CAN VIDEO AS A SERVICE PARADIGM LEAD TO THE FUTURE INTERNET OF VIDEO THING?

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SENSOR NETWORKS

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OUTLINE OF PRESENTATION

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- OVERVIEW OF VIDEO AS A SERVICE (VAAS)
- CONVERGENCE OF VAAS AND IOT
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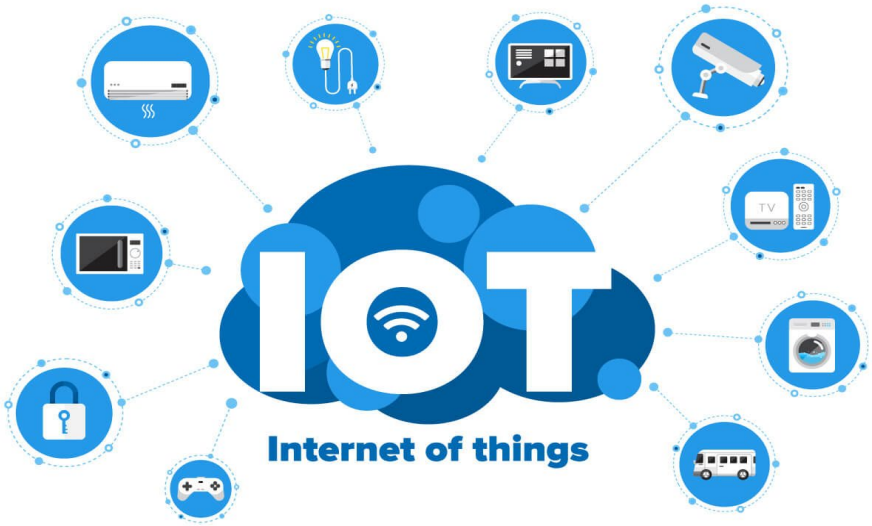
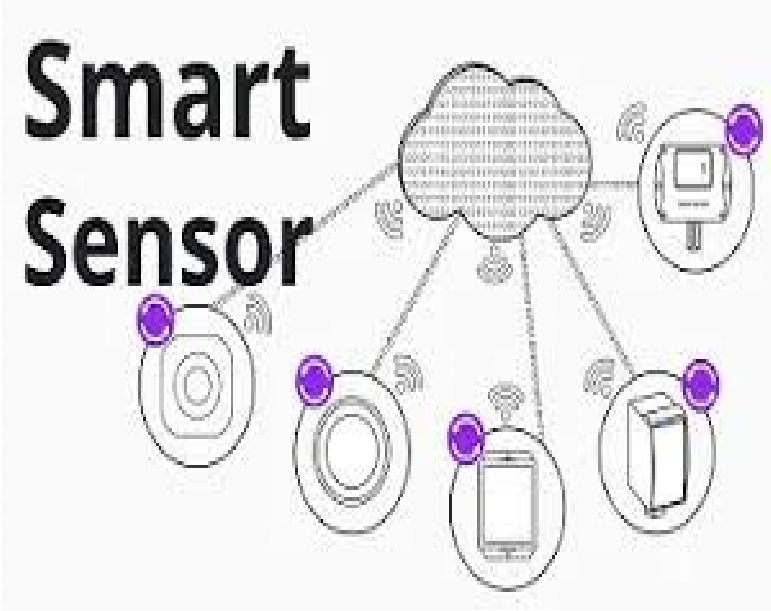
- APPLICATIONS OF VAAS IN THE INTERNET OF VIDEO THINGS
- CHALLENGES AND CONSIDERATIONS
- FUTURE TRENDS AND OPPORTUNITIES
- CONCLUSION
- REFRENCES



INTERNET OF THINGS (IOT) & INTERNET OF VIDEO THINGS (IOVT)



- The Internet of Things (IoT) :

IoT refers to the network of interconnected devices embedded with sensors, software, and connectivity enabling them to collect and exchange data.

