

Uncovering Hidden Risks & pSIF Prevention with Artificial Intelligence

September 29, 2021



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Learn tools & techniques to execute your strategy and be inspired by peers

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Build a network of peers whose experience can help you solve your challenges

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Actionable strategies to empower
EHS&S leaders to make an impact



NAEM Connects EHS & Sustainability Leaders

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Corporate Members

4,200

Individual Members

60

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Reaching a
community of Practice

25K+



Today's Presentation

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Meet Our Speakers



Natasha Porter
Chief Customer Officer
Benchmark Digital Partners LLC



Ronald "Chet" Brandon
Global Director of HSE
Special Metals, a PCC Company



Kade Medd
Manager, Strategic Growth
Benchmark Digital Partners LLC



Uncovering Hidden Risks & pSIF Prevention with Artificial Intelligence

Objectives & Agenda

Learning Objectives

- Understand more about technology and how it can support you in deriving real-time and actionable safety insights
- Explore technology in action supporting Significant Injury & Fatality (SIF) Prevention and operational risk mitigation

Agenda

- Overview of Benchmark ESG
- Tech Overview
 - What is Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT)?
 - How can you derive actionable insights by harnessing Tech to support Safety?
- Tech In Action ... Delivering Safety Insights!
 - Serious Injury & Fatality (SIF) Prevention
 - Operational Risk Mitigation
- Question & Answer





Benchmark Digital

Formerly Gensuite LLC

Trusted service partner for best-in-class
ESG digital transformation software solution platforms
for operational risk, compliance, and sustainable
business management systems!

■ Comprehensive Solutions Suite

- Built on best-practice workflows and integrated with the latest tech innovations

■ Cloud-Based, Single Version Software

- Readily configured & launched typically in <3 months with continuous evolution – never obsolete!

■ Streamlined Collaboration Platform

- Supporting ~300 global subscribers
- 1.5M+ users across 35 industries and in 30+ languages – no user licenses!
- #1 in Customer Service (Capterra)

■ Engaging & Empowering Stakeholders

- Real-time analytics & dashboards Cross-subscriber collaboration
- Global support in 9 countries
- 92% retention rate since 2015

Benchmark ESG™



Benchmark
Risk+Compliance™



Benchmark
Sustainability™



Benchmark
Stewardship™

Investment-grade operational ESG performance & metrics_{SM}

- Safety
- Environment
- Occ Health

- Quality, ISO, Operational Reliability
- Security

- Sustainability
- ESG Reporting

- Product Stewardship
- Responsible Sourcing

2020 VERDANTIX
Brand Preference #2
in EHS Software

2019 VERDANTIX
Product Award
Smart Innovator for
Sustainability

2020 VERDANTIX
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Product Compliance &
Regulatory Content

Benchmark Tech™



Mobile App



Virtual Assistant



Integrated AI

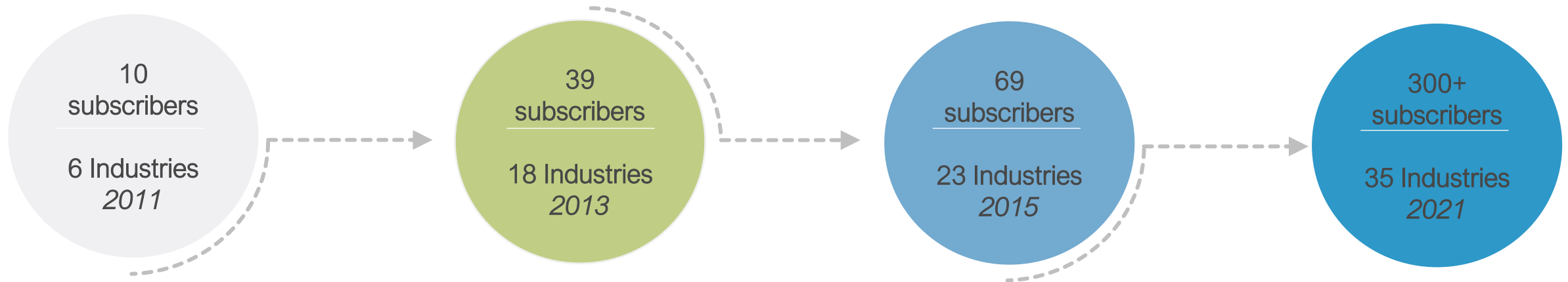
U Connect® In-App Collaboration

Analytics | Tableau®

Benchmark ESG | Gensuite® Story



FAST GROWING / HIGHLY ENGAGED GROUP OF SUBSCRIBERS



Built on a heritage of proven success in GE: 1997 – 2010

50% annual growth rate in subscribers since launch!

