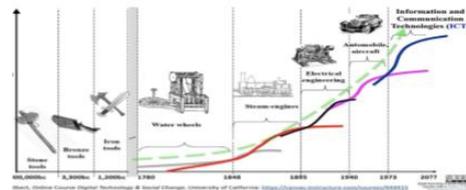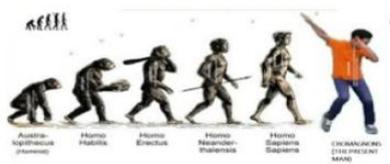# Immersive AI: Transforming Reality with Intelligence and Interaction

Kuldeep Singh

thinkuldeep.com/about

**/thoughtworks**

## Highlights



Understanding the Immersive AI

Making Artificial Sense of The World

Working with the Artificial Sense

Considerations, and way forward!





META FIRES 1500 METAVERSE EMPLOYEES AFTER LOSING $73 BILLION ON THE PROJECT

# Realities are going through a paradigm shift

## Realities are going through a paradigm shift

Metaverse

eXtended Reality (XR)

- Augmented Reality (AR)
- Mixed Reality (MR)
- Virtual Reality

Spatial Computing

- Artificial Intelligence
- Cloud
- 5G/6G
- Internet of things
- Blockchain

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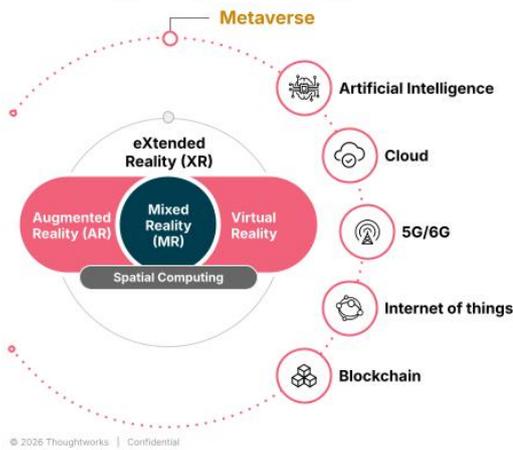
**XR beyond head mounted devices - web XR /mobile XR**

Immersive experience re-ignited by Apple Vision Pro/Android XR

Ecosystem shaping up with Meta Horizon OS/ Google Android XR / Qualcomm Spaces

XR investment growth over 100% in next 5 years for optimization of Enterprise operations

Driving XR based use cases
- Simulation & Training
- Operational Efficiency

Enhancing XR experiences using AI

Rise of spatial intelligence systems Physital AI / Immersive AI

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## How do we make senses of the world?

Sight, Smell, Hearing, Touch, Taste
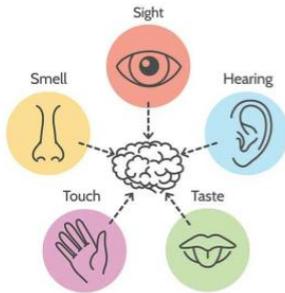
| | |
|---|---|
| Depth Sensing |
| Object detection, Voice recognition |
| Motion tracking - Physics, Gravity |
| Physical and psychological safety perception |

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## How do we make senses of the world?

Sight, Smell (AI), Hearing, Touch (AI), Taste (AI)
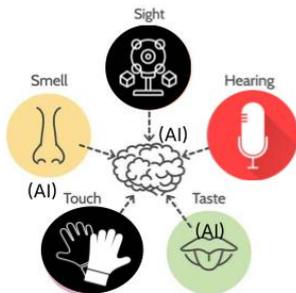
| | |
|---|---|
| Depth Sensing, (Lidar, Image to 3D, NeRF...) |
| Object detection, Voice Recognition |
| Motion tracking (SLAM, Physics Engine) |
| Physical and psychological safety perception (Sensors, Actuators, BCI - AI) |

# The Shift We Are Living Through
## From Digital Experiences to Intelligent Realities

**We used to step into digital worlds –**

**Now intelligence steps into ours –**

**Physical and virtual realities are converging –**

PHYSICAL — VIRTUAL

INTELLIGENT REALITY

---

# The Shift We Are Living Through
From Digital Experiences to Intelligent Realities

**Immersion traditionally**

- Audio visual
- Screens, headsets, and visuals
- Immersion was visual and device-bound
- AR, VR, MR → XR
- Experience, XRgonomics

**Immersion moving towards**

- Spatial Interaction
- Schematic understanding
- Headless interfaces
- AI glasses
- XR → Intelligent XR
- Emotion is new interface
- Immersive Intelligent World!

