Intel Digital Readiness Programs

www.intel.com/digitalreadiness

Accelerating Future of Work

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Key Presumptions

- AI is everywhere but AI skills are not available everywhere. People who use AI responsibly will replace people who don’t use AI.

- Both Work and Learning are human-centric social experiences. If work is changing with AI, the learning experience must evolve.

- Everyone talks of the big picture of AI, but we need the small picture also. Leaders act, not just talk. What can we do to make a difference now?

AI & Digital Readiness For Workforce

increased Digitization – Digital GDP growing 2.5X faster

All Jobs increasingly need digital skills and getting impacted by AI

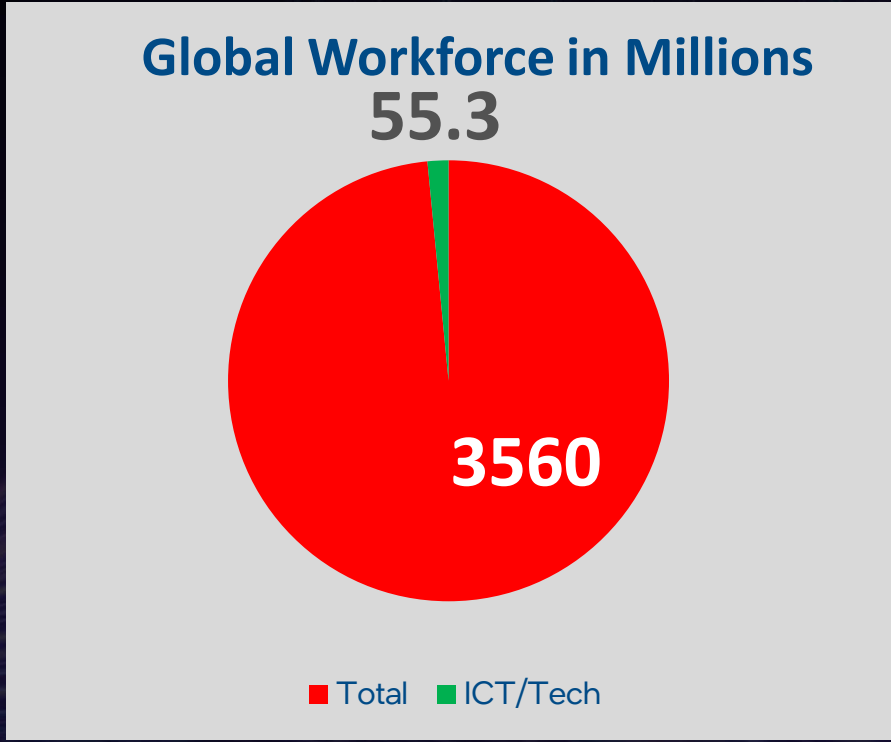
All Jobs increasingly need green skills

All jobs will need more digital trust and applied ethics

Semiconductor skills as the foundation for new competitiveness

The world needs new digital readiness (more skills, trust & responsible usage of emerging tech) for all workforce.

