

O in Action

#IoTinActionMS



Evolving IoT with AI, Mixed Reality and Automation

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People-centred experiences



Artificial Intelligence

← 01010 → Ubiquitous computing











Intelligent Edge



We are living in an automated world

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A Usalth Status

ion

FGE-HTR

-FG2

Evolution of industrial systems

Mechanized systems





Powered by steam or electricity Manually operated



Powered by software Fixed operation

Autonomous systems



Powered by AI Intelligent operation Sense – Act – Learn - Adjust

Convergence is driving new opportunities

R

Cloud

Globally available, unlimited compute resources

IoT

Harnessing signals from sensors and devices, managed centrally by the cloud

Edge

F

Intelligence offloaded from the cloud to IoT devices

Digital Twins

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Create living replicas of any physical environment, track the past and predict the future Breakthrough intelligence capabilities, in the cloud and on the edge

AI

A+

Microsoft's comprehensive IoT product portfolio



Recommendation 25ppm



Global Access

1 in 9 people are undernourished (UN)



Reduce poverty for 65% of the world's poor who live in rural areas and work in farming

70% more food is needed by 2050

Sustainable Production

70% of global water resources are needed for Agriculture

24% of global greenhouse emission comes from Agriculture

251T liters of water to be saved in 2030 from implementing Smart Agriculture



of global workers are employed by Agriculture

10-30% Agriculture contributes 10% of global GDP and up to 30% in low income countries

Need for Economic Growth

\$4.87 Global A

Global Agriculture revenue

Source: Sustainability development goals, UNITED NATIONS 2017

An end-to-end system that enables seamless data collection and insights for agriculture

FarmBeats





Recommendatio

Combine visual data from drones with the sensor data from the farm

11111

TTO .

Drones are ~1000 dollars and automatic

....

Can cover large areas quickly

Can collect visual data





Azure Al



Al apps & agents

Knowledge mining

Machine learning

Deliver breakthrough experiences



Al apps & agents

- Cognitive Services
- Bot Service

Azure Cognitive Services



Azure Cognitive Services

The most comprehensive pre-trained AI



Azure Cognitive Services

Deploy anywhere using containers



Wherever your data resides



Azure Al

Fueled by Microsoft breakthrough research



Azure Al



Al apps & agents

Knowledge mining

Machine learning

Machine Learning on Azure

Domain specific pretrained models To simplify solution development	Vision	Speech La	А _Б Q nguage Web sea	arch Decision
Familiar data science tools To simplify model development	Visual Studio Code	Azure Notebooks	Jupyter Jupyter	Command line
Popular frameworks To build advanced deep learning solutions	PyTorch	TensorFlow	Scikit-Learn	
Productive services To empower data science and development teams	Azure Machine Learnin	g Azure Da	Azure Databricks	
Powerful infrastructure To accelerate deep learning	CPU	GI	GPU	
From the l	ntelligent Cloud to the Intelligent E	dge 🌈 –		

Microsoft platform for autonomous systems



Scale human expertise

Machine Teaching

- Domain experts "teach" the machine
- No data science expertise required
- Expert provides "lesson plans" to help the Al algorithm solve the problem

Autonomous systems scenarios











Motion control

Smart buildings Machine calibration Process control Industrial robotics

Simplify machine learning for any skill level

Welcome to Automated Machine Learning

Getting Started

Create your first experiment with automated machine learning to produce quality models with zero effort.

Create experiment

What's Possible with Automated Machine Learning

Automate the process of algorithm selection, hyperparameter tuning, and best model selection with automated machine learning, and accelerate your productivity. Select your data and let automated ML do the rest to provide the best model from endless possible options.



