

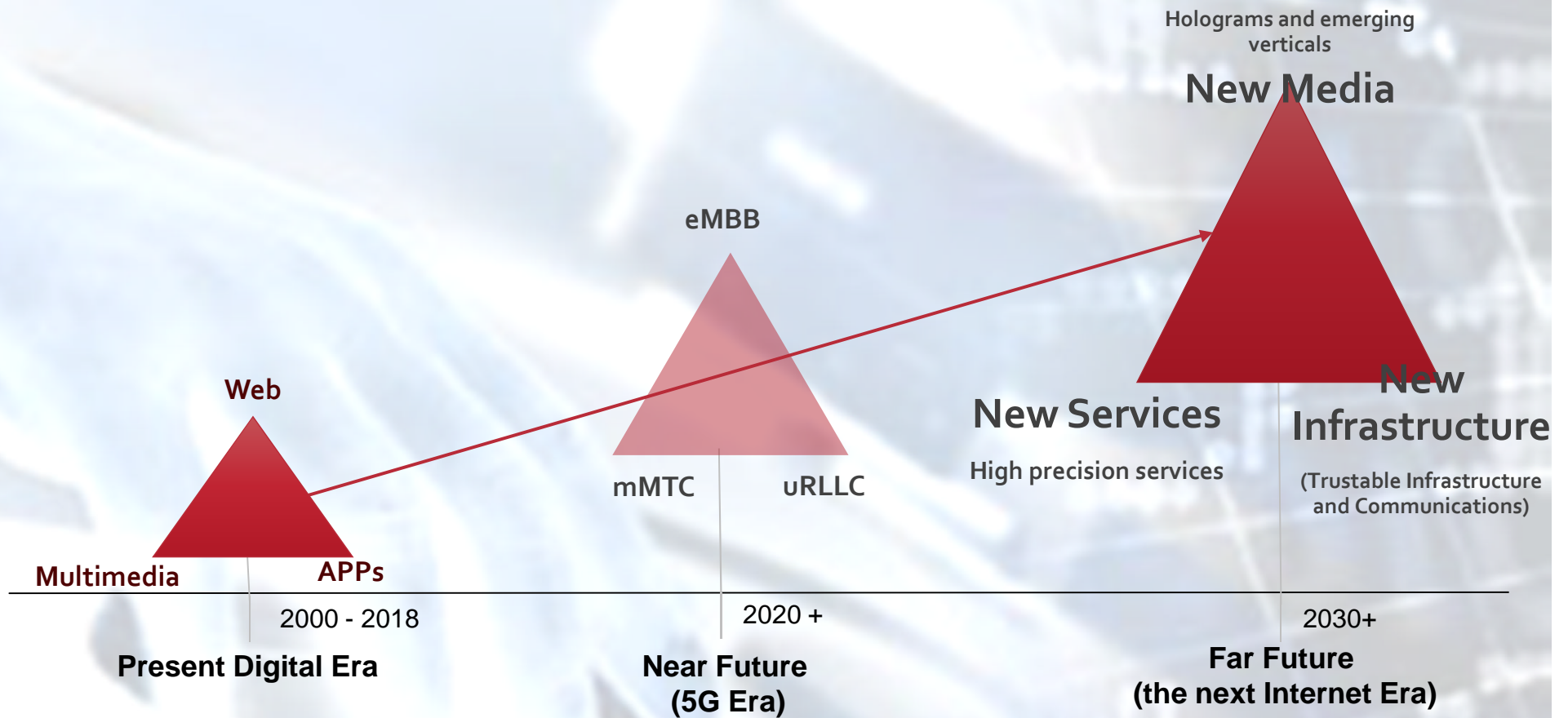
Panel Discussion

Theme: Towards 2030 and Beyond

Topic: Views on Next Services

Kiran Makhijani | Moderator

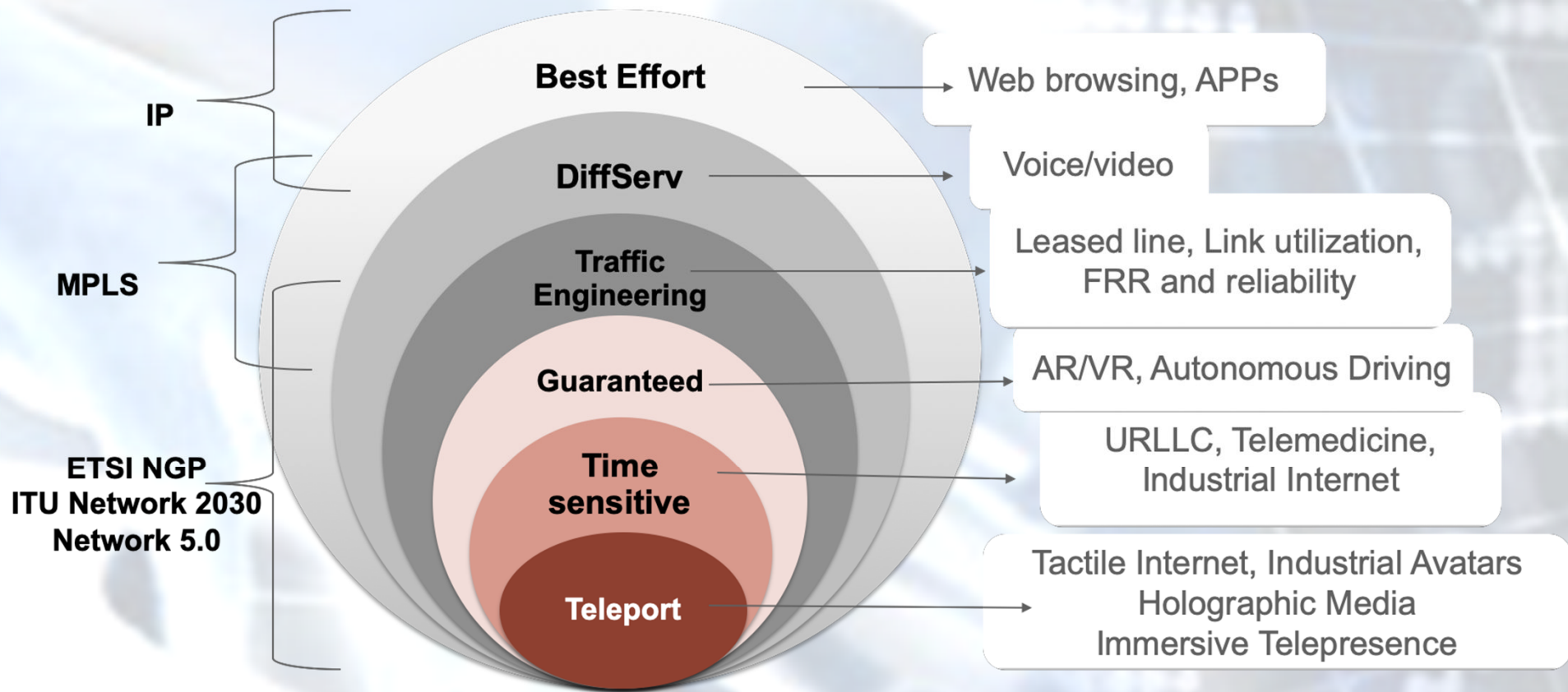
Evolution – Past, Present, Future



Next Wave of Services – New Digital Footprints

- **Automation**
 - Towards industry 4.0 and beyond
 - Tele-operations
- **Autonomous Systems**
 - Self-driving, self-arranging, self-adapting applications
 - Cars, drones, robotics
- **Holographic Media**
 - Natural experiences, Realistic visualization, Telepresence
 - Spatial Computing
- **Cognition:**
 - AI, Neural networks, Digital assistants

Network 2030 Vision



Panelists

- Arunita Jaekel, University of Windsor, Canada
- Sugata Banerji, Lake Forest College, USA
- Petre Dini, IARIA, USA

Questions

- **What will network 2030 digital society look like?**
The most important new service.
- **Is society ready for next level of digital footprint (holograms, automation, autonomous systems, AI)**
Will we adapt easily to such capabilities
- **What is the biggest technical barrier?**
i.e. capabilities that are missing in the networks.
Overcoming gaps between imagination and reality-2030
- **The age of AI**
- **The future of visual documentation**