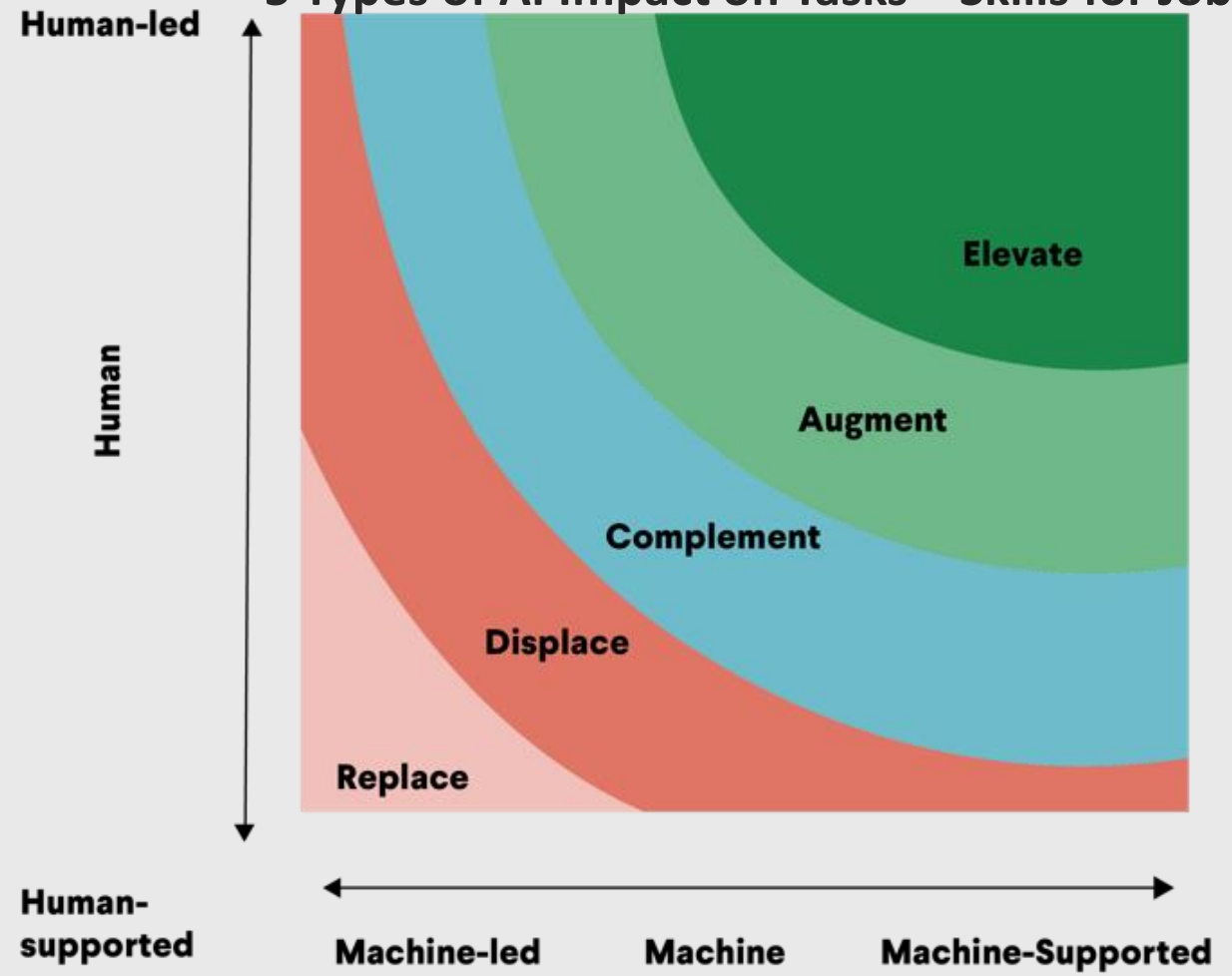
Need to prepare larger workforce, not just <2% workforce in tech industry



Source:
- Worldwide Labor - 3.56 Billion – ILO estimate Nov 2022
- ICT Labor - 55.3 million in 2020 – Statista projection