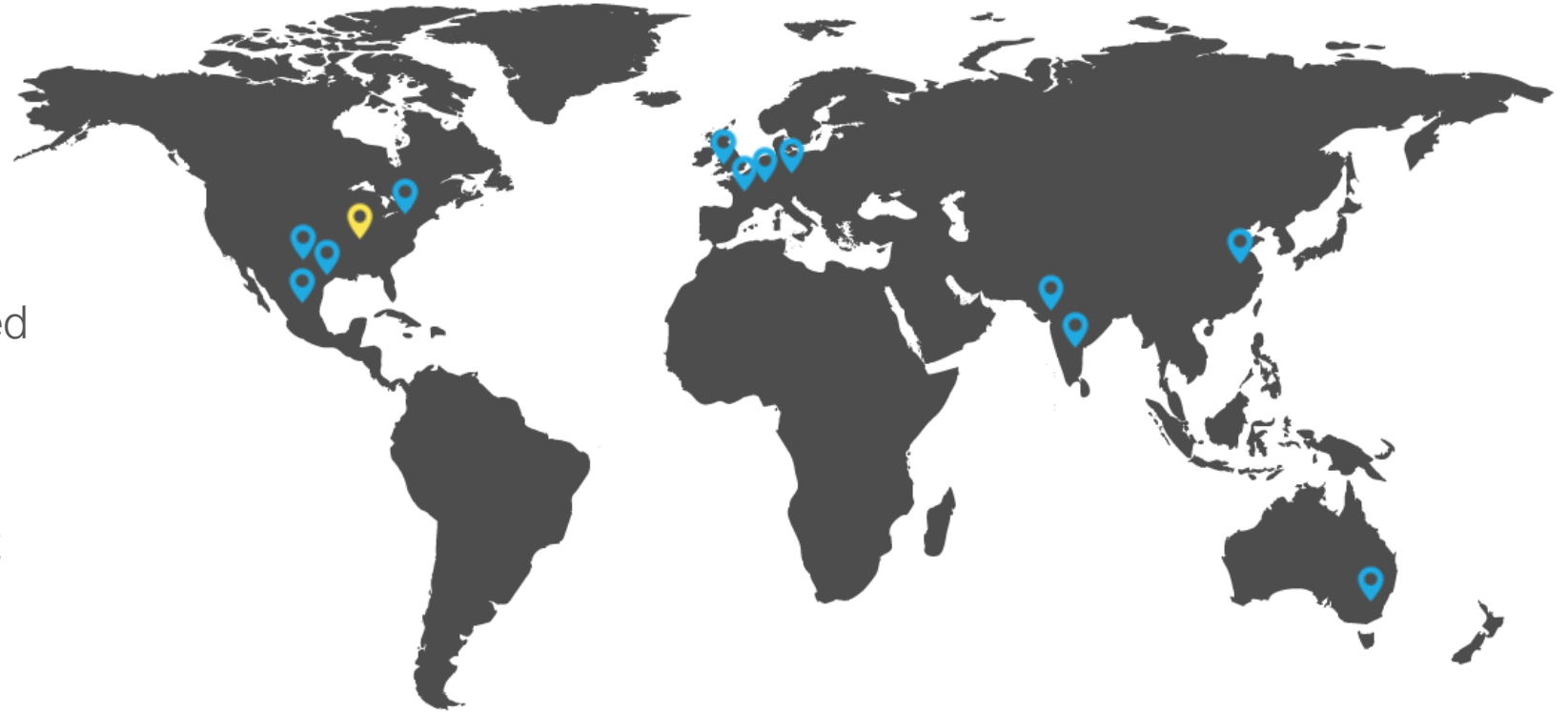
- 👍 25,000+ Sites
- 👍 1,500,000+ Global Users
- 👍 In 120+ Countries

- ♥ #1 in Customer Service (NAEM MIS Survey, Capterra)
- ♥ 92% Customer Retention Rate (since 2015)
- ♥ 100% On Time Launch, Typically <3 months

Global Subscriber Services Team



- 400+ global Benchmark Digital team members in 9 countries
- Global deployment capabilities with integrated service partner options
- Rapid response through dedicated support team with deep domain knowledge
- Product operations, development & innovation, round the clock
- Supporting subscribers/users in 120+ countries



Benchmark Digital
Global HQ



Benchmark Digital
Office Location

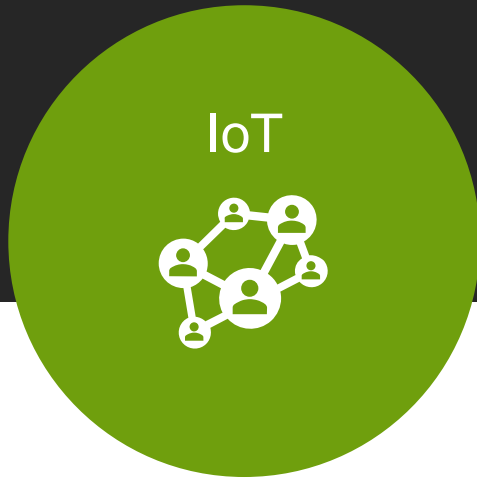


Technology Overview



What is Artificial Intelligence (AI), Machine Learning (ML), & Internet of Things (IoT)?