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# Immersive Intelligent World
## Spatial Computing as the Foundation with Reality, When Reality Becomes Semantically Aware

- Spatial computing enables machines to understand space
- Objects, places, and relationships become machine-readable
- Reality becomes searchable and interactive
- AI understands environments semantically, not just geometrically
- Different parts of a scene are indexed and contextualized
- Humans and machines can reason and act within physical spaces

Room: Context

Chair: Object

Plant: Living

Relationship: On

Table: Surface

Room: Context
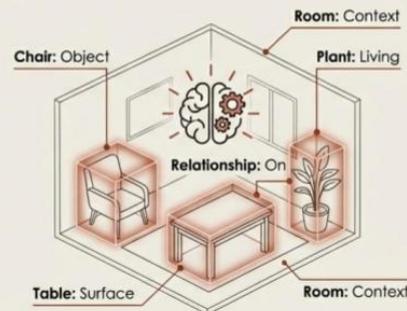
Use cases



## Use Case 1: Spatial Retail Intelligence
### IoT, Smart Tags, and Operational Efficiency

Retail stores become living digital environments

- Spatially aware IoT tags enable:
- Accurate placement tracking
- Faster maintenance and repair
- Better planogram compliance

Tracking

Maintenance

Compliance

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## From Insights to Action
### AI Agents, Robots, and Indoor Navigation

Indoor navigation improves both customer and staff experience

- AI agents and robots can:
- Locate problems
- Navigate to physical locations
- Perform or trigger actions
- Planogram

Intelligence moves from dashboards to execution

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## Use Case 2: Customer Engagement & Museums
### Spatial AI + LLMs for Living Experiences

Cultural spaces become adaptive environments

- Visitors are guided contextually, not statically
- LLMs personalize storytelling in real time
- Experiences become emotional and memorable

Contextual Guidance

Your personalized story...

LLM

Personalized Storytelling

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## Communication with Artificial Sense

### CONTEXT
- Education
- Training & Onboarding
- Consultation & Coaching
- Marketing & Customer support
- Entertainment

### CHALLENGES
- Language & Location
- Age, Sex and Race
- Culture & background
- Ability / IQ / EQ
- Behaviour and Preferences

### OUTCOME
- Personalized Training
- Virtual Communication Agents
- Targeted marketing
- Always available services
- Visualising AI
- Meet the scale
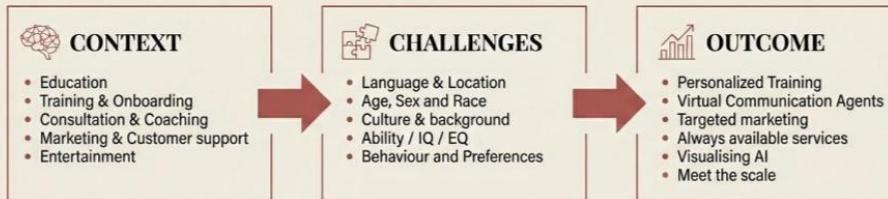
### Use Cases & Examples

#### Retail & Marketing
- In-store AR based engagement
- 360-degree VR tours
- Virtual Artist
- Virtual shopping experience, fitting rooms etc.
- AR based product catalog
- Virtual marketing
- Try before you buy
- Virtual customization

#### Enterprise & Training
- VR based design and engineering reviews
- 3D visualizations
- VR events
- Interactive 3D Simulation
- Training & Employee engagement
- Field service

## Working with Artificial Sense

### CONTEXT
- Operational Efficiency
- Safety Audit and Compliance
- Hybrid working
- Remote working

### CHALLENGES
- Aging labour, shortage
- Outdated knowledge, Traditional trainings
- Working with machines
- Mental health
- Increasing Complexity and cost

### OUTCOME
- Enhanced capability with AI assistant
- Human machine Integrated working
- Targeted upskilling
- Safety compliance
- Practice with simulation
- Enhanced Customer Experience