44% of the labor force to be affected by AI in 3 years - Morgan Stanley

AI & Future Of Work



Source: Intel – JFF Analysis

Industry-specific disruptions In

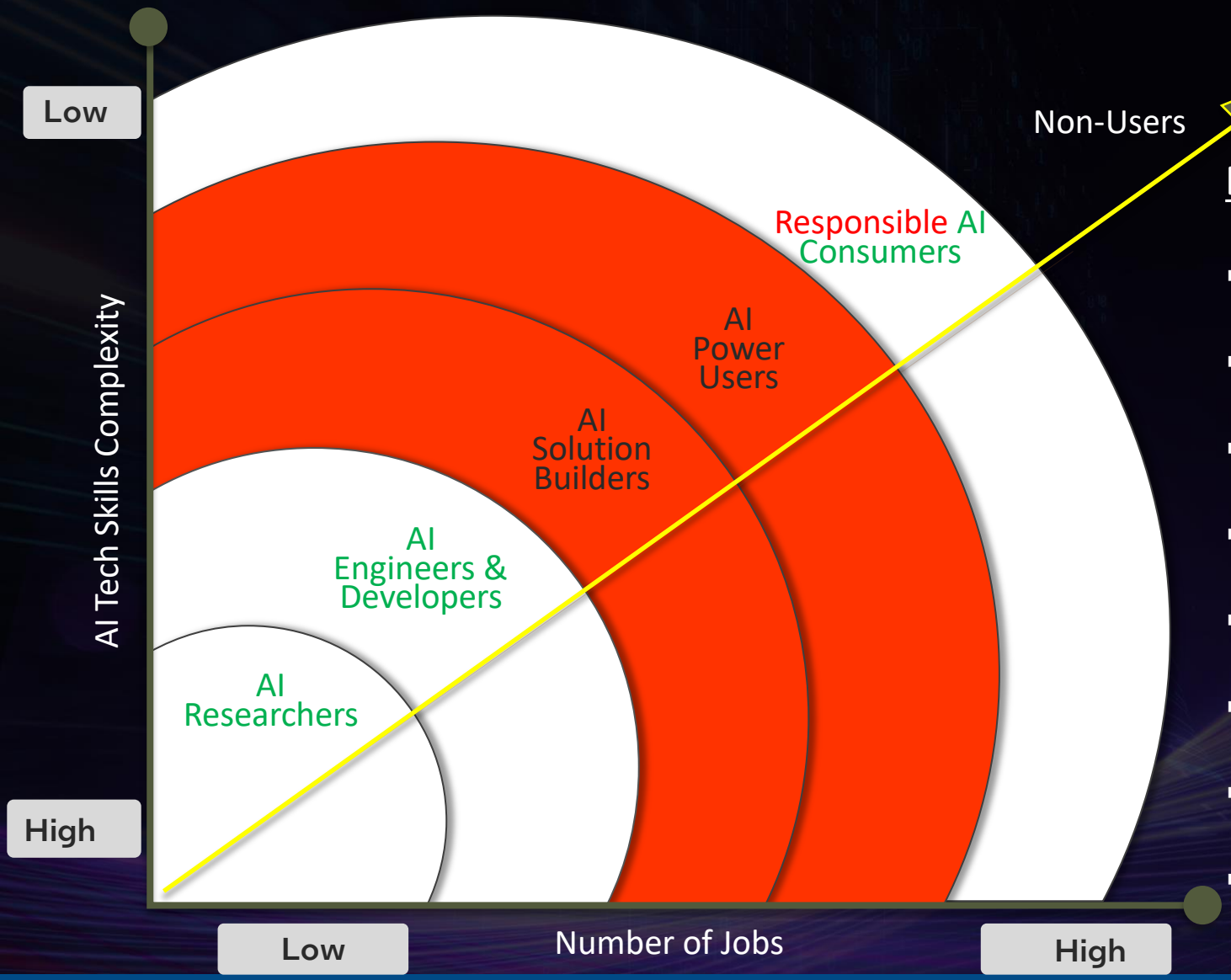
- Work-Job
- Work-Task
- Work-Place
- Work-Chain