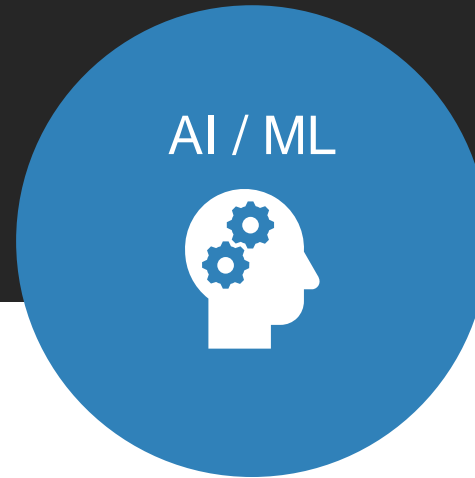
Collecting Data at the Point of Action



Internet of Things (IoT) is a **network of physical objects** that is connected for the purpose of collecting and exchanging data.

Value to Safety: Provides real-time data for *comprehensive & wholistic operational view*.

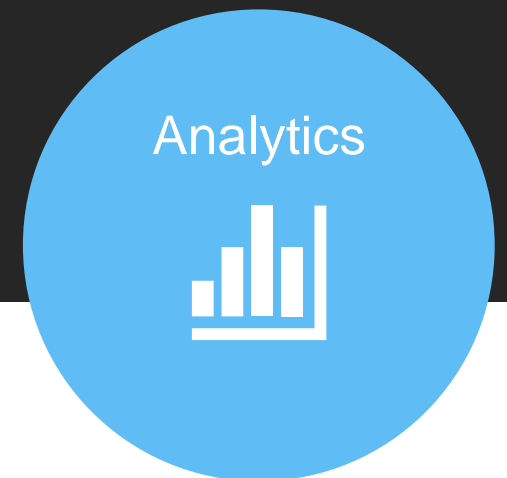
Analyzing Mass Quantities of Data



Evolving and learning algorithm(s) that can manage and **understand mass amounts of data**.

Value to Safety: Provides leaders *focused data sets that are actionable & provide new insights*.

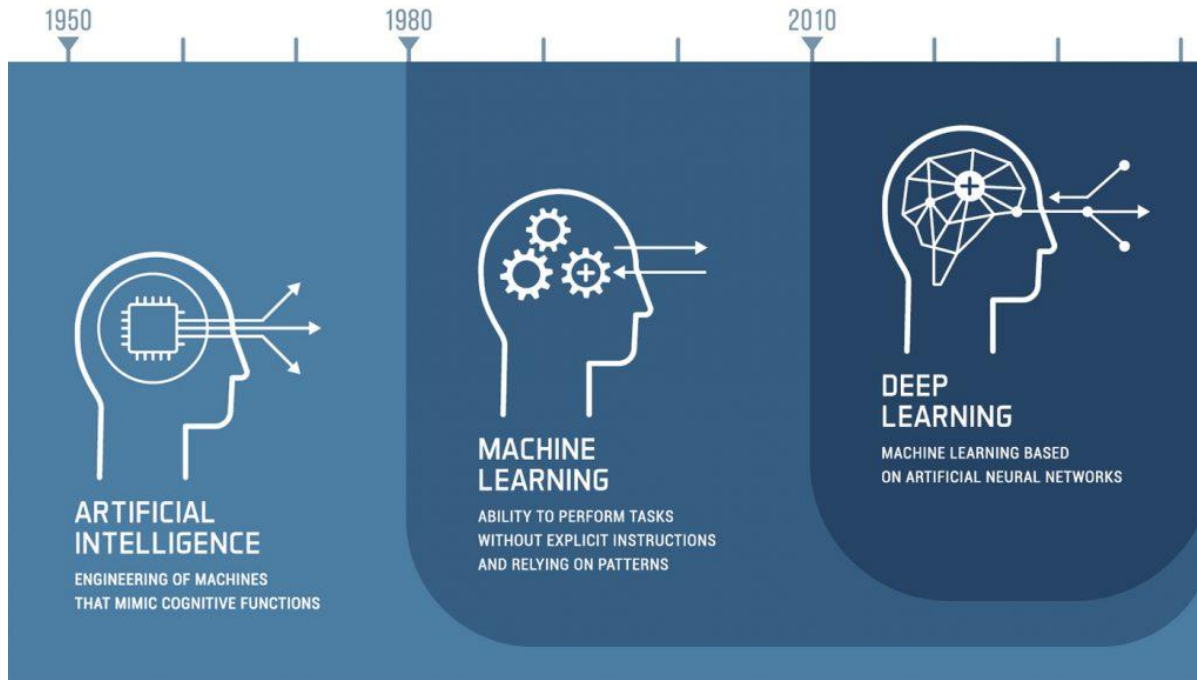
Deriving Actionable Insights



Synthesizes data for discover, interpretation, & communication of patterns.

Value to Safety: Aggregates data into a visual representation for *informed decision making*.

