



# GSC | 22

MONTREUX, SWITZERLAND

# Role of AI and its Standards in 5G for Emerging Markets

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# Agenda

## Introduction

- 5G in India
- AI role in India

## AI in 5G

- Role and Requirements
- Challenges with AI

## Concluding Remarks

# Introduction

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## 5G

### Application Categories

Massive Internet of Things

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Critical Communications

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Enhanced Mobile Broadband

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### Industrial Use Cases

Automotive and Transport Use  
Cases

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HealthCare and Smart City Use  
Cases

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Media and Entertainment Use  
Cases

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# What is AI ?

## Artificial Intelligence

- Machines with Human Like Intelligence

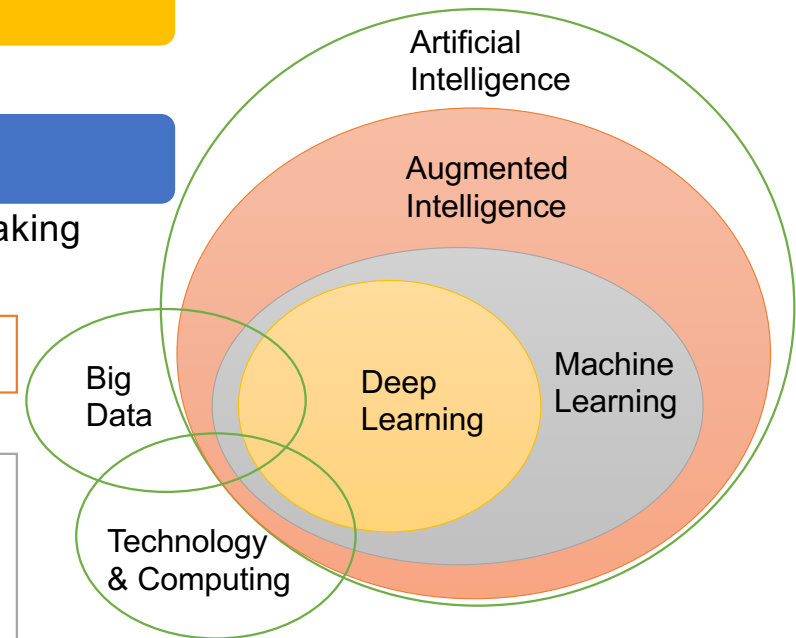
## Augmented Intelligence

- An Intelligent system or machine(s) to help humans with decision making

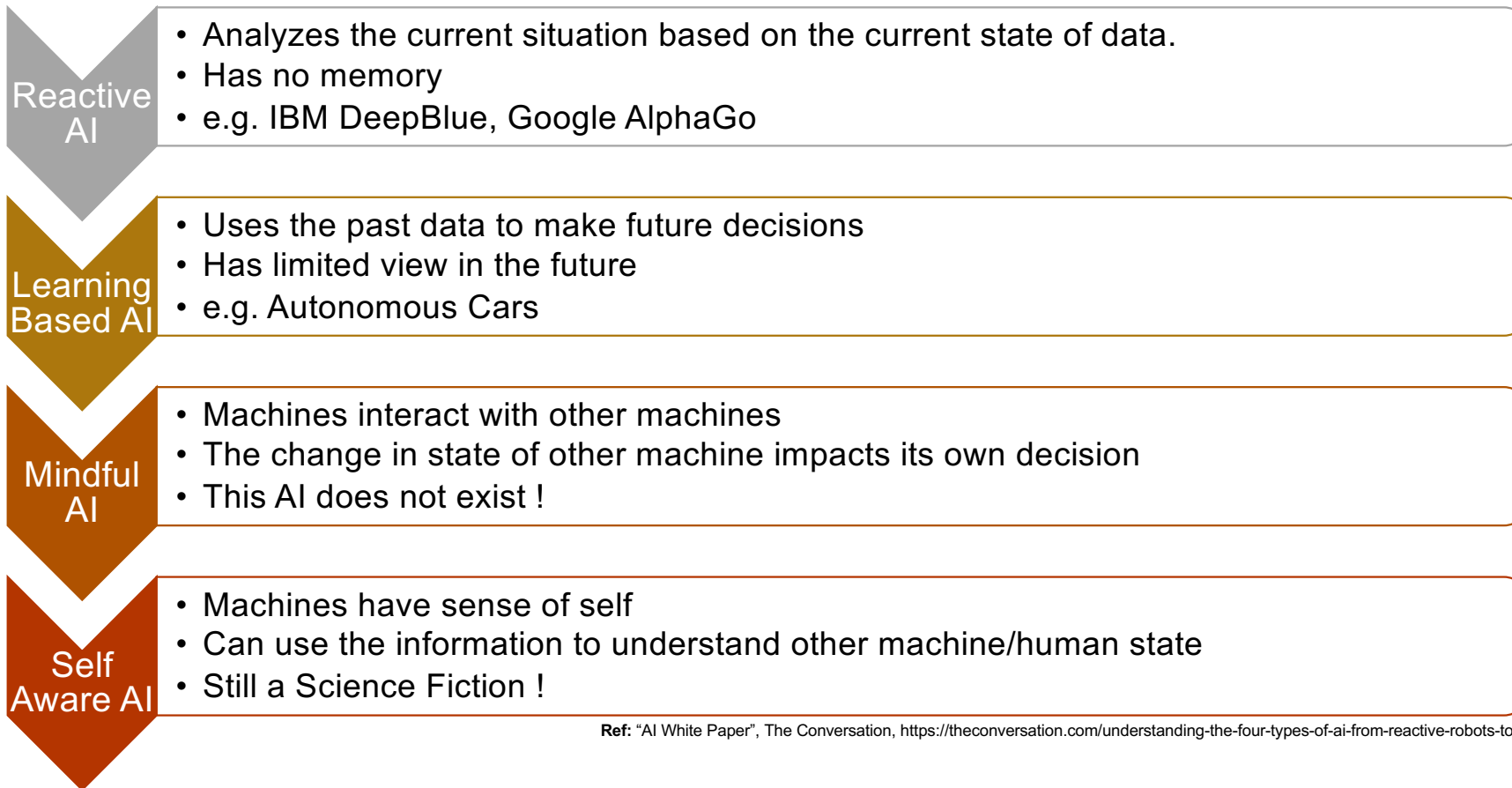
Based on Rules and Previously collected Data