❖ **Workers earning <38K p.a. 14 times more likely to lose jobs than those earning>58K p.a.**

❖ **Women 50% more likely in jobs that need urgent transition**

Source: Mckinsey Research

AI Skills Are Not Available For Everyone



Emerging deeper inequalities and gaps:

- **People**: Skills, Gender, Location, Color, Ethnicity
- **Diversity**: People, Models, Data
- **Fairness**: Explainability, Trust, Privacy, Hallucinations
- **Technology**: Access, Compute, Data, Sustainability
- **Ecosystem**: Government, Academia, Businesses
- **Job migrations**: Ghost work
- **Productivity Paradox**: Jobless growth
- **Mindsets**

How to demystify and democratize AI tech skills and emerging social skills and aspects for all?

What is Un-AI-able: Premium Human-Centric Skills

Need to reimagine work

Industry-specific Jobs-Tasks

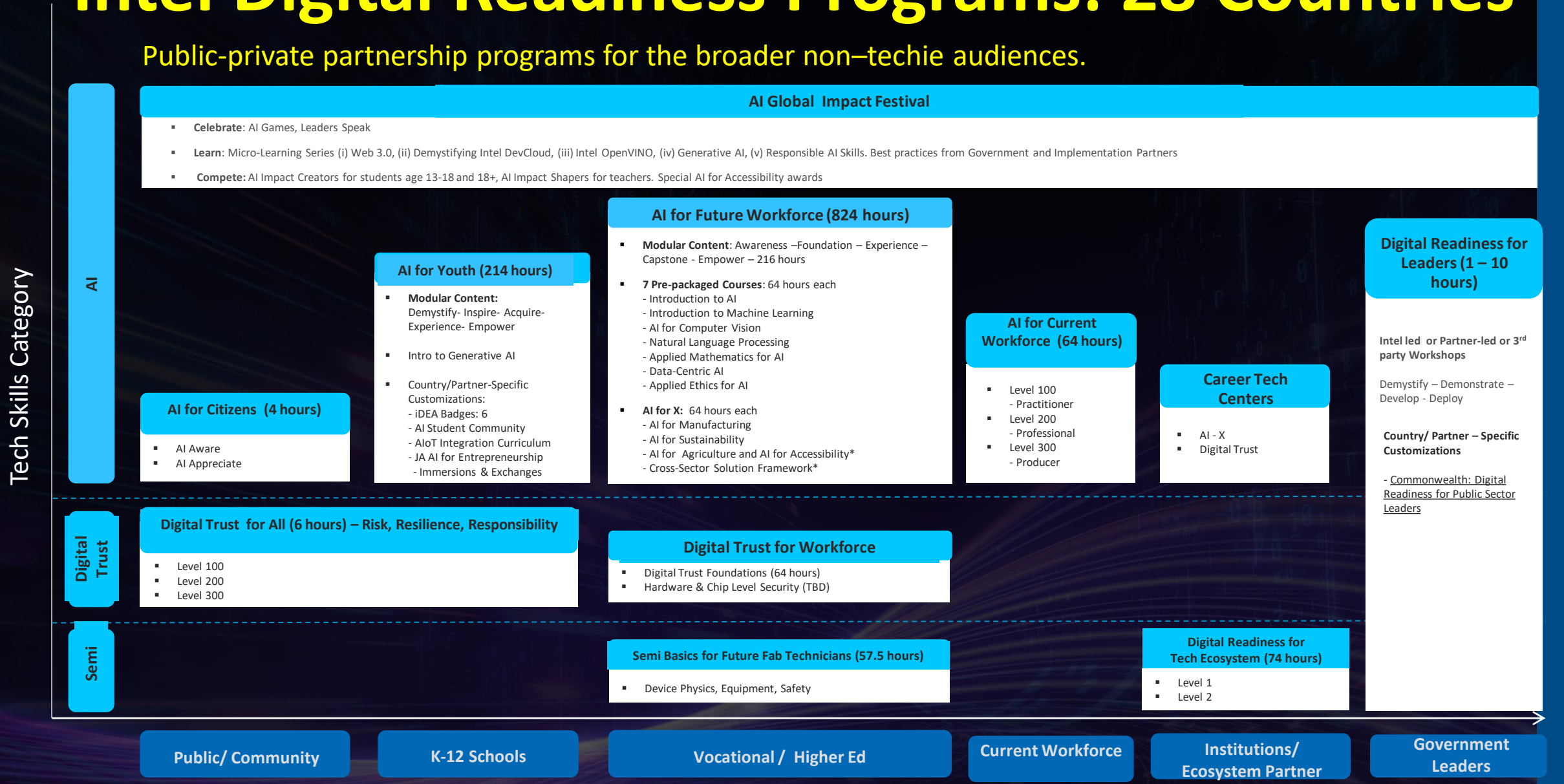
and hence

Skills Development

By preparing for a new Human-Machine Partnership

Intel Digital Readiness Programs: 28 Countries

Public-private partnership programs for the broader non–techie audiences.



Hi-Tech + Hi-Touch, Open, Shared Value-Shared Responsibility model

Vocational + H.Ed: (1) Full Modules Summary

Awareness (6h)

1. **Emerging Technologies – AI** (1h)
2. **AI Made Easy – Demystification** (1h)
3. **What is Inside AI** (1h)
4. **Impact of AI on Your Future - Surviving AI** (1h)
5. **Inclusive AI** (1h)
6. **Control Your AI Destiny** (1h)

Foundation (57h)

Industry Use of AI – Part 1 (No-Code) (Using *Analytics Software, No Programming Required*) (11h)

7. Introduction to AI Project Cycle (1.5h)

8. Common Trade Applications of AI (9.5h)

- Predictive Maintenance
- Image Classification
- Viral Post Prediction
- Employee Attrition Prediction
- Insurance Fraud Detection
- Quality Assurance System

Programming Fundamentals (7h)

9. Introduction to Programming using Python (3h)

10. Python Functions & Packages (NumPy, Pandas, Scikit Learn) (4h)

Industry Use of AI – Part 2 (Coding Approach) (24h)

11. Common Trade Applications of AI (24h)

Novice Level
1. Predictive Maintenance using **Linear Regression**
2. Recommendation System using KNN Model

Intermediate Level
3. Viral-Post Prediction using **K-Means**
4. Employee Attrition Prediction using **Linear Regression**

Advanced Level
5. Insurance Fraud Detection using **Random Forest**
6. Quality Assurance System using **Artificial Neural Network**

12. Deployment: Visualization (Dashboard) (4h)

13. CGS^ – Design Thinking (4h)

14. CGS^ – Systems Thinking (3h)

15. CGS^ – Entrepreneurial Mindset (4h)

Experience (129h)

16. ML/DL Techniques *(includes SL, UL, RL)* (4h)

Statistical Data[3] (28h)
- **17.** Data Import and Processing
- **18.** AI for Statistical Data Walkthrough
- **19. Guided Example:** Predicting Loan Approval†

Computer Vision[3] (28h)
- **20.** Basic Techniques in Computer Vision
- **21.** From Traditional Computer Vision to AI
- **22.** Types of Inference Models with OpenVINO and NCS2
- **23. Guided Example:** Pneumonia Detection†

NLP[3] (28h)
- **24.** Data Collection & Processing for NLP
- **25.** Classification for NLP
- **26.** Creating a Chatbot
- **27. Guided Example:** Hotel Reception Chatbot†

28. CGS^ – Social Emotional Skills (3h)

29. AI Ethics (2h)

30. AI Project Pitfalls (4h)

IoT (1/2, 16h)
- **31.** Introduction to Implementing IoT
- **32.** IoT for improving operational efficiency
- **33.** IoT for improving customer satisfaction

IoT (2/2, 8h)
- **34.** Working with Intel® RealSense

35. Developing Solutions with Intel® oneAPI (8h)
1. OneAPI Data Analytics Library
2. OneAPI Deep Neural Network Library

Intel® oneAPI/DPC++ via Intel® DevCloud (36-40 h)

Capstone (24h)

Solution Building (24h)

Students will apply their acquired knowledge to solve at least two of the 3 real-world problems.