Artificial Intelligence & Machine Learning



Artificial Intelligence (AI)

- Computer program's ability to function like a human brain

Machine Learning (ML)

- Subset of AI, a statistical computer model to parse and learn from data and improve based on feedback provided over time

Deep Learning (DL)

- Subset of ML based on artificial neural networks, a series of algorithms to recognize underlying relationships in a set of data

Consumer Examples:



Spotify



Siri



Alexa





Internet of Things (IoT)

What is IoT?

- Interconnection of everyday objects embedded with the internet. Broad phenomenon with endless applications & technology

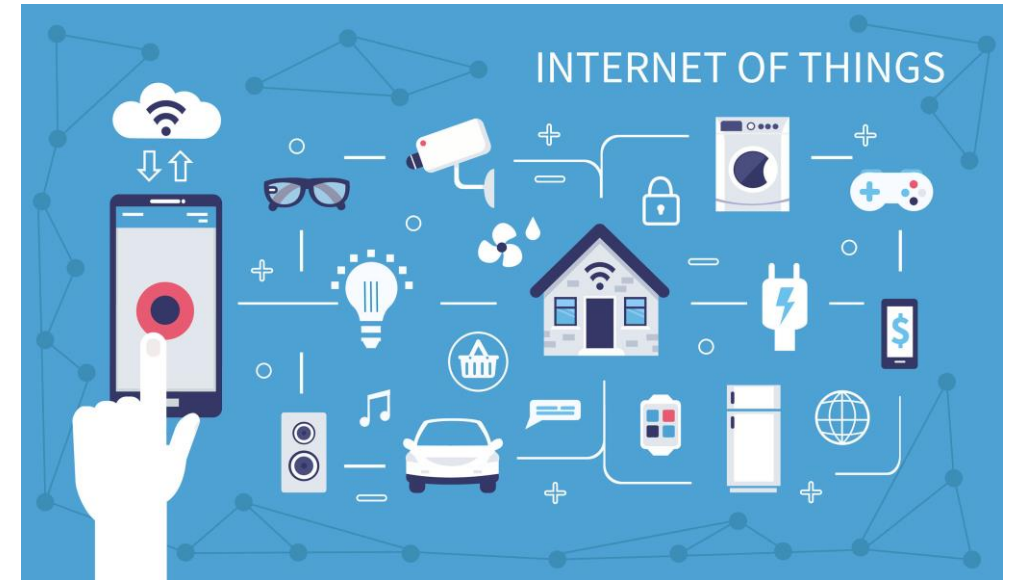
IoT Technologies

- Cameras, GPS, Bluetooth, Geofencing, Asset Tags, Barcodes, Beacons, Wearables, Sensors, Cellphones, etc.

Asset Tracking Example

- CIoT
 - Tracking of family members, pets, vehicles, personal devices, lights, furnace
- IIoT
 - Tracking fleets, equipment, employees, inventory, etc.

Consumer IoT



Industrial IoT



Let's take a quick poll!



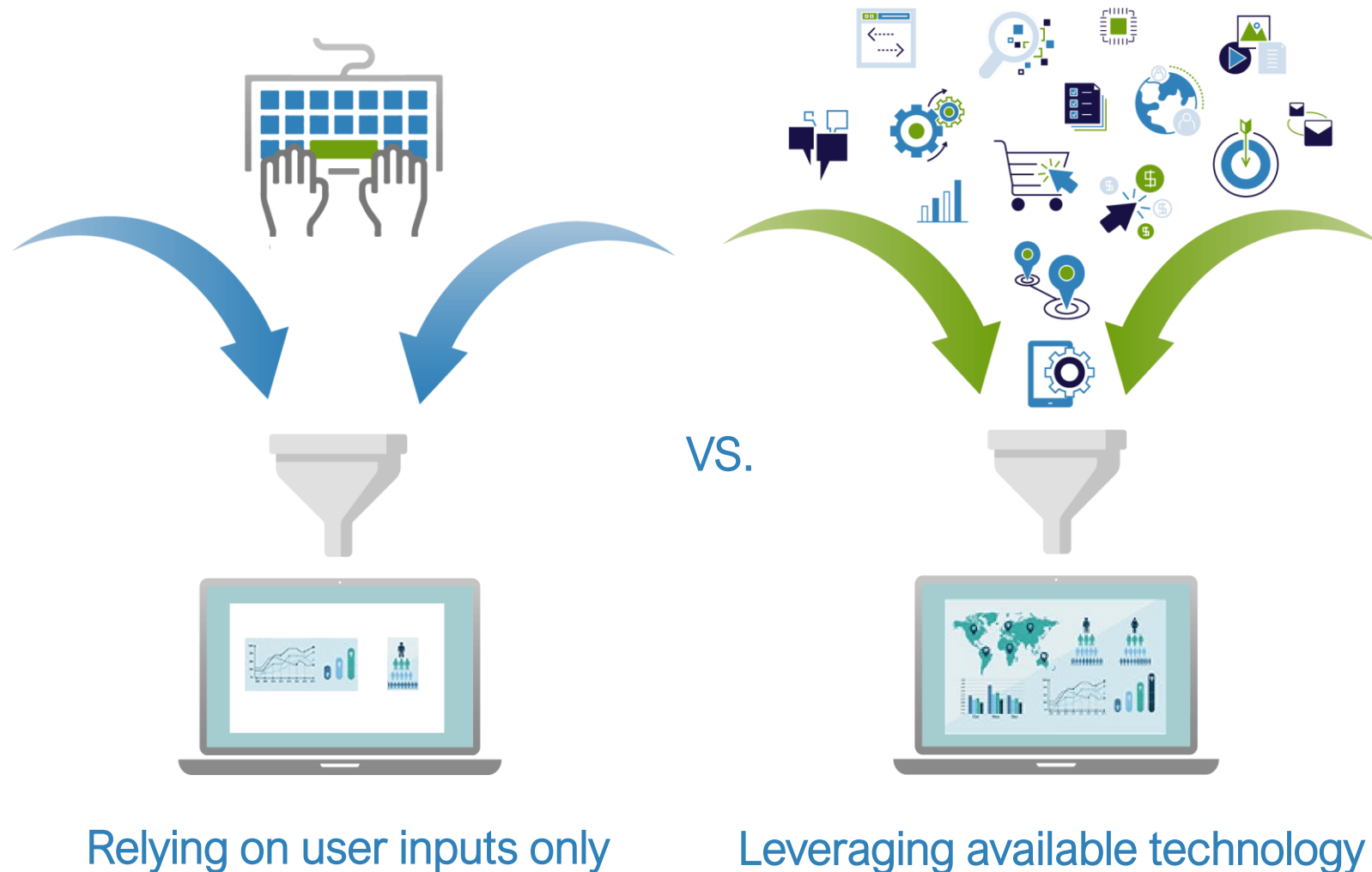
Where Are You on Your Artificial Intelligence,
Machine Learning, and Internet of Things
Technology Journey?