💭 jupyter	distributed-pytorch-with-horovod Last Checkpoint: 5 minutes ago (autosaved)		
File Edit	View Insert Cell Kernel Widgets Help Trusted Python 3		
B+×	2 1 H Run 1 C H Markdown C Edit Presentation C Show Presentation		
	Copyright (c) Microsoft Corporation. All rights reserved.		
	Licensed under the MIT License.		
To f Jo	Distributed PyTorch with Horovod In this tutorial, you will train a PyTorch model on the MNIST dataset using distributed training via <u>Horovod</u> across a GPU cluster. Prerequisites Go through the <u>Configuration</u> notebook to install the Azure Machine Learning Python SDK and create an Azure ML_Morkspace Review the <u>Interfail</u> on single-node PyTorch training using <i>R</i> zure Machine Learning		
In []:	<pre>In []: / Check core SDE version number import aureni.core print("SDE version:", aurenl.core.VERSION)</pre>		
	Diagnostics		

Automated machine learning UI

Visual interface

Machine learning notebooks

Deploy machine learning models at scale

Azure Machine Learning service



CI/CD and model retraining

Free AI online training & certification



AI Business School

Business leaders can use AI Business School to gain specific, practical knowledge to define and implement your AI strategy. Hear directly from industry experts on how to foster an "AIready" culture and learn how to use AI responsibly and with confidence.



8 MODULES 4 HR 16 MIN BEGINNER > INTERMEDIATE

Learn More >

business

6 MODULES 3 HR 10 MIN INTERMEDIATE

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business

INSEAL

3 MODULES 55 MIN INTERMEDIATE

Learn More >



People-centred experiences



Artificial Intelligence

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A blending of the physical and digital worlds in which users may interact with digital and real-world objects while maintaining presence in the physical world

Physical world

Digital world









Augmented reality

Virtual reality

Mixed reality spectrum

The Microsoft mixed reality stack



The 3rd wave of computing



Immersive Digital Twin Bridging the Physical and Virtual worlds

Chandrasekar Rajarathinam General Manager – Enterprise Application

Immersive Digital Twin Solution: For Whom?



Customer Service Manager:

Responsible to quickly resolve issue, coordinating required data, know-how and resources



Achieving Customer delight by solving mission critical issues meeting the operational SLA's with 3D Digital Twin

Expected Uptime **99.97%**

Few hours

of maintenance time available annually for critical issues



Over **17ft** long Over **3ft** high Over **8ft** wide **1000+ parts**



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4 Tons Kilo

Over

Engines, Power packs, Propulsion, Drive systems, Power gens

Immersive Digital Twin

Emergence of digital insights from mechanical systems in an IOT system allow for a loop back to physical systems via immersive tech by co-relating contextual information, intelligence, modelling and simulation data.





Holistic view of the engine in terms of component, problem areas (via sensor data), maintenance schedule (LOB systems) enabling quicker insights and turnaround time

Enables service technicians to solve problems and troubleshoot alarm codes quickly

Real time data relay incl. relay commands to the equipment with voice & gestures

Life size experience of huge equipment to interact – Field activities to replace or fix the issues will be simulated

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Structural Health Monitoring with IoT and MR

Load experienced by pumps on the field (earthmovers, factory equipment, mining tools) can be subject to real time analysis incorporating FE model simulation arrived using experiments on physical model and AR technology



- Reduced time to arrive at failure modes for NVH engineers from source vibration signature on field
- Uses computer vision to analyze structural abnormalities and notify engineer
- Contextual meta data inputs along with simulation results ensures a 360 degree view for technician / test engineer
- Data insights flow along with technician feedback and operating conditions will fed into the system continuously => enabling engineers to incorporate adoptive design

"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it."

Mark Weiser | former CTO Xerox Park



+20%

Increase in customer satisfaction

kodisoft

+32%

Increase in sales

Rockwell Automation

\$300K Cost savings per day

FINANCIAL FABRIC

90%

Reduced time from documents to insights

TAL (ADX)

More insurance cases reviewed



200K

Customers interacting with chatbots

So... what's stopping you from making things happen?

Microsoft

Artificial Intelligence People-centered experiences