



Journée thématique du GT SSLR 2021 sur la sécurité de  
s réseaux

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# Decentralized Reputation Model based on Bayes' Theorem in Vehicular Networks

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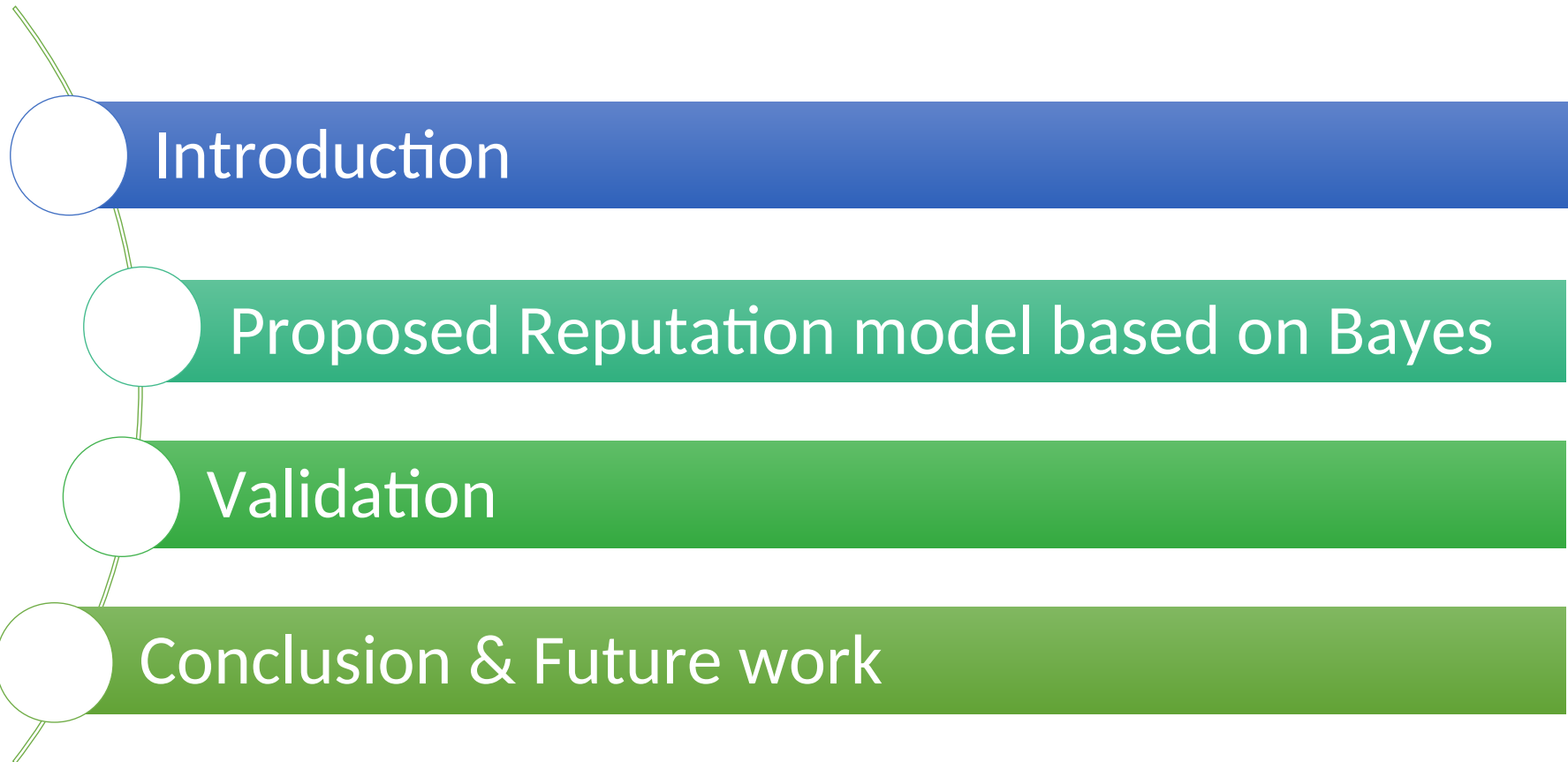
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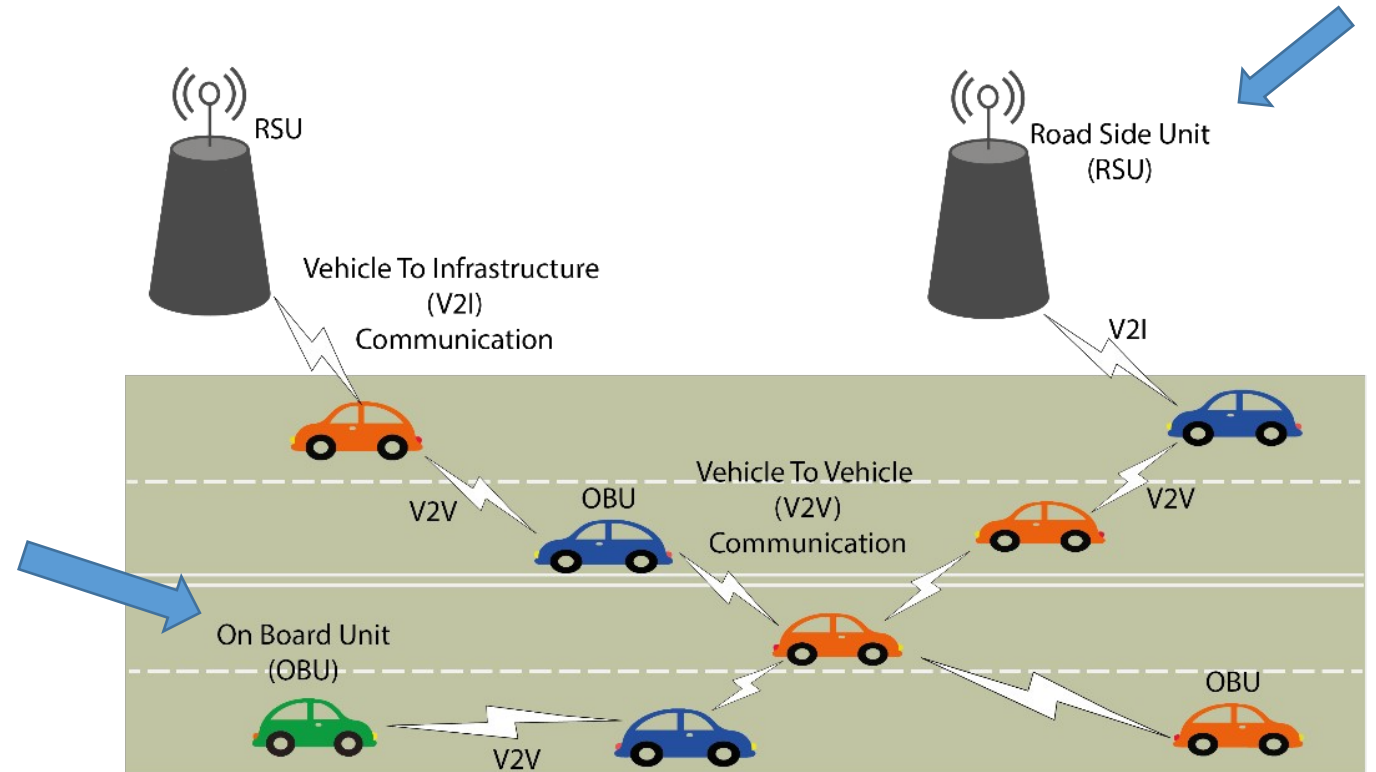