- The Internet of Video Things (IoVT):

IoVT is an integrated attempt of computer vision sensors, networking, video or image processing and information storage systems

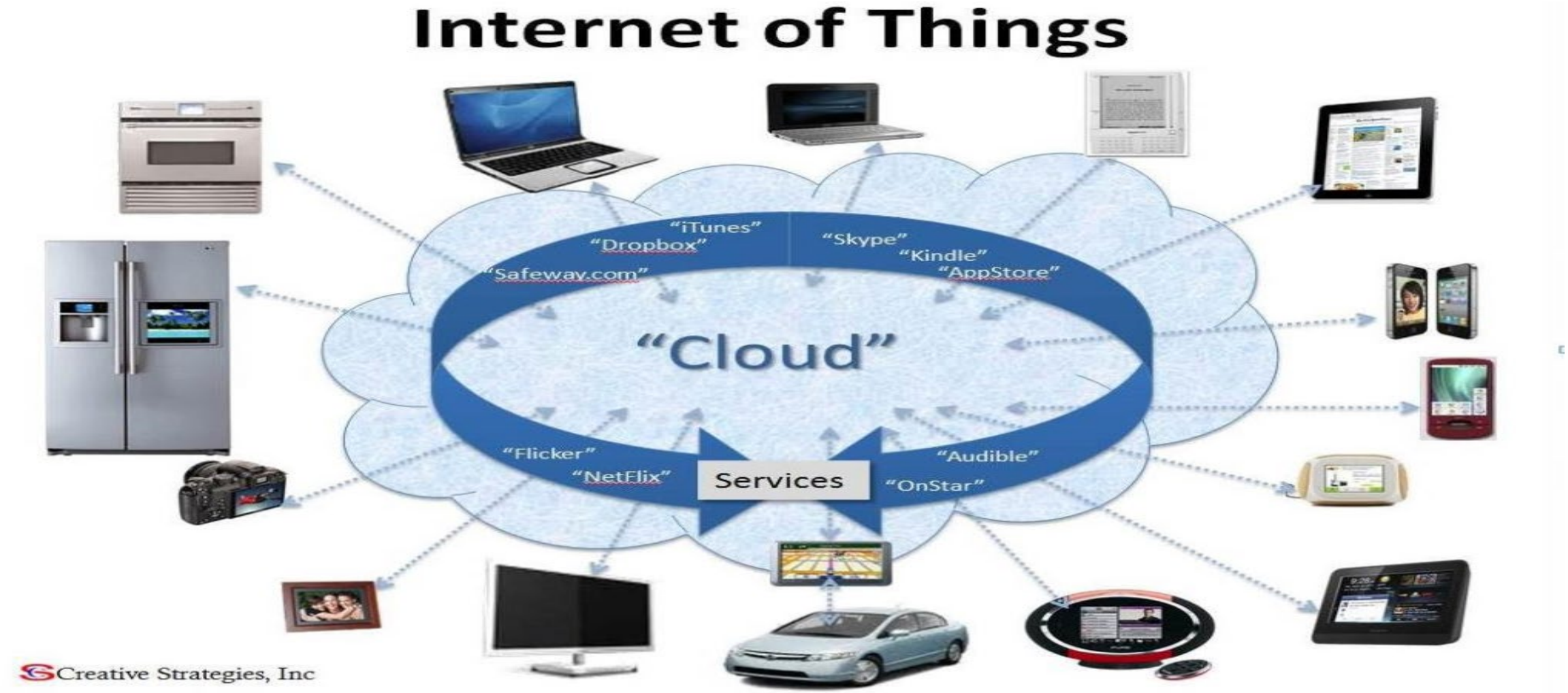
IOVT has become an emerging class of IoT systems that are equipped with visual sensors at the front end.

INTERNET OF THINGS IOT & INTERNET OF VIDEO THINGS IOVT

The IOT ecosystem comprises 3 key Components:

- Devices and Sensors: IOT devices with sensors measure & collect data from the physical environment for the IOT system. Such as temperature, humidity, pressure, motion, and various other parameters
- Connectivity: IoT devices rely on various communication technologies such as Wi-Fi, Bluetooth, cellular networks, and Low-Power Wide-Area Networks (LPWAN) to transmit data to the cloud or other devices and connectivity enables seamless data exchange and remote control.
- Cloud Computing and Data Analytics: The data generated by IoT devices is sent to the cloud for storage, processing, and analysis. Cloud-based platforms provide the necessary computing power and storage capacity to handle the massive volume of IoT data. Advanced analytics algorithms and artificial intelligence techniques are applied to derive meaningful insights from the collected data.