Accuracy depends upon

- Quality of data
- Context of data
- Complexity of algorithms

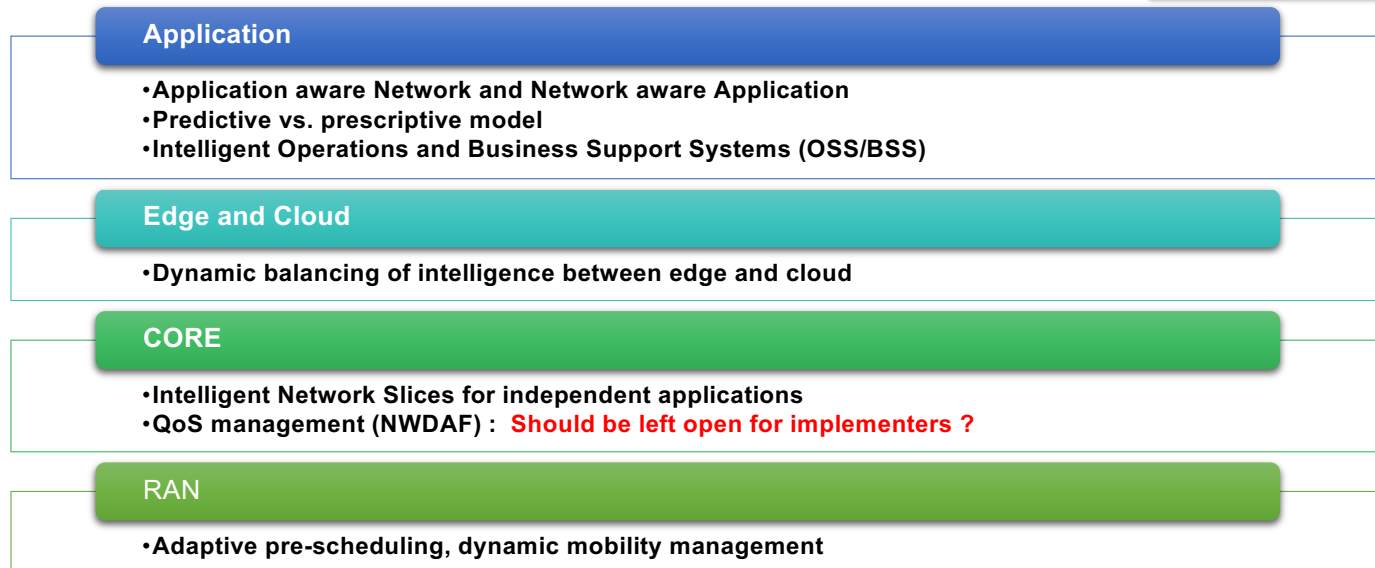
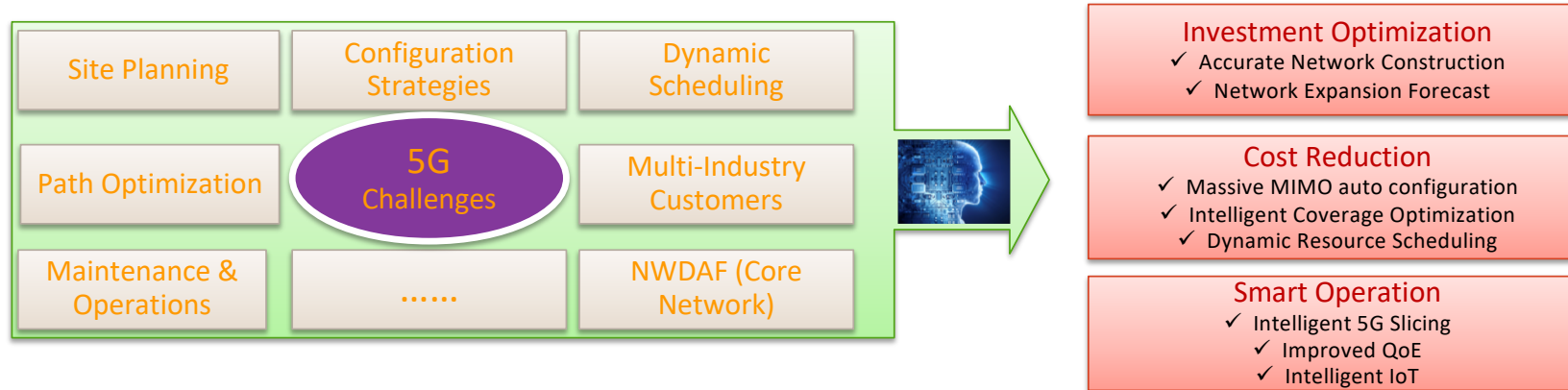


# Different Levels of AI

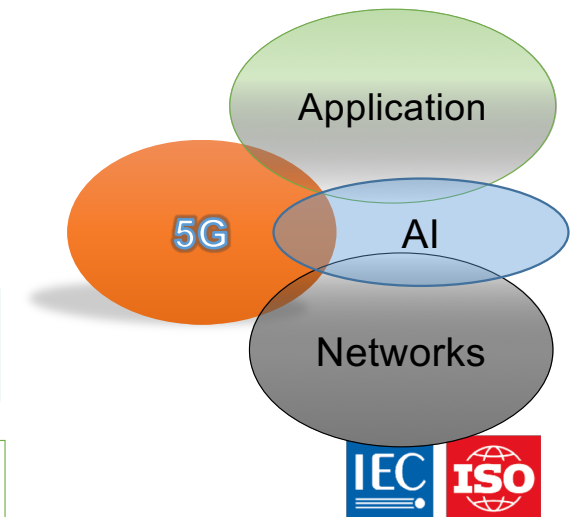


Ref: "AI White Paper", The Conversation, <https://theconversation.com/understanding-the-four-types-of-ai-from-reactive-robots-to-self-aware-beings-67616>

# Role of AI in 5G in India



Sensitivity: Internal & Restricted



# Dominant Applications in India

Niti Aayog (Govt of India) recommended following focus areas for use of AI & 5G

## Health Care

- Universal Health Care
- Primary Health Care in Rural Areas
  - Remote Health Monitoring
  - TeleSurgery

## Smart Agriculture

- Managing and Tracking agro-stock.
- Real updates to farmers about weather, crops, pesticides etc.