# OUTLINE



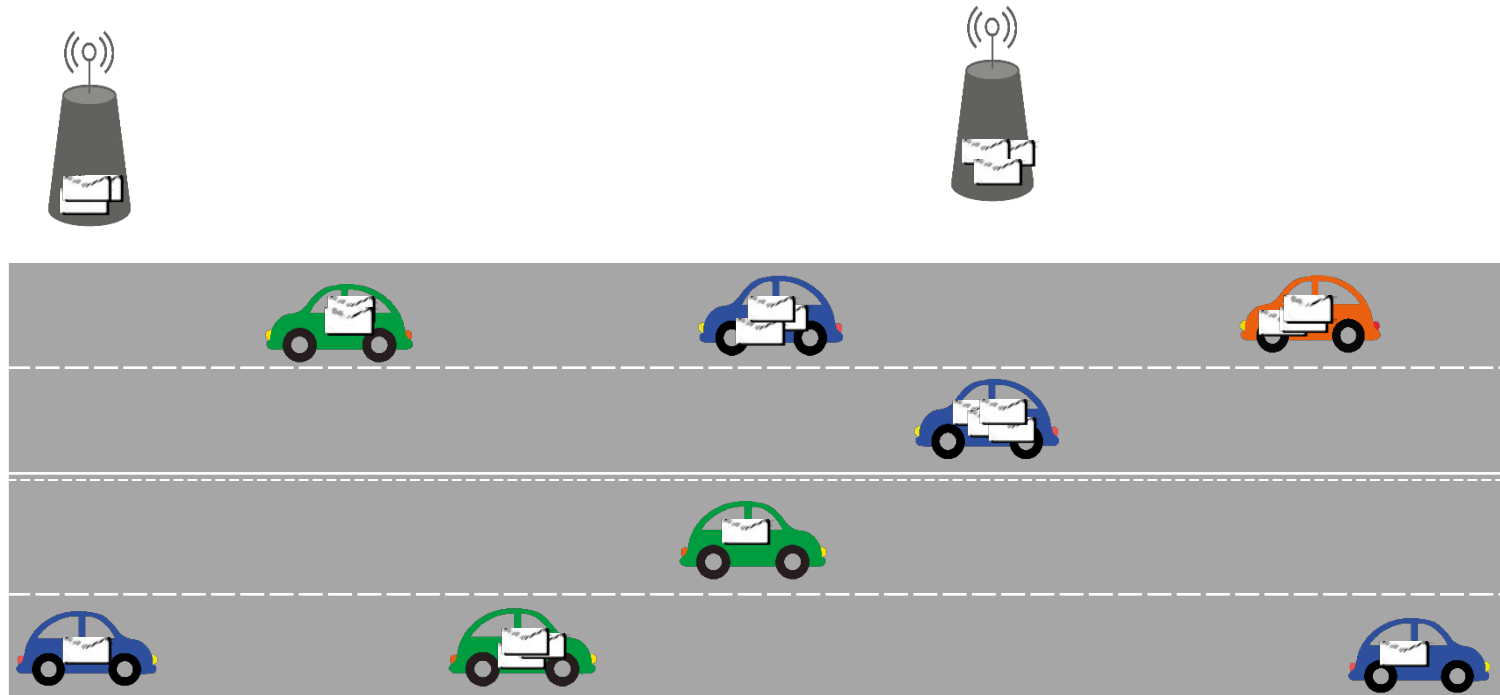
# VEHICLE AD-HOC NETWORK

- Offering many useful applications and services
- Providing safety and comfort for drivers and passengers
- Helping to prevent accidents
- Improving the traffic control system
- Making driving safer and more comfortable