They will use algorithms & libraries of their choice to build their AI solutions (following the AI Project Cycle).

36. Solution Building 1
Building AI Solution for Health Tech
(e.g. Fitness Tracking)

37. Solution Building 2
Building AI Solution that Helps Companies Predict/Forecast Outcomes
(e.g. Price Forecast, Inventory Level)

38. Solution Building 3
Building AI Solution to Identify Object of Value
(e.g. Visual Inspection/ Classification)

Practical Training (4 months+)

39. Practical Training (4 months)

Industry Training
Attachment to trade-relevant employers

Simulated Training
Trade-relevant sample project for Students not working with employers

AI for Education Sample Project
(to be provided by the educational institute)

Program Duration:
216h (excluding Practical Training)

[3] Students must complete min. 1 domain
† Indicative examples, can be expanded by institution as needed
^ CGS = Career Growth Skills
--- Resources from Intel OneAPI Academy

(2) Ready to deploy Pre-packaged Courses

Each Course is 16 weeks, 64 hrs in total – 64hr x 8 courses = 512hr

Intro to AI

- Basic concepts and applications of artificial intelligence (AI)
- Introduction to AI project cycle
- Focus on issues surrounding AI
- Ethics, Bias, Culture, Regulations, and Professional expectations

Intro to ML

- Introduction to Machine Learning concepts
- Introduction to Python applications
- Data Acquisition and Data Modelling
- Supervised and Unsupervised learning

AI for Computer Vision

- Basic techniques to process images using OpenCV and Python libraries
- Apply AI in CV for common tasks like Image Classification and Object Detection

Applied Ethics for AI

- Appreciate the role of responsible AI in benefiting society
- Explore ethical principles and frameworks for designing/evaluating AI solutions
- Identify and mitigate common ethical pitfalls in various stages of an AI project

Natural Language Processing

- Fundamental concepts in NLP and text processing
- Creating a Language Recognition application

Applied Mathematics for AI

- Basic concepts for the role of Mathematics in AI
- Application of Statistics, Linear Algebra, Probability
- Application of topics with reference to their role in the AI Project Cycle.

Data-Centric AI: Data-first approach to AI

- Focus on the data aspect of AI
- Learning how to work with data (statistical, text, and visual)
- Continuous improvements to datasets improve AI solutions
- Integrate and manage data pipelines with MLOps

Intro to Generative AI

- Explore applications of generative AI in various fields
- Develop practical skills in AI project development with the use of different tools
- Examine ethical implications of use of generative AI in various fields

Adding more in 2024

(3) New AI – X Courses

AI for Manufacturing (64 hours)	AI for Sustainability (64 hours)	AI for Agriculture (32 hours)
• Introduce students to applications of AI in the manufacturing sector	• Discuss how AI can aid in tackling societal challenges for a sustainable future	• Introduce students to applications of AI in the agriculture sector
• Explore AI industry use cases and techniques like quality monitoring, predictive maintenance, and demand forecasting	• Covers fundamentals of AI, Sustainability and Sustainable Development Goals (SDGs)	• Explore AI industry use cases and techniques relevant to the agricultural sector
• Discuss ethical concerns and guide students to develop responsible AI	• Discuss potential of AI for addressing environmental, social, and economic sustainability challenges through case studies and real-life solutions	• Discuss ethical concerns and guide students to develop responsible AI
• Practice the AI project cycle and its usability in manufacturing applications and create an AI project toward the end	• Evaluate the impacts of AI projects in different dimensions and discuss ethical considerations and create AI project toward the end	• Practice the AI project cycle and its usability in agriculture applications and create an AI project toward the end
• Includes both low code/ no code and code use cases	• Includes both low code/ no code and code use cases	• Includes low code/ no code use cases

A new AI-X template ready for larger industries. Adding more industry topics

Use Cases
AI for Manufacturing

Handson- Use-Cases include curated datasets, Low-Code/No-Code tools, and organized Jupyter Notebooks for practical applications

1. Predictive Maintenance
- Predict machine breakdown based on sensor values
- Uses a no-code machine learning tool
- Useful in reducing downtime in manufacturing plants

2. Material Classification
- Segregate generated waste material into recyclable and non-recyclable
- Uses a no-code computer vision tool
- Useful for waste reduction and increased recycling in manufacturing plants

3. Inferencing on Edge
- Identifying defects in semiconductor manufacturing using inline sensor values
- Uses deep learning
- Useful in making the corrective process simpler and avoid potential yield loss

4. Demand Forecasting
- Forecast sales demand based on past trends
- Uses machine learning models on sales data
- Useful for predicting future trends to inform manufacturing decisions

5. Robotic Process Automation
- Automate anonymization of employee data in office records
- Uses computer vision and data processing
- Useful in protecting employee privacy

6. Quality Monitoring
- Monitor product images to identify any defects
- Uses leather product dataset
- Useful in identifying defective products accurately