INTERNET OF THINGS (IOT) & INTERNET OF VIDEO THINGS (IOVT)



OVERVIEW OF VIDEO AS A SERVICE (VAAS)

- VIDEO AS A SERVICE (VAAS):

VAAS refers to a cloud-based model that enables the delivery of video content and services over the Internet. VAAS provides a flexible solution for users to leverage the power of video without the need for extensive infrastructure. By leveraging cloud-based technologies,

The VAAS allows for seamless access to video capabilities, regardless of the user's location or device.

- VAAS Encompasses: Video capture, Processing, Delivery, and Management

CONVERGENCE OF VIDEO AS A SERVICE (VAAS) AND IOT

The convergence of (VAAS) and (IoT/IoVT) represents a service paradigm in that

we can interact with the following items:

- enhanced monitoring: Cameras equipped with IoT capabilities provide comprehensive video coverage for security purposes, allowing for proactive threat detection.
- Advanced analytics: AI-driven algorithms can analyze video streams to detect objects, recognize patterns, and identify anomalies and quality control.
- Real-time Decision-making: For instance, smart traffic management systems leverage video analytics to monitor traffic flow, detect congestion, and dynamically adjust signals to optimize traffic flow in real-time.
- Seamless Integration: The cloud-based nature of VaaS allows for easy deployment across a wide range of IoT devices and leads to the development of video-enabled IoT solutions.
- challenges: security and privacy concerns related to video data, managing the increasing volume of video traffic, ensuring standardization

BENEFITS OF THE VAAS PARADIGM FOR THE FUTURE INTERNET OF VIDEO THINGS

The Video as a Service (VaaS) paradigm offers several instrumental benefits in shaping the future IOT:

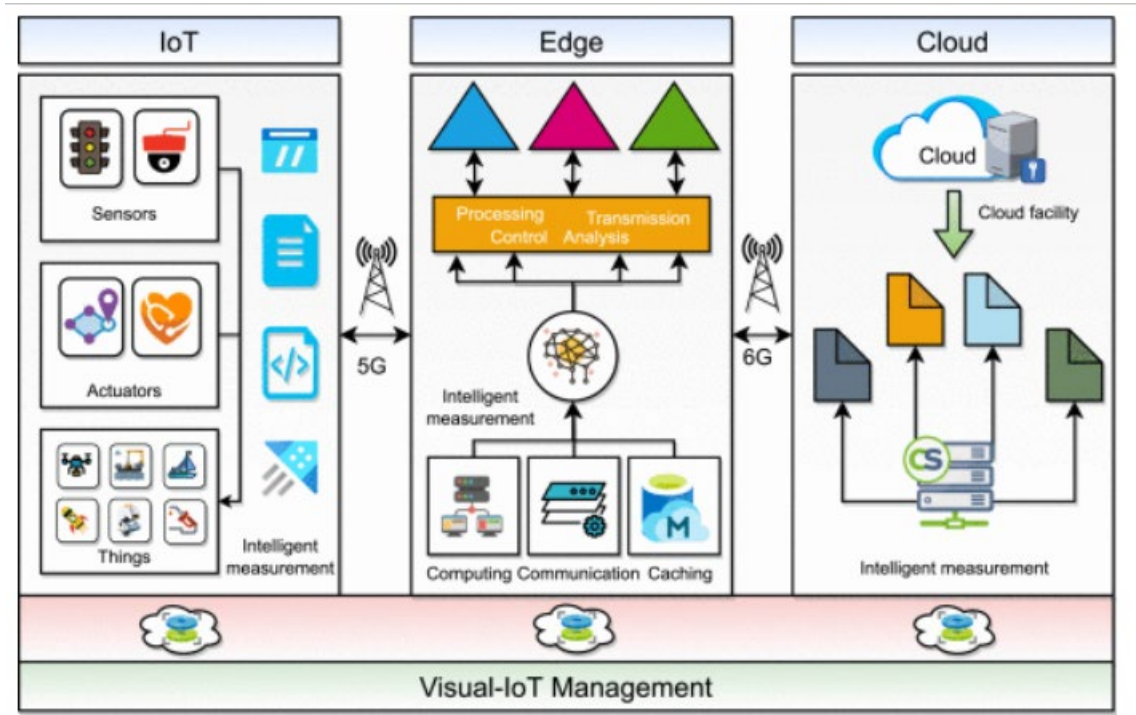
- scalability: Ability to handle large-scale video data from IoT devices
- Flexibility: Seamless integration with existing IoT infrastructure
- Real-time analytics: Enhanced decision-making capabilities through video analysis
- Cost efficiency: Reduced hardware requirements and maintenance costs
- Smart cities: Video-enabled surveillance, traffic management, and public safety
- Healthcare: Remote patient monitoring, telemedicine, and medical imaging
- Industrial applications: Video-based monitoring, predictive maintenance, and quality control
- Retail and marketing: Video analytics for customer behavior analysis and personalized advertising

