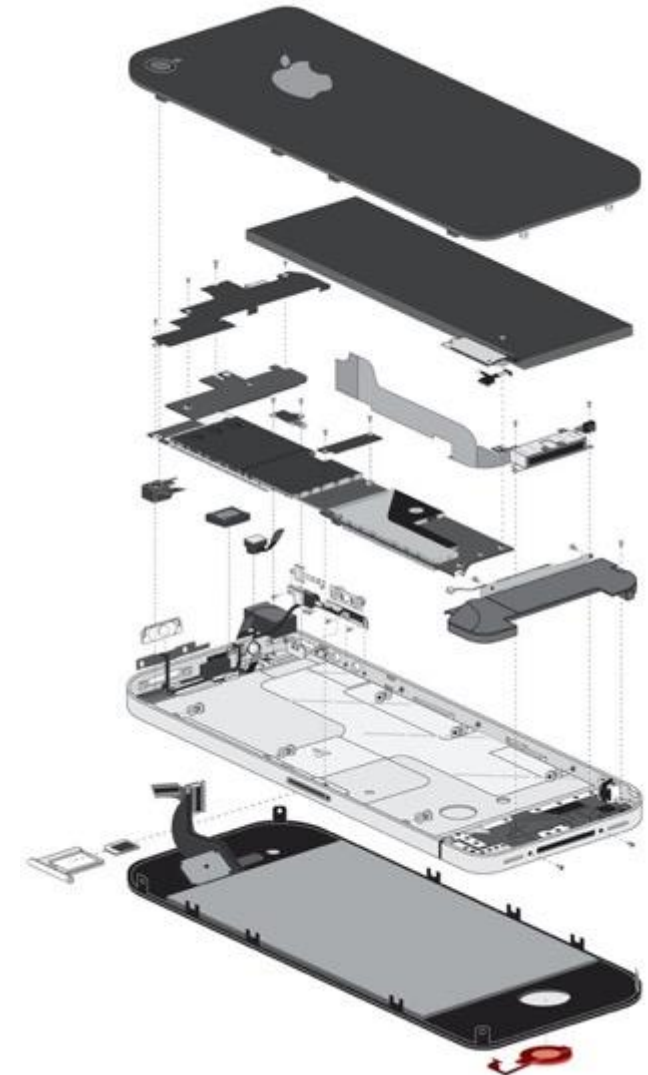
Edge Processing

Keep data local, secure, and real-time with on-device processing that protects privacy. Ability to update new models over the air.

Cost-Effective

Half the CapEx cost of comparable (processing power, camera quality, networking alternatives, security) security cameras and AI sensors
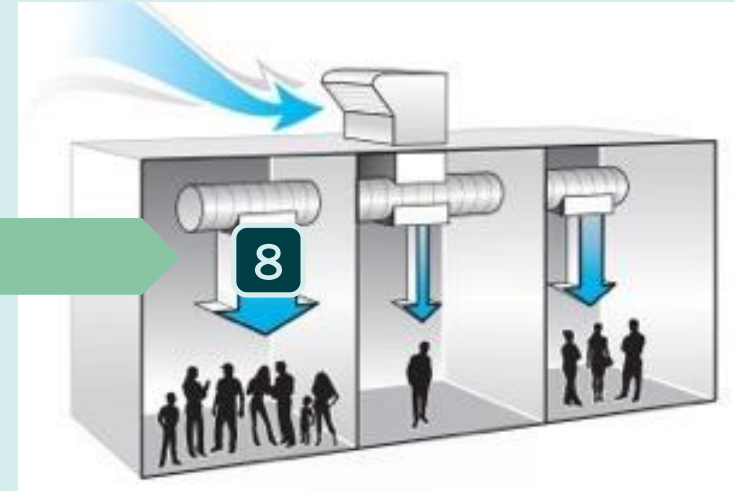
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Edge AI Computer Vision:
Occupancy-based HVAC: Real-time and Highly Accurate
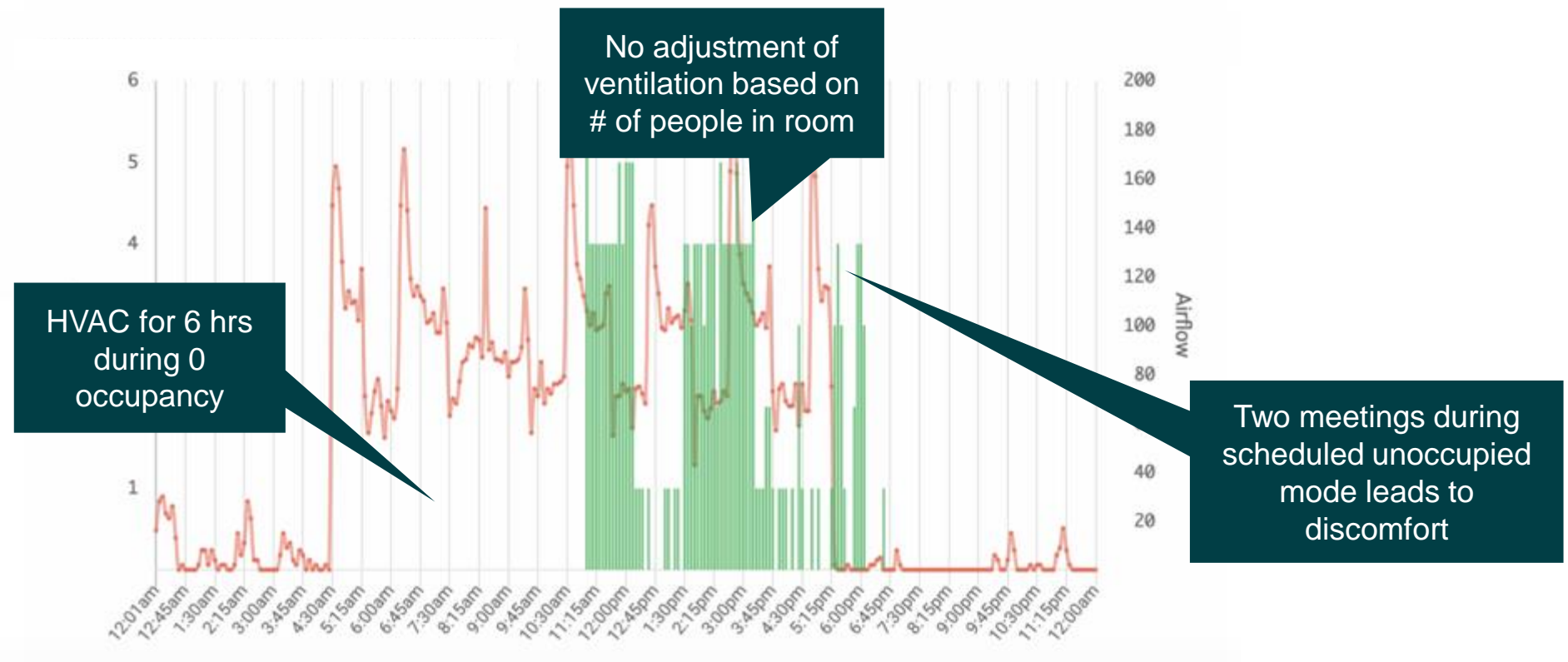
AI finds 8 people in space