### Use Cases & Examples

#### Safety and Compliance
- Innovative Marketing
- Increased user/staff engagement

#### Operational Efficiency
- Improved service and repair

Challenges
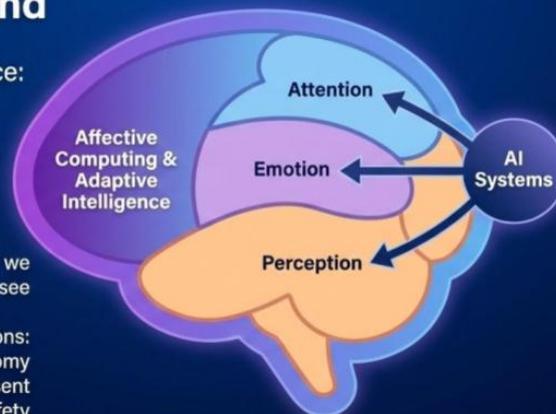
# Survival Challenges

Privacy, Identity, and Ubiquitous AI Glasses

- Always-on intelligence changes the privacy equation
- Questions of:
  - Who sees what
  - Who owns spatial data
  - Who controls identity
- Poor design leads to surveillance, not empowerment
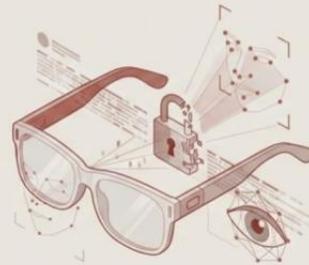
# Platforms and Enterprise AI

### Trust, Policies, and Responsible Systems

Immersive intelligence must operate within enterprise boundaries

- Integration with policies, governance, and compliance is essential
- Trust becomes the platform layer

Enterprise AI Boundary

Policies & Governance   Compliance   Integration

Trust Layer (Platform)
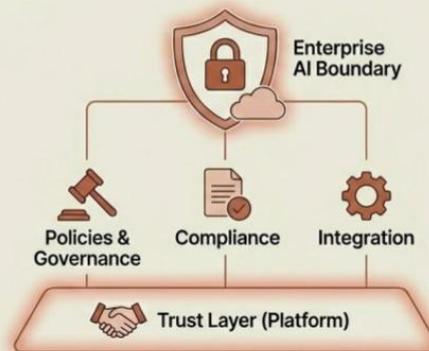
The Way Forward!



Innovation without responsibility leads to fragility

**SURVIVING VS THRIVING**
Designing for Resilience, Not Just Innovation

Designing for Resilience, Not Just Innovation

SURVIVING

THRIVING REQUIRES:

SUSTAINABLE GROWTH & TRUST

ETHICAL AI   TRANSPARENT SYSTEMS   HUMAN-CENTERED DESIGN

FRAGILITY

RESILIENCE

# Standards Matter the most
## Open, Interoperability, and User Control

Fragmented ecosystems erode trust

Open standards enable:

- Interoperability
- Longevity
- Human agency

**Standards are survival tools, not technical details**



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# Call to Action: Building the Future Together
## The immersive intelligent world is a shared responsibility



Builders, enterprises, policymakers, and users must collaborate

Key Collaborators & Actions

As explored in *Exploring the Metaverse:* **The next internet is societal, not just technical.**

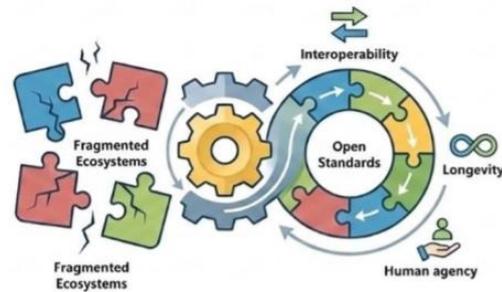The future we survive in is the future we choose to build

Conclusion: Our Choice

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# Way Forwards: Navigating the Metaverse & AI Glasses Era



**Embrace Ethical AI**

Prioritize fairness, transparency, and accountability in AI development and deployment within the Metaverse. Ensure AI systems are unbiased and respect user privacy.

**Foster Collaborative Innovation**

Encourage open standards, interoperability, and cross-industry partnerships to build a unified and accessible Metaverse ecosystem. Break down silos.

**Design for Human Well-being**

Focus on creating positive and meaningful experiences that enhance human capabilities and connection, rather than just engagement metrics. Address potential negative impacts on mental health.

**Invest in Digital Literacy**

Educate users about the capabilities and risks of AI and the Metaverse. Empower them with the skills to navigate and participate effectively in the new digital landscape.

**Develop Robust Policy Frameworks**

Establish clear regulations and guidelines to govern the Metaverse, addressing issues such as data ownership, intellectual property, and content moderation. Ensure a safe and secure environment.

# THANK YOU

Kuldeep Singh

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