Use Cases
AI for Sustainability

Hands-on Use-Cases include curated datasets, Low-Code/No-Code tools, and organized Jupyter Notebooks for practical applications

Environmental Sustainability

- **Land Disaster**: Classifying droughts and landslides from images of land disasters
- **Air Quality:** Real-time air quality monitoring to enable individuals/communities to take necessary precautions
- **Forest Fire:** Predicting severity of forest fires to limit loss of forest cover and damage

Social Sustainability

- **Sentiment Analysis**: Analyze social media posts to assist in understanding public opinions
- **Predictive Policing**: Identify high-risk areas by analyzing crime data to aid authorities
- **Healthcare Chatbot:** AI chatbot to aid in diagnosing mental health issues
- **Accident Detection:** Real-time road accident detection for quick response

Economic Sustainability

- **Fraud Detection:** Aid in identifying fraudulent transactions to protect consumer interests
- **Predictive Maintenance:** Predict equipment maintenance to minimize downtime
- **Material Recycling:** Categorize generated waste as recyclable or non-recyclable
- **Discriminatory Hiring Practices:** Uncovering bias present in hiring practices

Gaining Power Skills: Joint Intel Certifications

Awareness (6h) → Foundation (50- 57h) → Experience (41 – 129h) → Capstone (24h) → Practical Training (optional)

Tech Skills

- **Foundational Skills**
  - Programming and Statistics
  - Python Libraries for Machine Learning
  - AI Project Cycle
- **AI Programming**
  - Data Modeling
  - Classification
  - Computer Vision
  - Clustering
  - NLP, GenAI
  - Prediction
- **IoT**
  - Implementing a IoT Solutions
  - Integrating Hardware RealSense
  - OneAPI
  - Deployment Across Different Architectures
- **AI Project Implementation**
  - Applying AI Project Cycle
  - Deploying AI Solution

Social Skills

- Awareness of AI Ethics, Inclusion, Bias and Privacy
- Awareness of AI Ethics, Inclusion, Bias, and Privacy
- Social Perceptiveness, Critical Thinking, Computational Thinking, and Problem Solving
- Communication
- **Sharing Tech in Simple Language**
- Leadership
- Organization Skills
- Collaboration

Career Growth Skills

- **Self-Management**
  - Growth Mindset
  - Personal Management using “SMART” Goal Setting
- **Frameworks**
  - Design Thinking
  - Systems Thinking
  - Entrepreneurial Mindset
- Social Emotional Skills
- Technical Confidence: **The confidence to apply new technology skills to create value and stay relevant in the workplace.**

Scale Across USA: 80+ Colleges in 38 States

AI for Workforce Program Colleges

Sept 2023

Central Alabama Community College	AL	Tech College System of Georgia	GA	**Forsyth Technical Community**	**NC**	**Tulsa Community College**	**OK**
Wallace State Community College	AL	Hawaii Community College	HI	Rowan-Cabarrus Community College	NC	Portland Community College	OR
Chandler Gilbert Community	**AZ**	Honolulu Community College	HI	Bismarck State College	ND	**Umpqua Community College**	**OR**
Estrella Mountain Community	**AZ**	**College of Dupage**	**IL**	Southeast Community College	NE	Montgomery County Community College	PA
Pima Community College	AZ	**Harper College**	**IL**	Manchester Community College	NH	Bucks County Community College	PA
Yavapai College	AZ	Lake Land College	IL	**Middlesex Community College**	**NJ**	Harrisburg Area Community College	PA
Folsom Lake Community College	**CA**	Lincoln Land Community College	IL	County College of Morris	NJ	**Houston Community College**	**TX**
Mission College	CA	Ivy Tech Community Colleges	IN	**Ocean County College**	**NJ**	Lone Star College	TX
Laney College	**CA**	WSU Tech	KS	**Central New Mexico Community**	**NM**	San Antonio College	TX
Foothill Community College	CA	Northern Essex Community College	MA	**College of Southern Nevada**	**NV**	El Paso Community College	TX
CLA-OC/ Coastline ROP	**CA**	**Howard Community College**	**MD**	**Rockland Community College**	**NY**	South Texas College	TX
Santa Ana College	CA	Capitol Tech University	MD	Tompkins Cortland Community	NY	**Austin Community College**	**TX**
National University	CA	Central Maine Community College	ME	Jefferson Community College	NY	Dallas College	TX
San Bernadino Valley College	CA	Lansing Community College	MI	Hudson Valley Community College	NY	Utah Valley University	UT
College of the Desert	CA	Grand Rapids Community College	MI	LaGuardia Community College	NY	Northern Virginia Community College	VA
Antelope Valley Community College	CA	Alexandria Technical & Community College	MN	**Blue Ash College- University of Cincinnati**	**OH**	Community College of Vermont	VT
Pueblo Community College	CO	North Central Missouri College	MO	**Rhodes State College**	**OH**	**Bellevue College**	**WA**
CT State Community College -	**CT**	Mississippi Gulf Coast Community	MS	**Stark State College**	**OH**	Edmonds College	WA
Miami Dade College	**FL**	**Wayne Community College**	**NC**	Columbus State Community College	OH	Gateway Technical College	WI
Broward College	**FL**	Vance-Granville Community College	NC	Central Ohio Technical College	OH	Waukesha County Technical College	WI
Palm Beach State College	FL	Fayetteville Technical Community	NC	Eastern Gateway Community College	OH	**BridgeValley Community &**	**WV**
Polk State College	FL			Southern State Community College	OH	Laramie County Community College	WY