APPLICATIONS OF VAAS IN THE INTERNET OF VIDEO THINGS

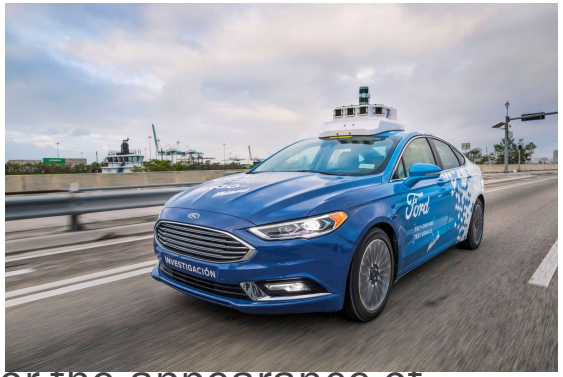
- Smart City
- Retailer sector
- Emergency response
- Home management
- Office management
- Healthcare management

CHALLENGES AND CONSIDERATIONS

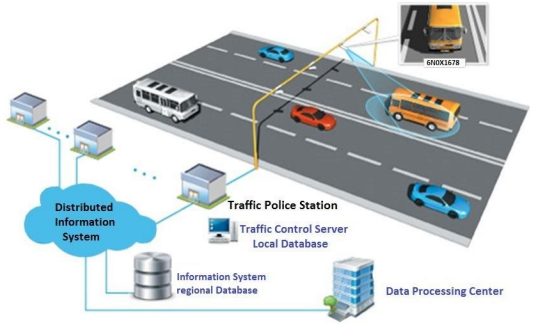
- Amount of the Data that gather from larger set of Cameras.
- Bandwidth and latency of Network
- Processing video in real-time
- Security and Privacy issues
- Delay-sensitive and context-aware service requirements



FUTURE TRENDS AND OPPORTUNITIES



- Autonomous vehicles
- Privacy Issues
- Great accuracy of decision making such as movements associated with retail theft or the appearance of flames.
- Better business insight
- More innovative Use cases



CONCLUSION

- The VaaS model is similar in that the surveillance equipment. It acceptance of IoVT paradigm as the next-generation IoT platform capable of acquiring, transporting, and analyzing the visual data for much improved IoT application performances.

- There are some challenges in deployment of IoVT. But Deep learning methods, Artificial Intelligence Methods, computer Vision tasks, Image and video acquisition, network and network architecture can helps to use Vaas model as Future IoVT.

REFERENCES

Benrazek, A. E. et al., 2023. IoVT-based efficient solution for optimal active smart camera selection in a tracking mission. *Internet of Things,* Volume 24.

Chen, C. W., 2020. Internet of Video Things: Next-Generation IoT With Visual Sensors. *IEEE,* 7(8).

Hazra, A., 2023. Promising Role of Visual IoT: Challenges and Future Research Directions. *IEEE.*

Kusuma , P., 2015. A Study on Impact of Consumer Behaviour Pattern on Buying Decision of Small Cars in Karnataka. *International Journal of Innovative Research in Science, Engineering and Technology,* 4(10).

Mohan, A. et al., 2017. *Internet of video things in 2030: A world with many cameras.* Baltimore, IEEE.

Nisha & Urvashi, 2023. A systematic literature review of Internet of Video Things: Trends, techniques, datasets, and framework. *Internet of Things,* Volume 24.

Sammoud, A., Kumar, A., Bayoumi, M. & Elarabi, T., 2017. *Real-time streaming challenges in Internet of Video Things (IoVT).* Baltimore, IEEE International Symposium on Circuits and Systems (ISCAS).