## Education

- Remote Education
- Skill Development

## Smart Cities and Infrastructure

- Governance
- Augmental Robotics & Industry 4.0
- Smart Grid, Smart Meter
- Smart Insurance

## Intelligent Transportation

- Assisted driving,
- Autonomous driving (?)
- In-vehicle media



# AI/5G usage in Indian Use Cases [1/3]

Ministry of Commerce, India – AI Task Force has recommended following use cases

## Manufacturing

- Process modernization and real time decision/planning
- Logistics & supply chain management
- Reduced rate of rejection through early detection of faults
- **Human-Robot Collaboration – India can be a test bed as well**
- Autonomous vehicles and driver assisting systems

## Financial Services

- Cashless, paperless, consent-based financial transaction
- Risk Assessment – Lending, Investment, Payments etc.

## Healthcare

- Creating National – Scale clinical decision support system
- Health data annotation for machine learning applications
- Self learning system – Radiology, Pathology, Genomics.
- AI based system to aid differently abled people.



# AI/5G usage in Indian Use Cases [2/3]

## Agriculture

- **Crop Prediction**
- **Crop Health Management**
- Macro and Micro Irrigation management
- Prediction and Prevention of Poor-harvest losses

## Education

- Personalized education
- Help government in planning by predicting the outcome

## Environment

- **Automation to estimate and control at source – pollutants, waste etc.**
- Prediction of depletion of non-renewable resources, endangered species, meteorological events, natural disaster etc.

# AI/5G usage in Indian Use Cases [3/3]

## National Security

- Autonomous surveillance and combat systems
- Adaptive and Secure communication systems
- Cyber attack mitigation and counter-attack systems
- Intelligent data fusion and decision making

## Public Utility Services/Big Data

- **AI can play big role in Aadhaar based systems**
- AI based data analytics for planning and execution of public services

# Requirements of AI in 5G

## Continuity of Services

- Service provisioning & slicing across **multiple operators** !
- Network personalization for **each user and Application** !
- Network cognition to meet requirements such as user density, computing requirements

## Continuity of Coverage

- Optimization of coverage
- Fault prediction and mitigation
- Intelligent edge vs cloud
- Vertical offload across multiple technologies

## Enhanced Security

- Pattern Identification
- Irregularity in data and usage
- **Attackers will also use AI/ML !!!**

