THE ROLE OF FORMAL VERIFICATION IN NEXT-GENERATION WIRELESS NETWORKS

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ABOUT ME

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OUTLINE

- Overview of Next-Generation Wireless Networks

- Security and Reliability in Wireless Communication

- Why Formal Verification in Wireless Networks?

- Challenges of Formal Verification in Wireless Networks

- Open Issues and Future Directions

OVERVIEW OF NEXT GENERATION WIRELESS NETWORKS

- Enhanced connectivity
- Multi radio access integration
- Network slicing / customized services
- Evolution of protocols
- Standardization
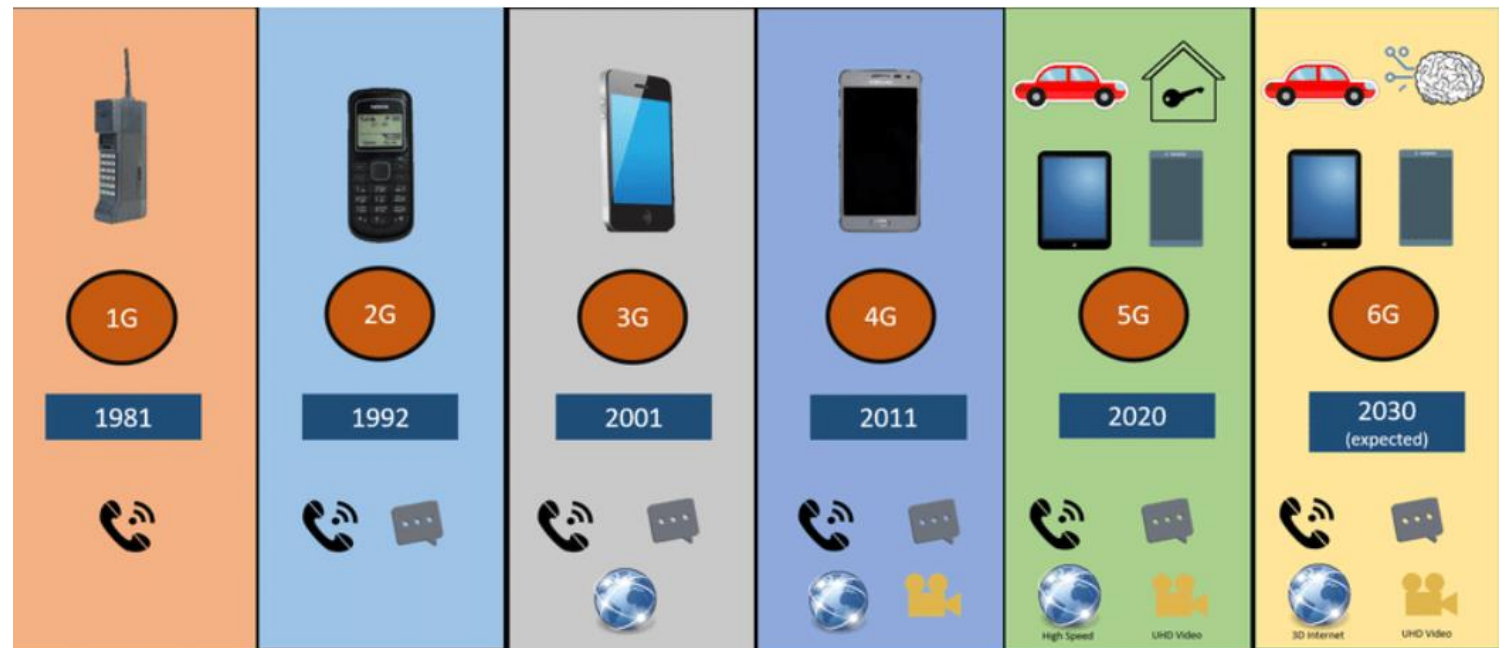
SECURITY AND RELIABILITY IN WIRELESS COMMUNICATION