Analytics ... Tying it All Together

Analytics is a tool to visually represent data so leaders can make informed decisions.
Analytics is only as good as the data going in...



- ✓ Volume – Amount of data
- ✓ Variety – Amount of sources
- ✓ Velocity – Speed of data collection (real-time view)
- ✓ Veracity – An accurate representation of data
- ✓ Value – The right kind of data
- ✓ Variability – Different types of sources for data



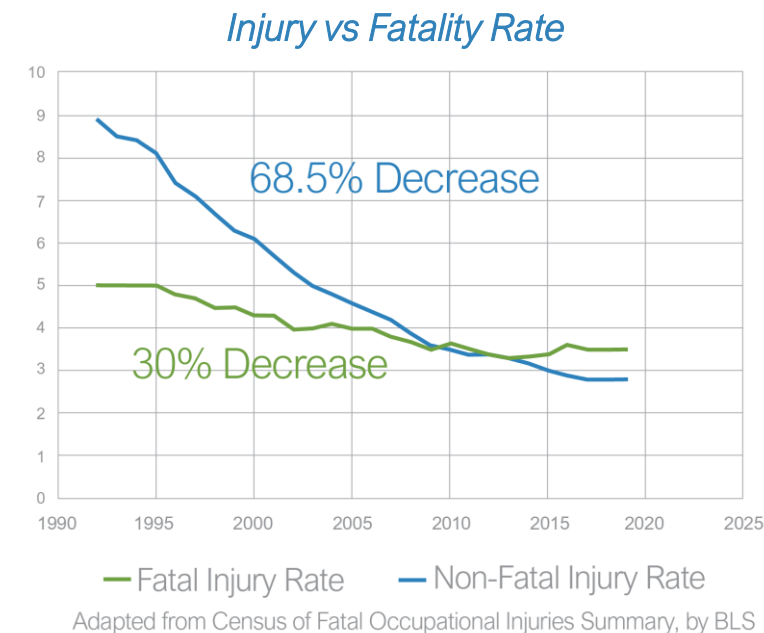
Tech in Action

Delivering Safety Insights



Serious Injury & Fatality (SIF) Prevention

- Total Recordable Incident Rate has been on the steep decline
 - “From 8.5 cases per 100 fulltime equivalent (FTE) workers in 1993 to 2.8 cases per 100 FTEs in 2019” (Source: Bureau of Labor Statistics, 2019)
- Life altering injuries and fatalities have declined only slightly over time
 - “5,333 fatal workplace injuries recorded in the US in 2019, a 2-percent increase over the 2018 count, largest fatal case count since 2007” (Source: Bureau of Labor Statistics, 2019)
- Reduction of potential for less serious injuries does not necessarily reduce potentially serious incidents & fatalities (pSIFs)
- Causes and correlations of SIFs are often different for less serious injuries
- Safety measures are more easily applied to risks with low SIF potential because they happen more frequently
- It is challenging to measure progress on SIF prevention due to innate infrequency



Reducing precursors to recordable Incidents does not necessarily reduce precursors to Serious Injuries & Fatalities



Identifying Potentially Serious Injuries & Fatalities (pSIFs)