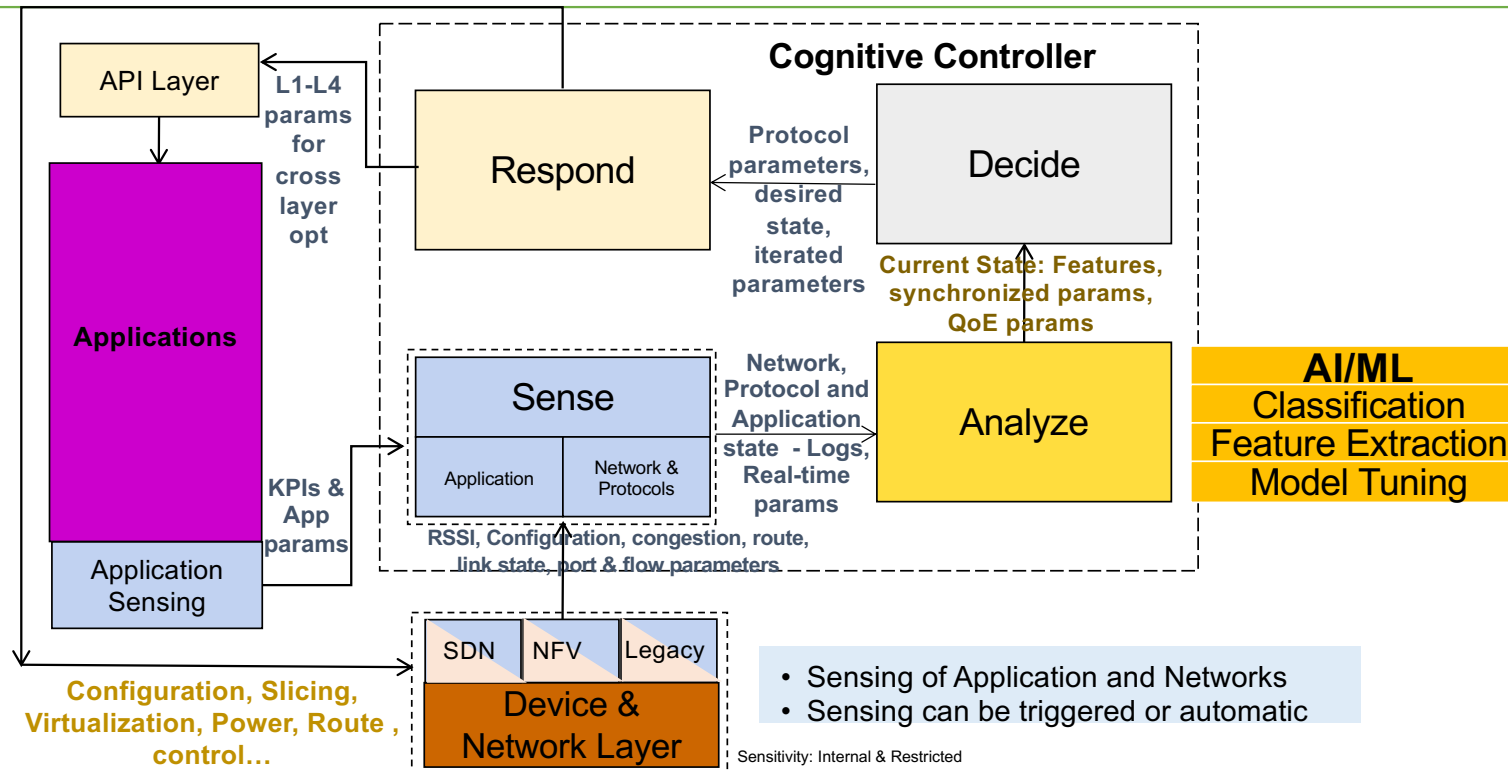
# Network Cognition using AI in 5G

Provides Application aware Networking

- Network adapts itself based upon application requirement

Develop Network aware Applications

- Application adjusts itself based upon network availability



- Sensing of Application and Networks
- Sensing can be triggered or automatic

Sensitivity: Internal & Restricted

# Challenges with AI/5G

## AI Task Force in India has identified following Challenges

Data collection, archiving, and encouraging data availability with adequate safeguards, possibly via data marketplace/exchanges.

Ensuring data security, protection, privacy, **ethical use** via enabling framework both regulatory and technological.

Digitization of systems and processes with IoT systems while ensuring safety from cyber security.

Deployment of autonomous products (robots, autonomous cars) after careful study and mitigation of any impact on **employment and safety**.

# Challenges with AI/5G

Bureau of Indian Standards (BIS) has discussed following challenges

## Trust

- No knowledge sharing about **HOW** the AI prediction algorithm is working and the decision is being made
  - **User is unaware of any decision made by the network/application**
  - **Can the model trained using the data from one geographical region be used in another**
  - **Can AI be used for critical applications (tele-surgery, autonomous cars)**

## Validation

- **Data generated by the Network and Applications varies with geographies.**