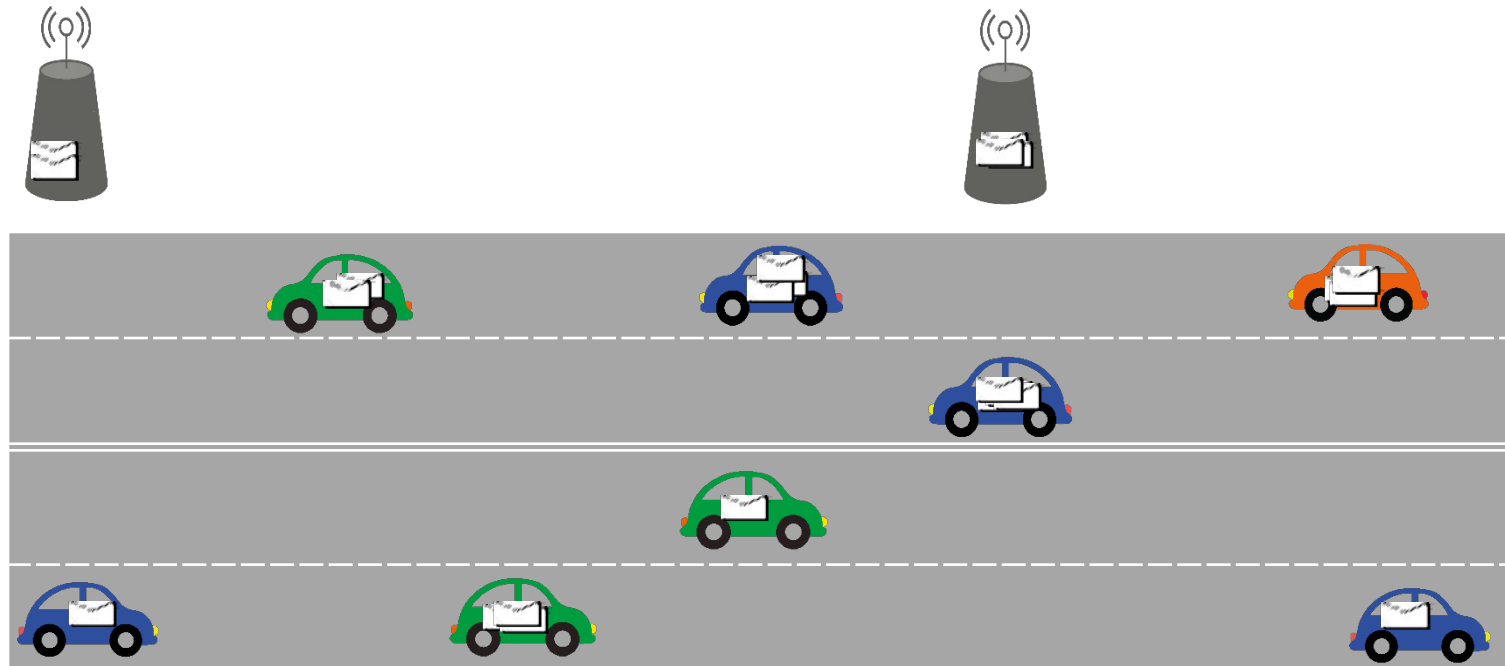
# Most important communication modes

- Vehicle-to-vehicle network (V2V)
- Vehicle-to-infrastructure network (V2I)



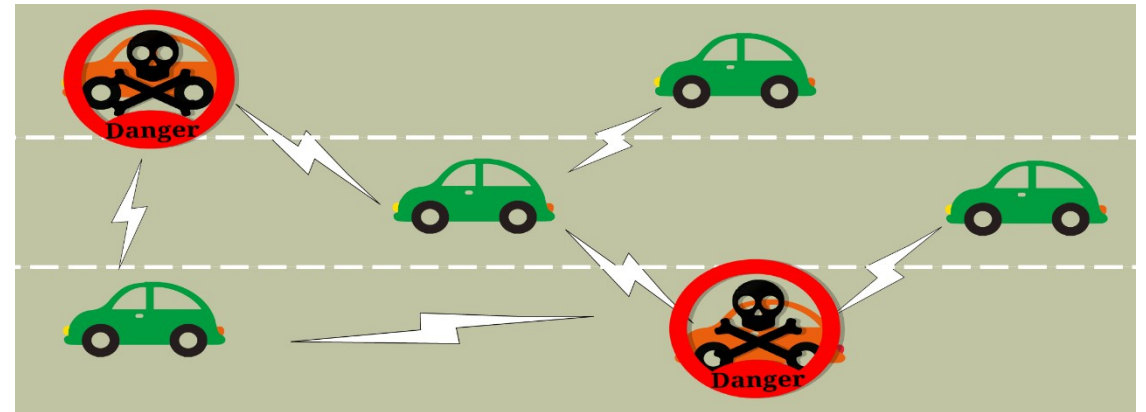
# VEHICULAR AD HOC NETWORK “VANET”