Our Challenge in 2020

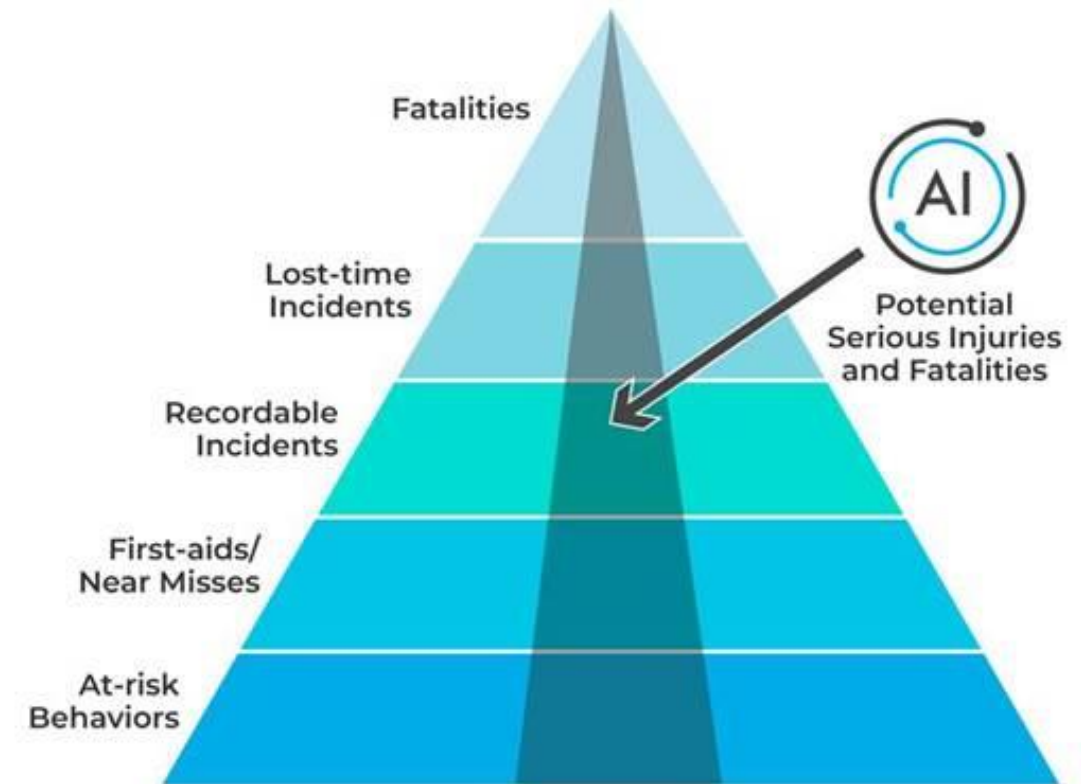
Can Artificial Intelligence help to narrow the data to the critical few?

Pilot Results

The Answer is Yes!

Artificial Intelligence (AI) can:

- **Quickly and consistently** identify potentially serious injuries & fatalities (pSIFs) across various data sets including Injury & Illness Cases, Events, Concern Reports, and Behavior-Based Safety Observations
- **Enable leadership to focus** on addressing operational & systemic issues that have the highest potential to lead to Serious Injuries and Fatalities
- Assist in **uncovering new and hidden risks**



Serious Injury or Fatality (SIF)...Occupational injury or illness that had, or reasonably could have had, life threatening or life altering consequences

pSIF... A scenario, situation, or activity that tends to precede or accompany – in some cases, predict – the occurrence of a SIF,

Also known as PSE, FSI, HiPo, etc.



Applying AI to pSIF Identification



2020 Pilot Objective

- Develop and apply an Artificial Intelligence (AI) engine to identify potentially Serious Injuries & Fatalities (pSIF) & High-Risk incident types
- Explore AI integration in Benchmark for real-time insights on pSIFs
- Partnership:  

Sample Data & Pilot Results

2015 – 2020

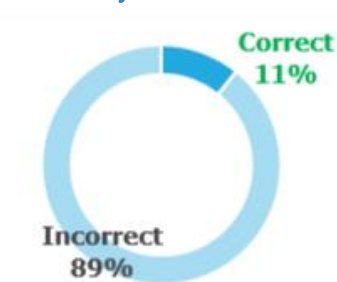
- Total I&I Cases: 3,229
- Actual SIFs: 37
- Potential SIFs: 141

Result #1: Accuracy of pSIF identification by AI Engine vs Manual User Selection

AI Engine Identified SIFs (60%+ Confidence)



Manually Identified Actual SIFs



Examples: "pinch injury to right finger", "Pain in right wrist while setting up panels", "right shoulder and back pain"