- Data protection
- Threat mitigation
- User trust and confidence
- Network integrity and continuity
- Reliability
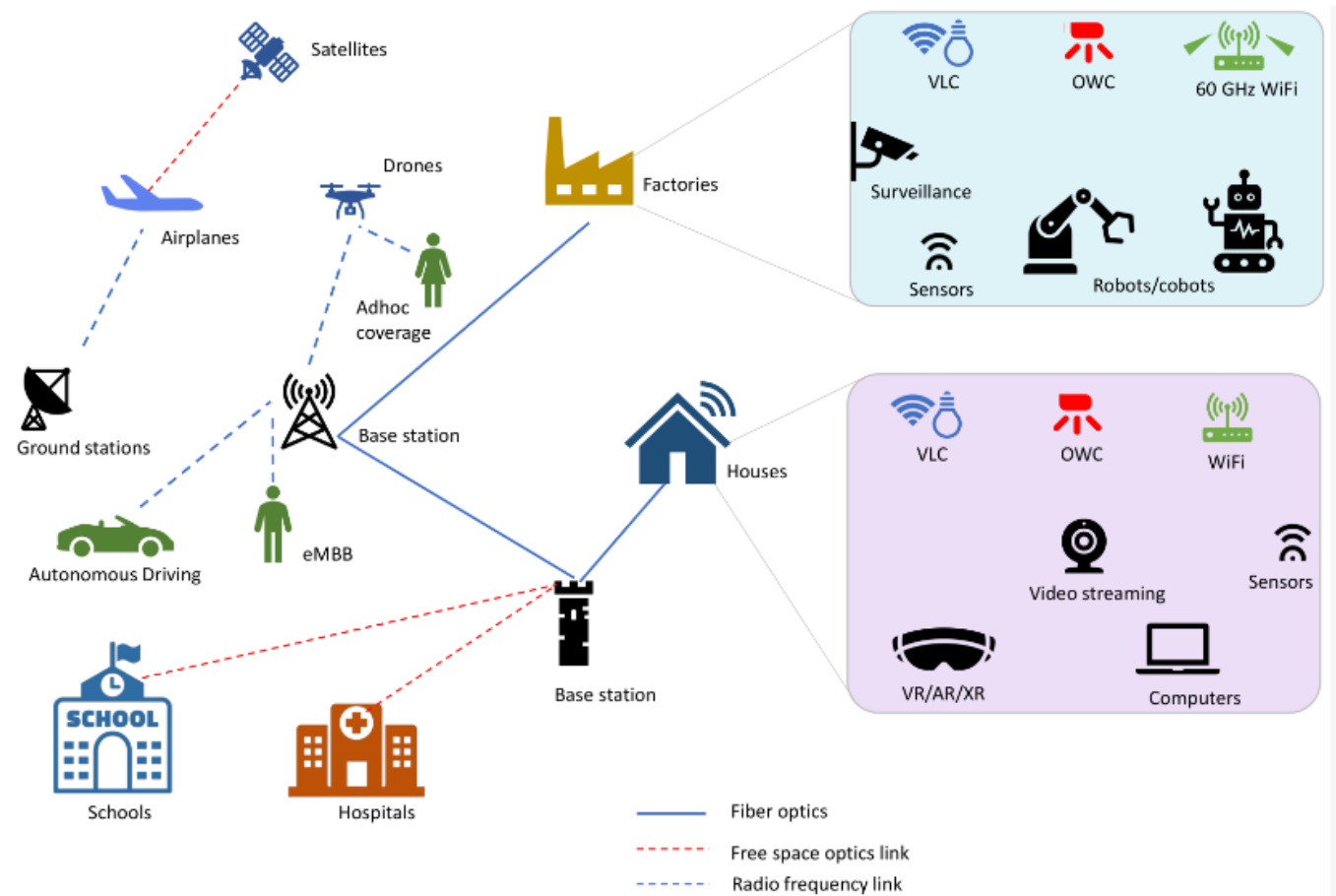
WHY FORMAL VERIFICATION IN WIRELESS NETWORKS?

- Ensuring protocol correctness

- Modeling and analyzing the design and the behavior of the network

- Assurance of security properties

- Fault tolerance and reliability

- Compliance and standardization

- Verification of real-time constraints

CHALLENGES OF FORMAL VERIFICATION IN WIRELESS NETWORKS

- Complexity of models

- State space explosion

- Specification ambiguity and lack of standardization

- Verification complexity

- Dynamic and evolving systems

OPEN ISSUES AND FUTURE DIRECTIONS

- *Scalability of formal methods* to handle the increasing complexity and scale of network architectures and protocols

- *Improving the automation and tool support* for formal verification to reduce the expertise barrier and enhance accessibility to network designers and engineers

- *Integrate current cellular standards that* are written in English text—not machine readable (especially for 6G)

- *Integrating formal verification* into the network development lifecycle

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THANK YOU

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