- Global architecture of vehicular ad hoc network

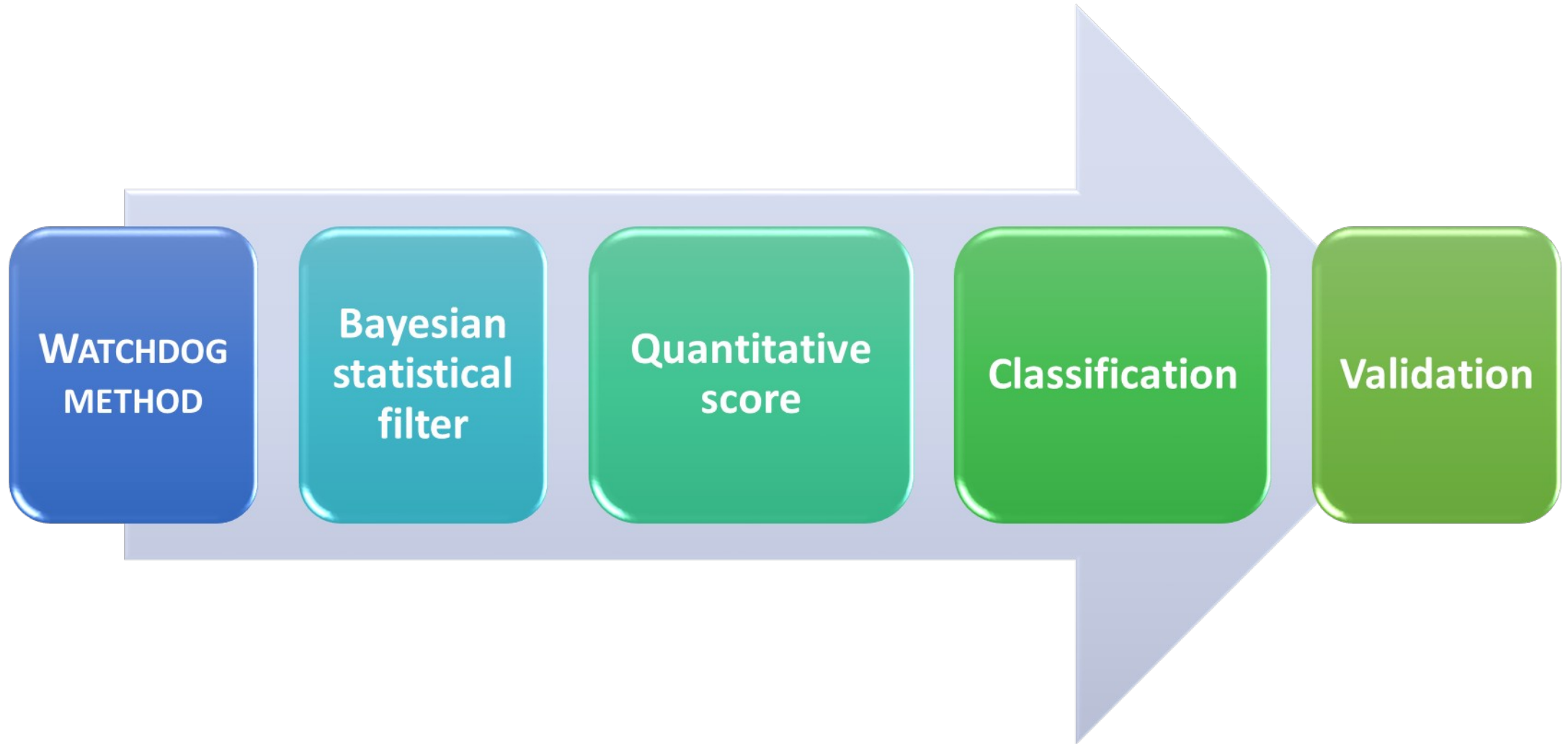


# Problem

- Vehicular nodes are easily captured and attacked
- VANETs are vulnerable to many types of threats
  - The modified messages or dropped messages by attackers may induce the traffic authority center to make wrong actions, which leads to traffic disorder and road accidents.
  - A Vehicle should check the validity of any received message before making decisions to forward or drop the received data.