- Correctness of AI algorithms depends upon the **quality of data**
- **FAT ML**– Fairness, Accountability, Transparency plays an important role

## Integrity and Verifiability

- Outcome changes even with the sample of data used for the same network/application
- Delivery Guarantees (time) is essential for 5G.

# Concluding Remarks

Data Dependency between different applications and networks to be standardized.

Regulatory framework for Privacy and Security for the data collected/exposed by network.

- Safety and security challenges also for services enabled by AI and 5G.
- Data Economics should also be defined and regulated !

Coordinated efforts are required to create AI standards in different aspects of 5G !!

AI is still far from its actual potential.

- Beware of unregulated AI !



# Thank You !

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# Indian Uniqueness

<b>World Bank Data (2017)</b>	<b>Population (Billion)</b>	<b>Population Density (per Km<sup>2</sup>)</b>	<b>% Urban Population</b>	<b>Nominal GDP (Trillion \$)</b>	<b>Energy (Kwh/User in 2014)</b>
<b>North America</b>	0.362	14.6	83.8	21.05	12,984
<b>Europe</b>	0.512	50.3	74.5	17.28	5,908
<b>Middle East &amp; North Africa</b>	0.444	60.9	-	3.2	2,875
<b>China</b>	1.386	144.4	60.4	12.23	3,927
<b>India</b>	1.358	413	33.6	2.6	806

## Unique Scenarios:

- ✓ Largest consumer base and Appetite for technology

## Challenges:

- ✓ High Density and scale
- ✓ High Diversity – Language, Culture etc.
- ✓ Lost cost solution