Faculty training and curriculum implementation, > 40% with AI Associate Degree

Outcomes: AI Ready Workforce

HOUSTON COMMUNITY COLLEGE

- Started AI Associate's Degree program in Summer 2020
- Starting AI Bachelor's Degree program Fall 2023

- 2 Students got jobs with Tesla
- 1 Student with Cephid Pharmaceuticals
- 1 Student with McKinsey and Co.
- 1 Student with Computer Aid Inc.
- 3 Students each winning the Intel Global & Country Competitions
- 1 Student employed A.I. in his Trucking business
- 1 Student used A.I. in his Plumbing business
- 6 Students have transferred for advanced degrees
- 3 Students will be Apprentices for GeoSpatial Enterprises
- Another 6 students will become Apprentices for NOV
- 4 Students have been NASA Scholars
- 2 Graduates are Co-Executive Directors of SHPC
- Several Students will have internships with City of Sugar Land

Source: Data received from HCC

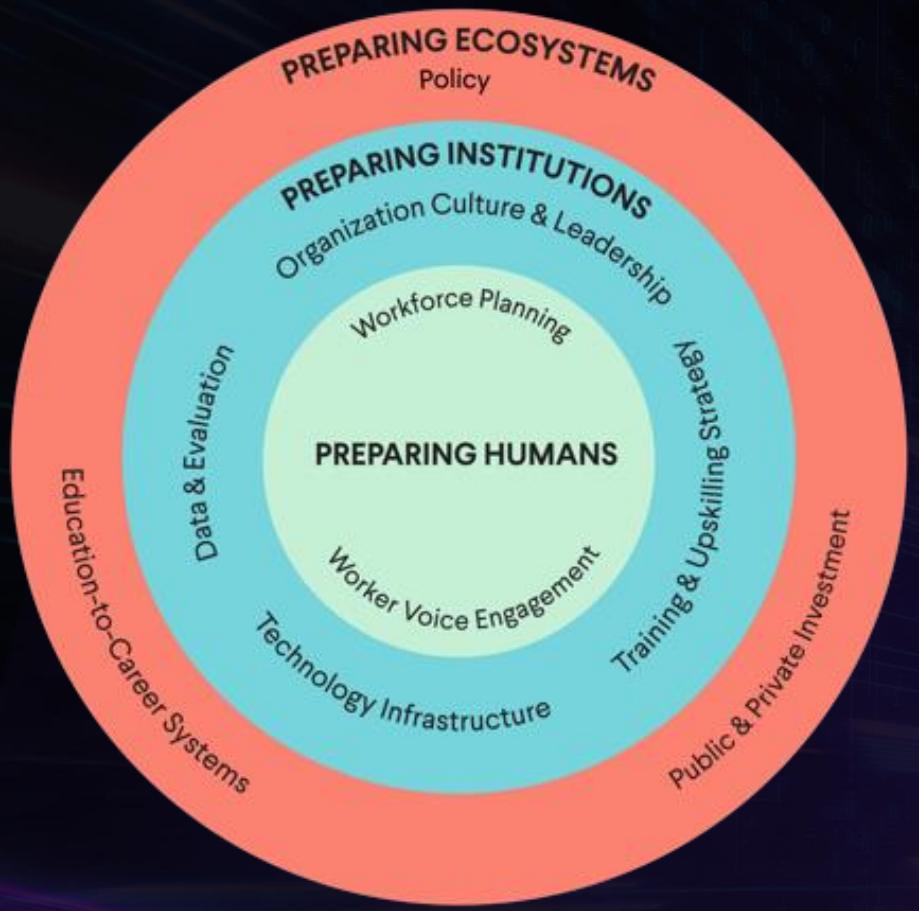
Results are always a function of leadership vision and collaboration commitments

Leaders Engage Early To Build New Vision

- ✓ Nation's first AI & ML Associate Degree in 2020: Maricopa Community College, Arizona
- ✓ Intel- NSF University Research Collaboration for AI4OPT and TILOS Institutes: National University and Georgia-Tech University
- ✓ First AI Entrepreneurship Degree and Certificates: Houston University
- ✓ Early adopters of AI for Manufacturing: Austin CC, Miami Dade College, Mission College CA, Harper College, South Texas College, Waukesha County Technical College
- ✓ Piloting AI for Sustainability: Austin CC, Miami Dade, Folsom Lake College
- ✓ Digital Trust for All and Digital Trust for Workforce: Houston Community College and Miami Dade College
- ✓ Semiconductor Education and Research Program: State of Ohio