Take Away

- **The challenges of bringing AI, ML and autonomous decision making were discussed,**
- **ML enhances images, how to tell that this is original?**
- **Biases in the models were discussed. Often models are provided without the training data set. Therefore, it is hard to verify them**
- **New Trust models need to be derived for society based on AI. Level of control between mankind and robots.**
- **Infrastructure is changing. ISPs are discouraging use of public IP addresses. This often leads to issues of decentralized, democratic Internet vs walled gardens, controlled access.**
- **Regulatory and policy aspects have to evolve to consider automation, AI, new infrastructure – as of now we have no clear direction.**
- **Reversing centuries long trend: sense of ownership will change. F.g. cars need not be owned but maybe on-demand. Is there a need for parking garages? Influence of new automation and digital society on home, building architectures.**

Thanks

Thanks



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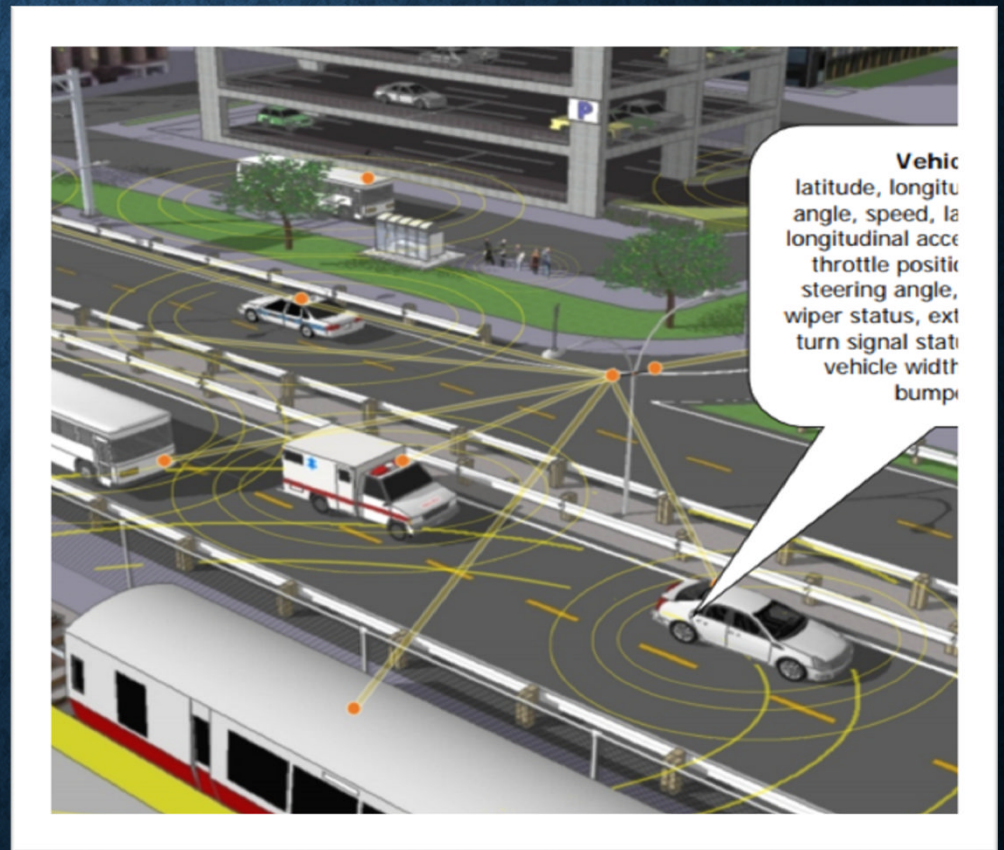
VEHICULAR NETWORKS: OPPORTUNITIES AND CHALLENGES

Dr. Arunita Jaekel

University of Windsor

VEHICULAR NETWORKS

- Forecast: Over 10 million CAV by 2015
- New Services/Applications
 - Infotainment
 - e-toll collection
 - Parking locator etc ...
- Innovative business models
 - Marketing opportunities



CONNECTED/AUTONOMOUS VEHICLES (CAV)