Result #2: Identification and comparison of High-Risk Incident Trends

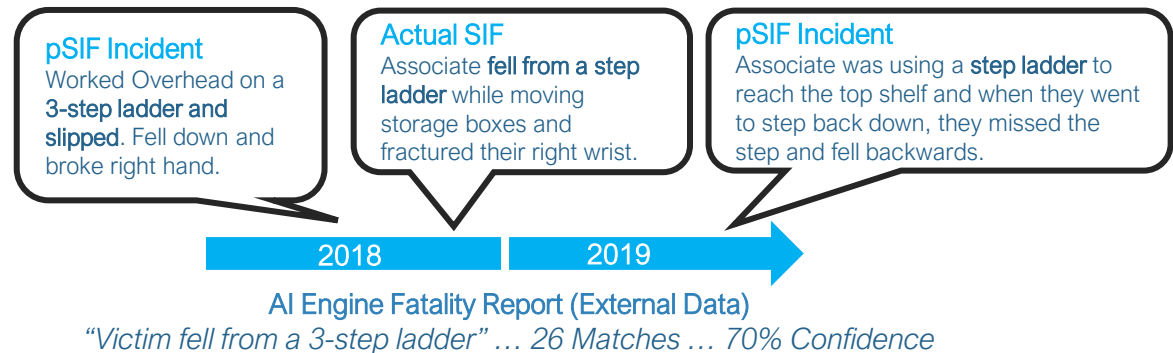
pSIF (Manual Selection; Correctly Identified) High Risk Incident Types



pSIF (AI Engine Identified) High Risk Incident Types



Result #3: Deep Dive pSIF to Actual SIF Connection





Integrated EHS Management System AI Tech

- Consider recommendations from pSIF AI Advisor in user's final determination
- AI processes results in the background upon record submission providing consistent analysis
- Aggregate results available in analytics

Incident Management

Add Case Record Incident Management

Injury/Illness Details

Injury/Illness Description (F)

Employee cut their hand while using a grinding wheel, wheel needs to be replaced

Illness

Site Case #

OSHA Recordable?

Recordability Rationale?

Place of Accident or Exposure

PSM Incident

No

Workers' Comp ID

Does this case meet the Escalation Policy criteria for notifications?

Serious Incident & Fatality (SIF)

AI

Ask pSIF Advisor!

AI

pSIF Advisor Recommendations

pSIF Advisor identifies *potentially Serious Injuries & Fatalities* through a dynamic AI analysis that compares reported incidents with an industry-wide knowledge base* of 10,000+ incidents that have resulted in fatalities. Use the pSIF Advisor's recommendations as one factor in pSIF Classification.

Incident Descriptions**	Employee cut their hand while using a grinding wheel, wheel needs to be replaced.	pSIF Classification (User-Selected)	Not Selected
Similar Incidents (Industry-Wide pSIF Knowledge Base)	Victim during a grinding operation was struck by an exploding grinding wheel. View More	pSIF AI Advisor Recommendation	Yes
High-risk Activity	crushed by machinery/moving objects	pSIF Confidence Rating	88.29%

*Powered by Bowers Management Analytics (patent pending 63082949)

**Benchmark Translator™ powered by Google®



Case Study: pSIF AI Advisor & PCC



Chet Brandon

Division Director, Global HSE, Special Metals

- Industry: Aviation & Aerospace,
- Headquarters: Portland, Oregon
- ~120 Operations / 75+ locations
- 30,000+ Employees

Manufacturer of complex metal components and products, airfoil castings, forged components, aerostructures, critical fasteners, seamless pipe, fittings, forgings, clad products, commercial and military airframe structures, metal alloys and other materials for casting & forging

Integrated the pSIF AI Advisor into Incident and Concern Reporting Workflow beginning of 2021





pSIF AI Analysis in Risk Mitigation

- Reviewing higher occurring pSIFs through integrated analysis in the Incident Management and Concern Reporting Modules



- As PCC drives Incident Rate down leverages employee concerns to analyze operational risk
- Creating Audit forms to look for behaviors, conditions and safeguards
- Documenting findings in Benchmark ESG | Gensuite. – Inspection Tool & Risk Registry



- **Leveraging Technology Partnership with Benchmark to Enhance Functionality**
- Member of workgroup of 6 other businesses which meet to discuss how to best utilize the pSIF AI Advisor functionality
- Helps shape the future of the pSIF AI Advisor feature enhancements