# Organigramme

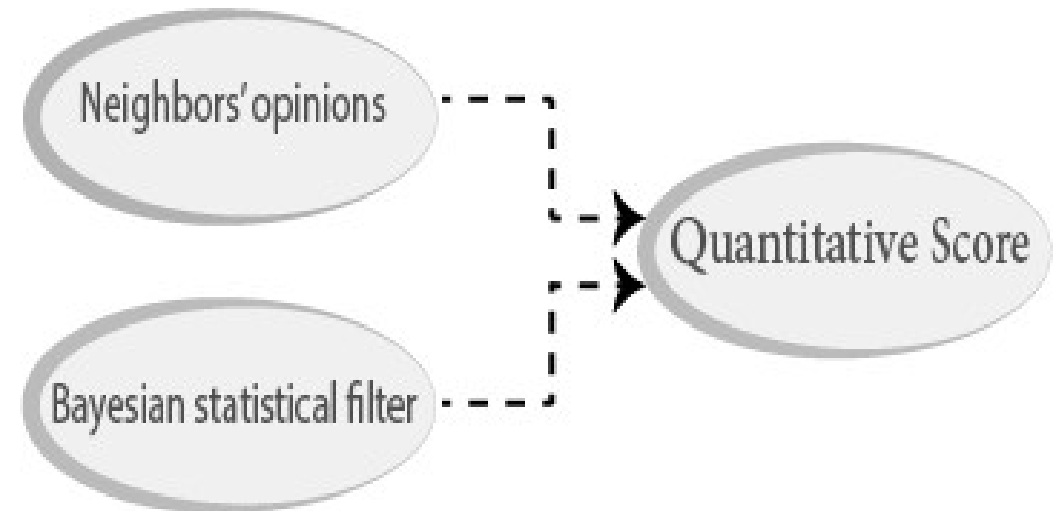


# VEHICLE SCORE COMPUTATION

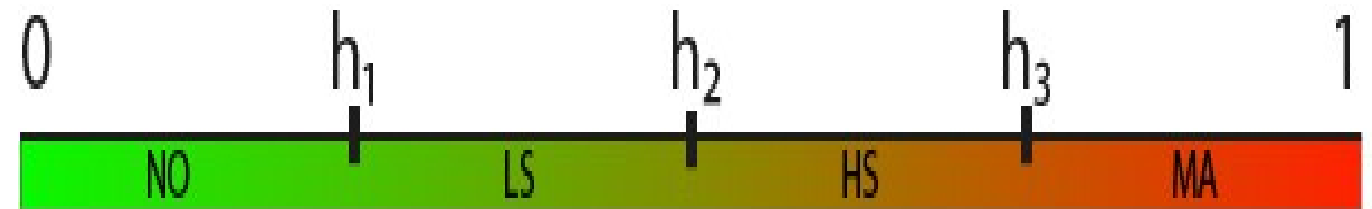
Robust decentralize reputation model:

- Filter out malicious vehicles
- Calculate the probability of malicious behavior
- Assign a score to each vehicle to determine its state

The architecture of the decentralized reputation model:

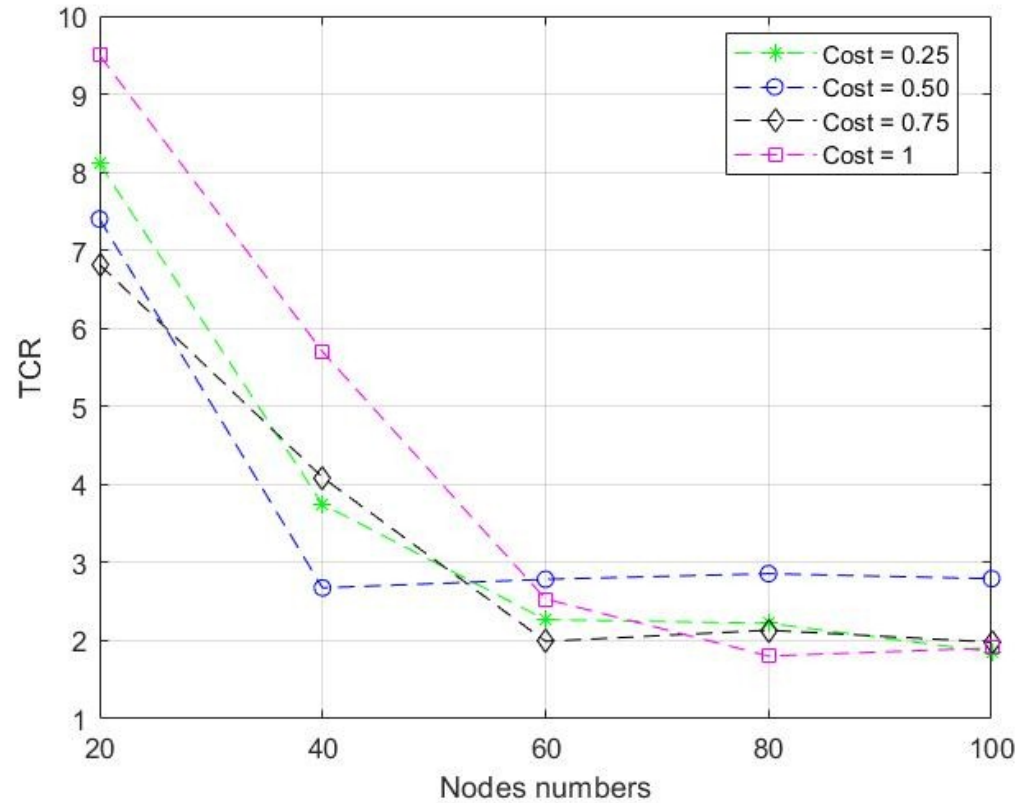


Filtering thresholds ranges:





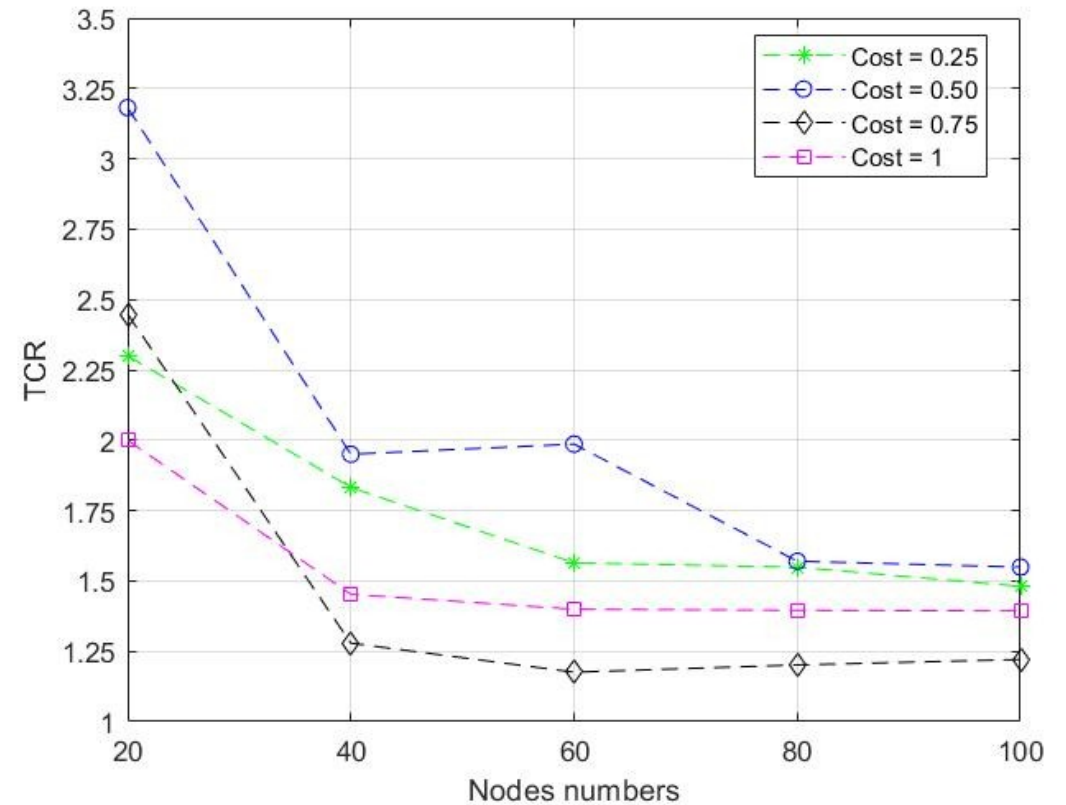
# TCR VS. NODES SCALABILITY



(MA: 5%, HS: 5%, LS: 5%, NO: 85%)