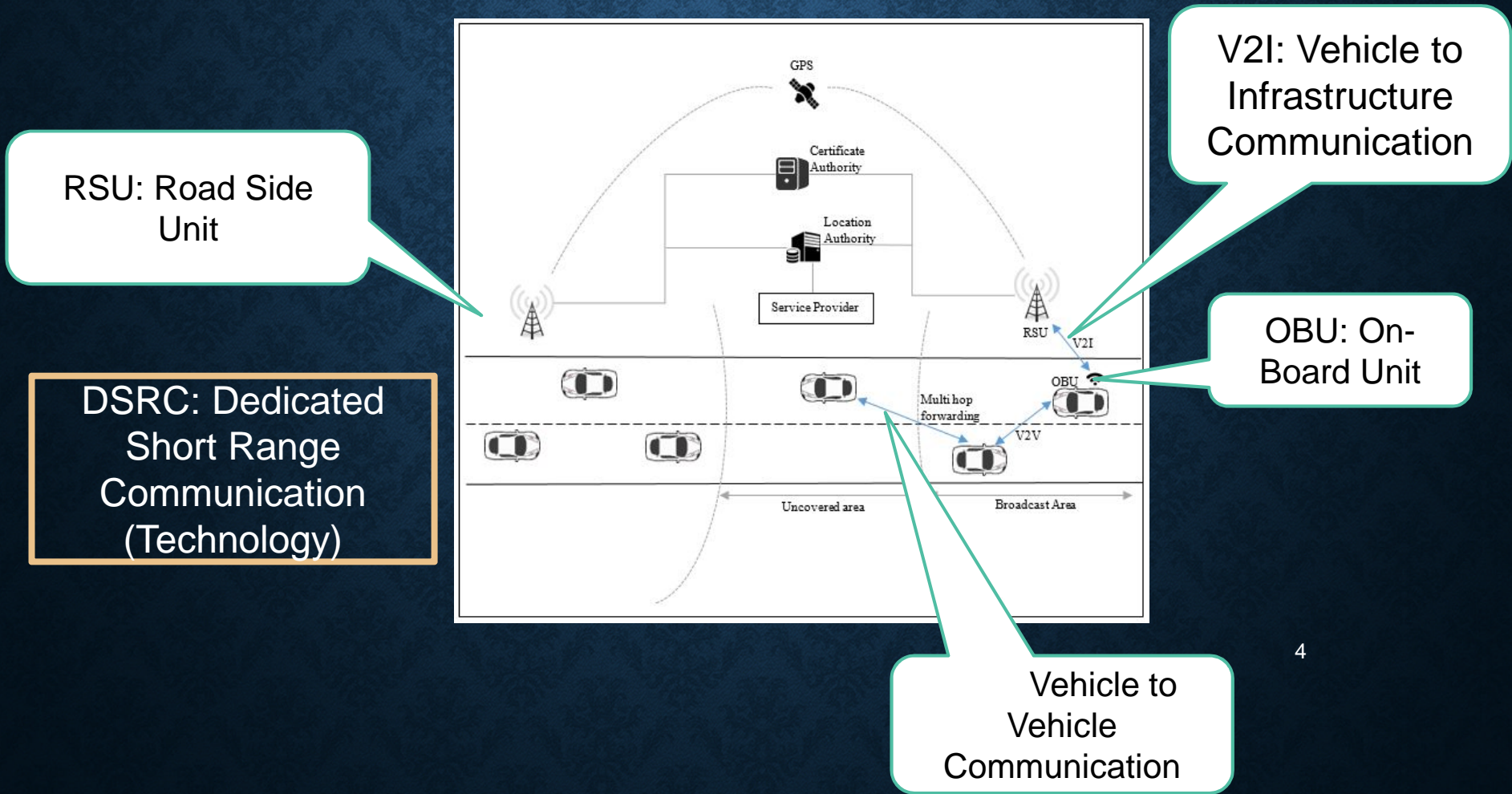
Automation

- Improved spatio-temporal perception –
 - integrate data from sensors mobile devices, vehicles to enhance real-time awareness of environment
- Advanced autonomy and decision making