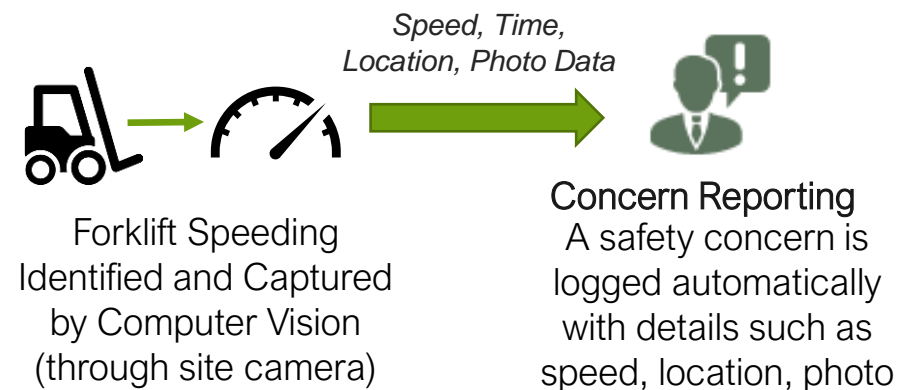
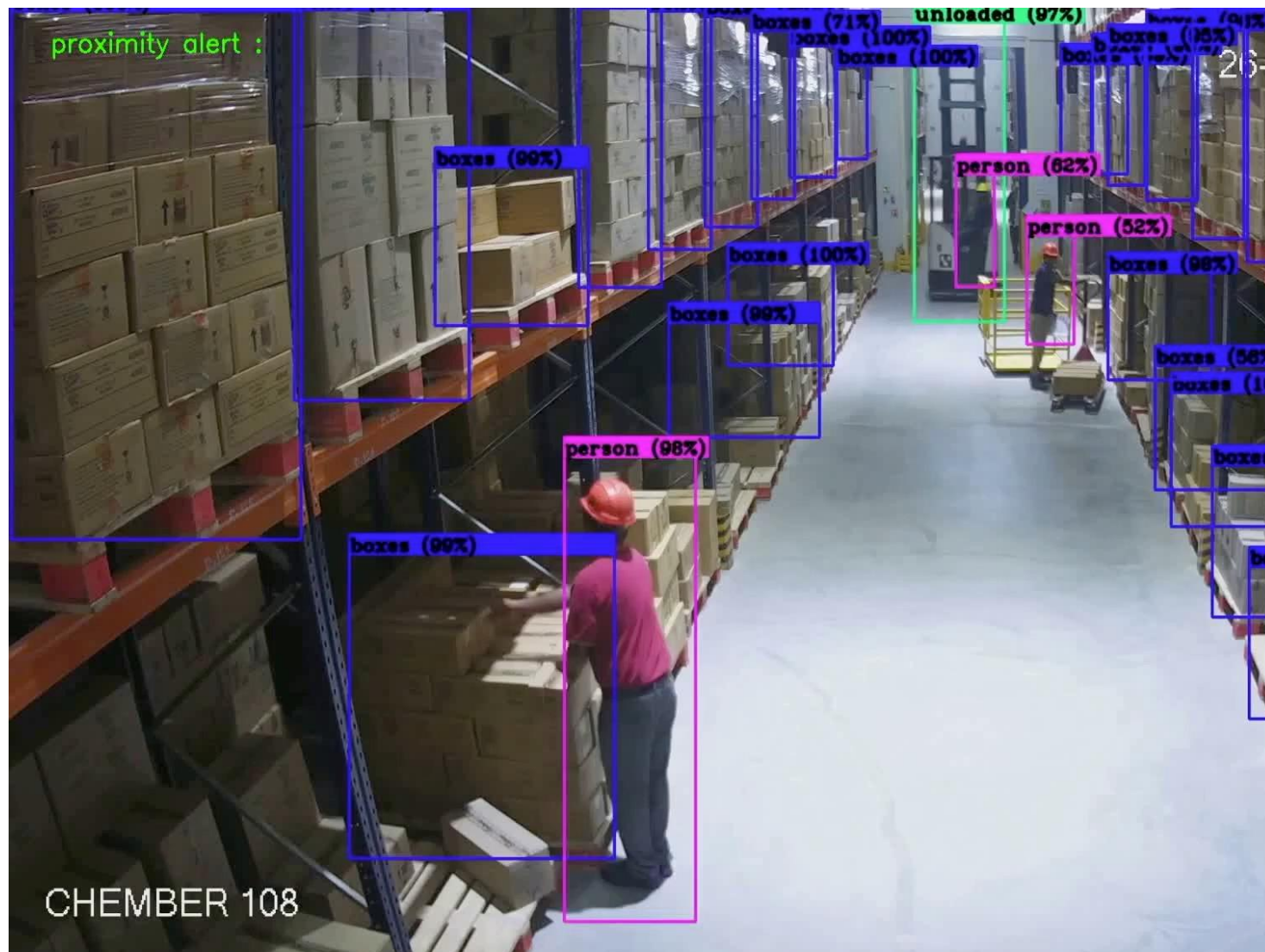


AI & IoT

Tech in Action
Going to the Next Level



Computer Vision & Hazard Identification ... Integration Prototype: Forklift Speeding



-
- (Optional) Trigger alarm installed in the area or on the vehicle
-
- Email Notification & Follow-up Workflow
 - Data Reporting & Analytics

Prototype Now Live!



Let's take a quick poll!

Which Technology Solution In-Action
resonated with you the most?



Q&A

Thank You



Natasha Porter

Chief Customer Officer

Benchmark ESG | Gensuite

Natasha.porter@benchmarkdigital.com



Kade Medd

Manager, Strategic Growth

Benchmark ESG | Gensuite

Kade.medd@benchmarkdigital.com



Ronald (Chet) Brandon

Division Director, Global HSE

Special Metals a PCC Company

CBrandon@specialmetals.com

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be available in 3-4
days. You will
receive an email
once it's posted
to our site.



Have a safe &
healthy day!