Fig. A

The best value is achieved by cost = 0.5

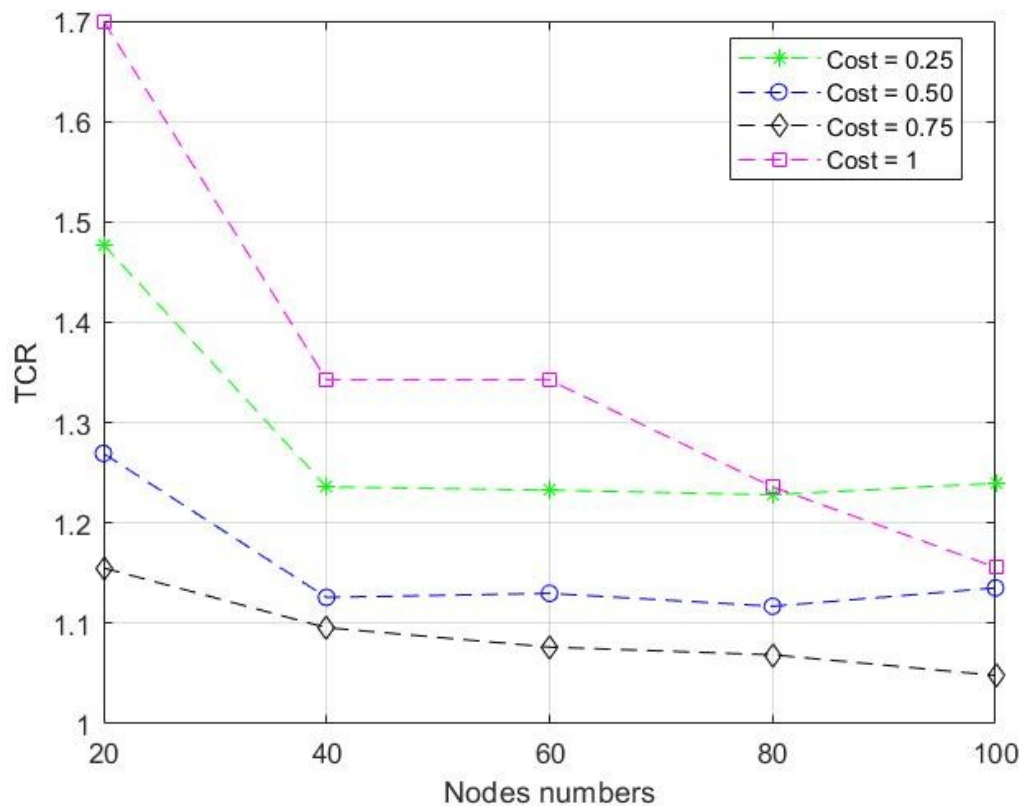


(MA: 10%, HS: 5%, LS: 5%, NO: 80%)

Fig. B

The best value is achieved by cost = 0.5

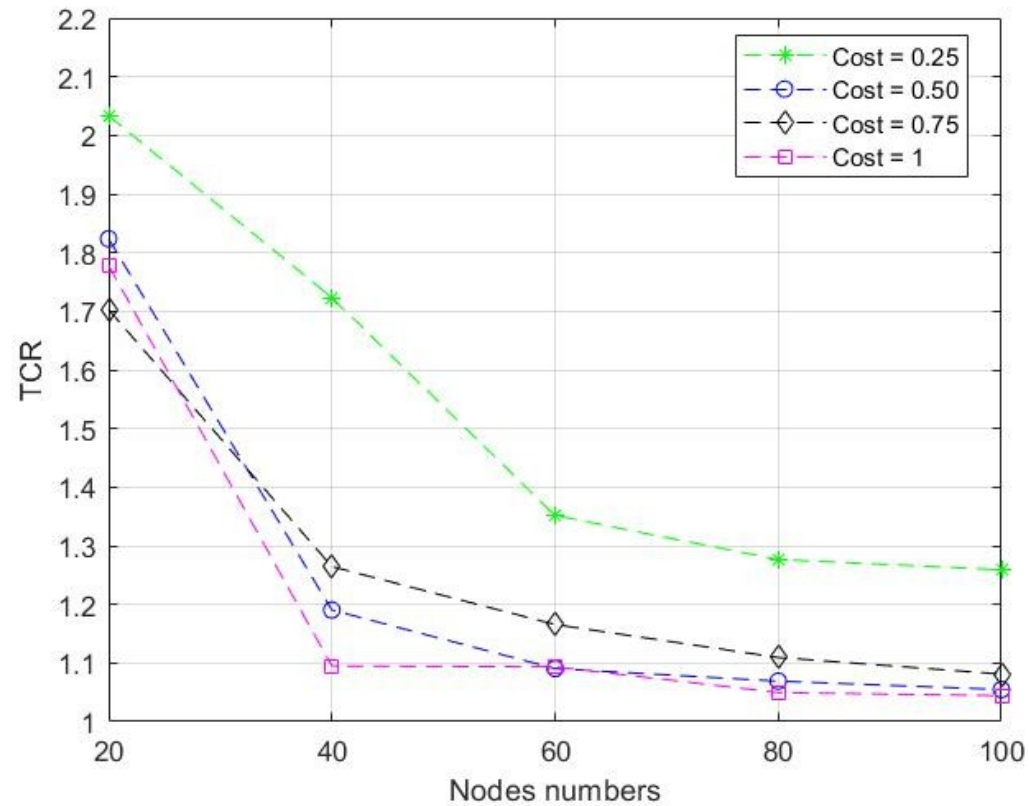
# TCR VS. NODES SCALABILITY



(MA: 15%, HS: 5%, LS: 5%, NO: 75%)

Fig. C

The best value is achieved by cost = 0.25



(MA: 20%, HS: 5%, LS: 5%, NO: 70%)

Fig. D

The best value is achieved by cost = 0.25

# CONCLUSION

VANET is prone to critical risks, threats, and attacks due to its unique characteristics and its dynamic topology

We proposed an accurate decentralized reputation model

- Calculate the behavior scores
- Evaluates the reliability of nodes
- Describe our classification strategy
- Compute the precision and accuracy of the proposed filter
- Illustrate the validity of the proposed reputation model

Future work:

- Isolate malicious vehicles
- Predict the vehicle's state



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# Thank you !

# Questions?

Presented By Maryam NAJAFI