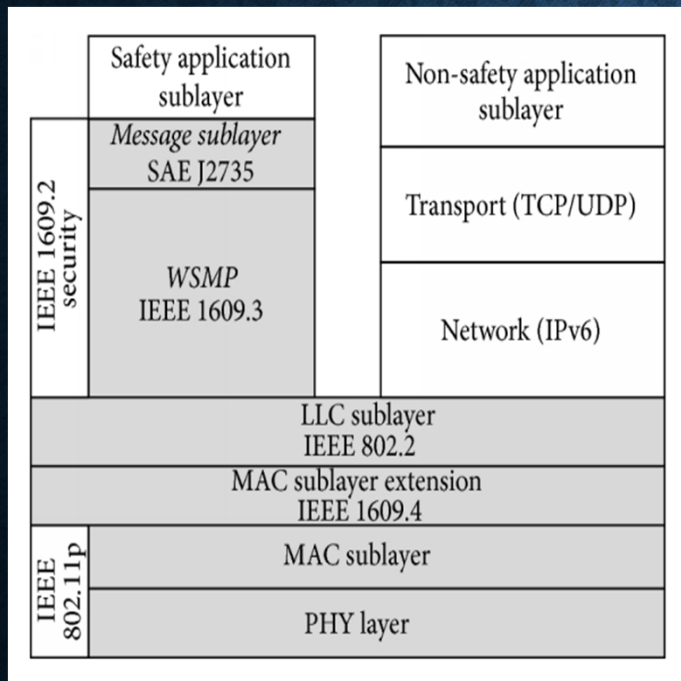
Connectivity

- V2X communication
- Low Latency (safety critical applications)
- Ultra-high reliability
- High data rates

VANET COMMUNICATION



DSRC-WAVE ARCHITECTURE



- ❑ Communication channel: DSRC
- ❑ Communication Protocol: WSMP
- ❑ Safety applications need to communicate reliably :
 - Channel fading, obstacles etc
 - Channel congestion
 - Security/privacy threats

WIRELESS COMMUNICATION REQUIREMENTS IN VANET

Mode of Transmission

- Periodic message broadcasting (BSM)
- Cooperative awareness between vehicles associated with unicast
- Time limited periodic messages on event, e.g. accident

Minimum Transmission Frequency Requirement

Low Latency (safety critical applications)

TECHNOLOGICAL/SOCIETAL CHALLENGES

Interoperability

Reliable and energy efficient routing protocols

- Single/multi-hop routing
- Urban and highway

Secure communication

- Misbehaviour detection – data centric or node centric
- Prevention of information disclosure

Scalability

Legal/Ethical Issues

- Who is liable?
- Insurance?

Petre Dini - Panelist

Theme: Towards 2030 and Beyond

Topic: Views on Next Services

Petre Dini | IARIA, USA

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On..

- **Drone Dynasty**
- **Mobility as a Service**

Drones dynasty

- **home surveillance**
- **delivery**
- **dangerous missions | rescues**
- **underground/mines**
- **utility services | windows cleaning**
- **army-surveillance**
- **taxi-drone**
- **territorial images**

Mobility-as-a-Service

- **change in ownership attitude**
- **cars-by-request**
- **house architecture change**
- **new car rental-on-request services**
- **driver-by-request**
- **taxi-by-request | bicycles**
- **self-controlling ferries**

Thanks

Thanks



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Sugata Banerji- Panelist

Theme: Towards 2030 and Beyond

Topic: Views on Next Services

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The Age of AI

- **AI has been around for a few decades in the form of expert systems, game-playing programs**
- **The recent increase in AI-based services is due to the use of artificial neural networks**
- **AI can now drive cars, fly drones, paint pictures and do everything a human secretary can**
- **Need for caution as we become more and more controlled by our digital assistants**
- **AI can put people in information “bubbles” where they only see resources which confirm their biases**

The Age of AI

- **Designers of autonomous cars must address ethical questions – such as how to choose between two accidents when one is inevitable**
- **Sharing road space with human drivers may lead to accidents. Non-verbal communication needed.**
- **ANN-based AI systems are difficult to understand and debug. Consequently, their errors are also more unpredictable.**
- **People hate to give up control to AI systems**
- **People will lose jobs to AI – they must adapt or perish.**

The Future of Visual Documentation

- **Photos and videos were reliable means of documentation in the film era.**
- **Manipulation was easier with Photoshop in the digital era, but it was still difficult**
- **Today Generative Adversarial Networks (GANs) can produce realistic photos and videos using AI**
- **Sometimes these are done to make a photo clearer, or sharper, or brighter. This works most of the time, but it is guesswork by AI.**
- **As all cameras in the world start making photos “better” than reality using AI as their default setting, the very nature of documentation changes.**

Thanks

Thanks



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