Let's multiply impact with more public-private partnerships

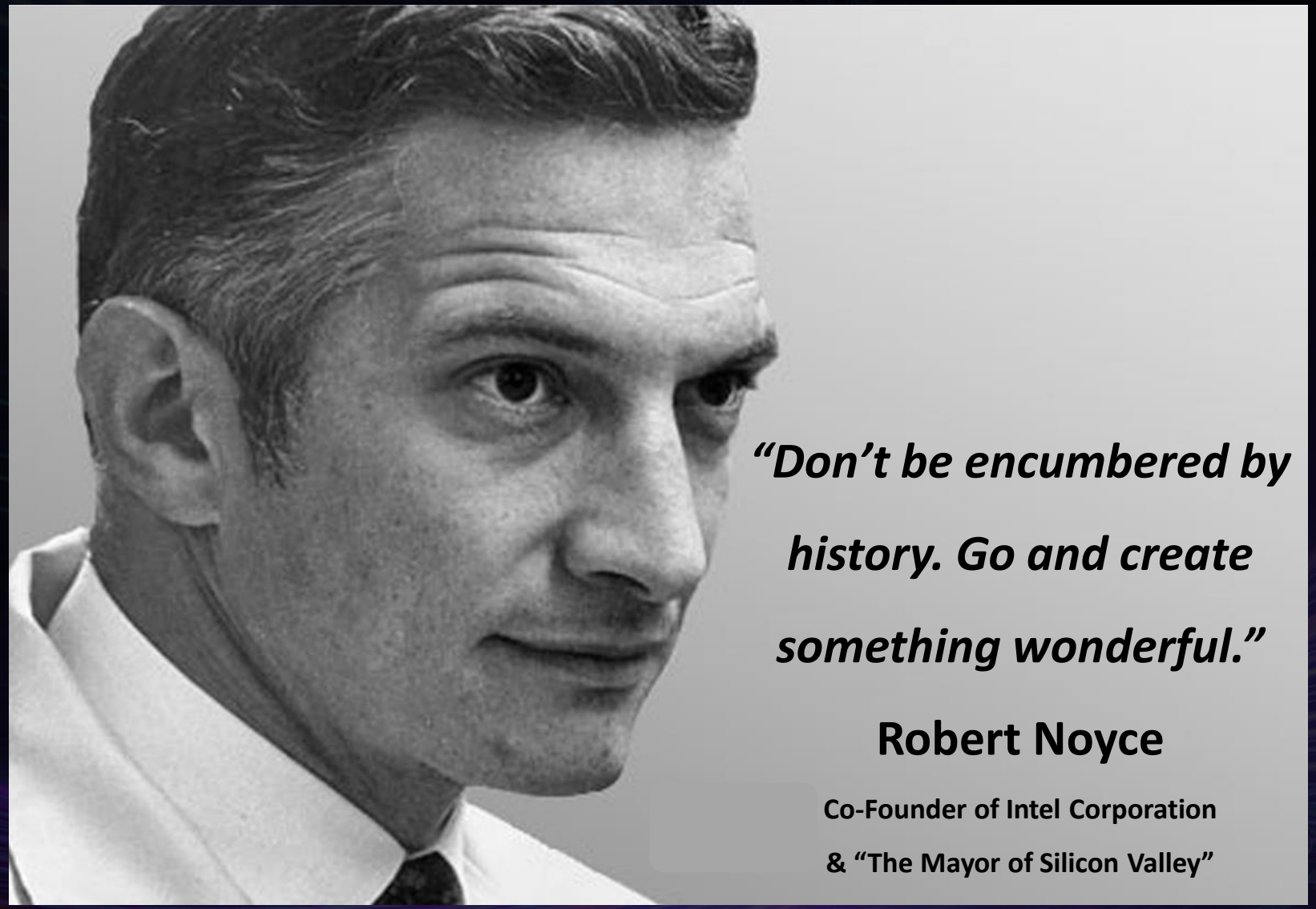
End Reflections For Leaders:



Source: JFF, Intel Analysis

- ✓ Let's make AI skills accessible and inclusive for all, together.
- ✓ Let's rebuild the competitive advantage with 4 Ps: Program – Partnerships – Platforms – Policies for scale.
- ✓ Let's embrace a new mindset of lifelong learning with AI skilling – reskilling – upskilling for human-machine collaboration.

Thank You!



“Don’t be encumbered by history. Go and create something wonderful.”

Robert Noyce

Co-Founder of Intel Corporation

& “The Mayor of Silicon Valley”

Contact for collaboration:
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Reach out to me:
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