Building automation system uses AI data for precise HVAC controls

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Why Live Occupancy Matters

Buildings Can't Predict When a Space is Used

Utilization Last 24 Hours

24% Usage/24 Hrs

No adjustment of ventilation based on # of people in room

HVAC for 6 hrs during 0 occupancy

Two meetings during scheduled unoccupied mode leads to discomfort

Scheduled vs. Actual Occupancy

92% → **25%**

Scheduled Occupied Mode   **Actual Average Occupancy**

Scheduled Occupied Mode (92%) (12am to 10 pm)

Potential Savings : 50%+ per day

Date	Value
3/12	36%
3/13	19%
3/14	18%
3/15	35%
3/16	16%
3/17	18%
3/18	37%
3/19	26%
3/20	7%
3/21	36%
3/22	11%
3/23	34%
3/24	35%
3/25	29%
3/26	35%
3/27	10%
3/28	24%
3/29	21%
3/30	36%

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Potential Costs Savings for 7 Common Areas

- **$52,000/year** Estimated annual HVAC spend (based on electric/gas bills)

- **$18,480/year** Potential OpEx savings (35%)

- **$370K** Improvement on net asset value

Greenhouse Gas Emissions Reduction

148 → **40**

Tons of C02/YR with Scheduled 92% scheduled HVAC

Tons of CO_2/YR with Occupancy-based HVAC

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Visual Intelligence Solutions

Energy & Sustainability
Usage-based building controls

Health and Safety
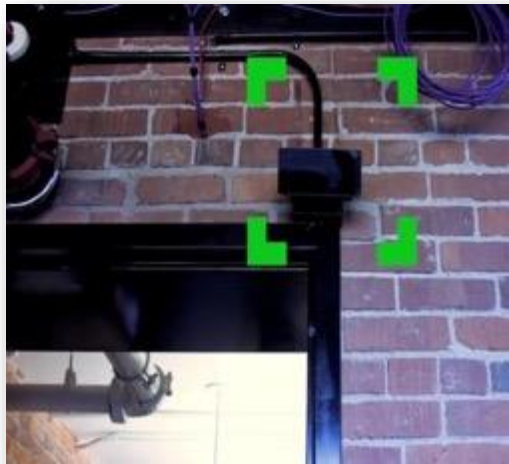COVID reopening & compliance

Space Utilization
Know how any space is used

How it All Comes Together

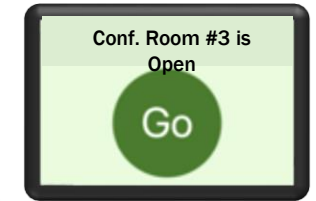**Smart devices & smart cameras collect and process computer vision on the edge**

AI processing of data for real-time out-of-the-box metrics

Real-time data feeds

Occupancy/Density/Traffic

Dwell Time

Mask Compliance

Distancing Compliance

Demographics

Survey

Dashboard Reporting

Conf. Room #3 is Open

Go

App/Alerts

API Access/HVAC Controls

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See Anything

Gain immediate visibility into facility activity

Measure Anything

Use AI to automatically measure and track

Impact Everything

From smarter building controls to safer spaces,
Visual Intelligence becomes your data backbone

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Thank You

Resources

Report: Nationwide HVAC Energy-Saving Potential Quantification for Office Buildings with Occupant-Centric Controls in Various Climates: https://www.sciencedirect.com/science/article/abs/pii/S0306261920312186

Bill Gates: https://www.gatesnotes.com/Energy/Buildings-are-good-for-people-and-bad-for-the-climate

Drawdown.org: https://drawdown.org/sectors/buildings