IMPROVED STATISTICAL BROADCAST PROTOCOL IN VANET
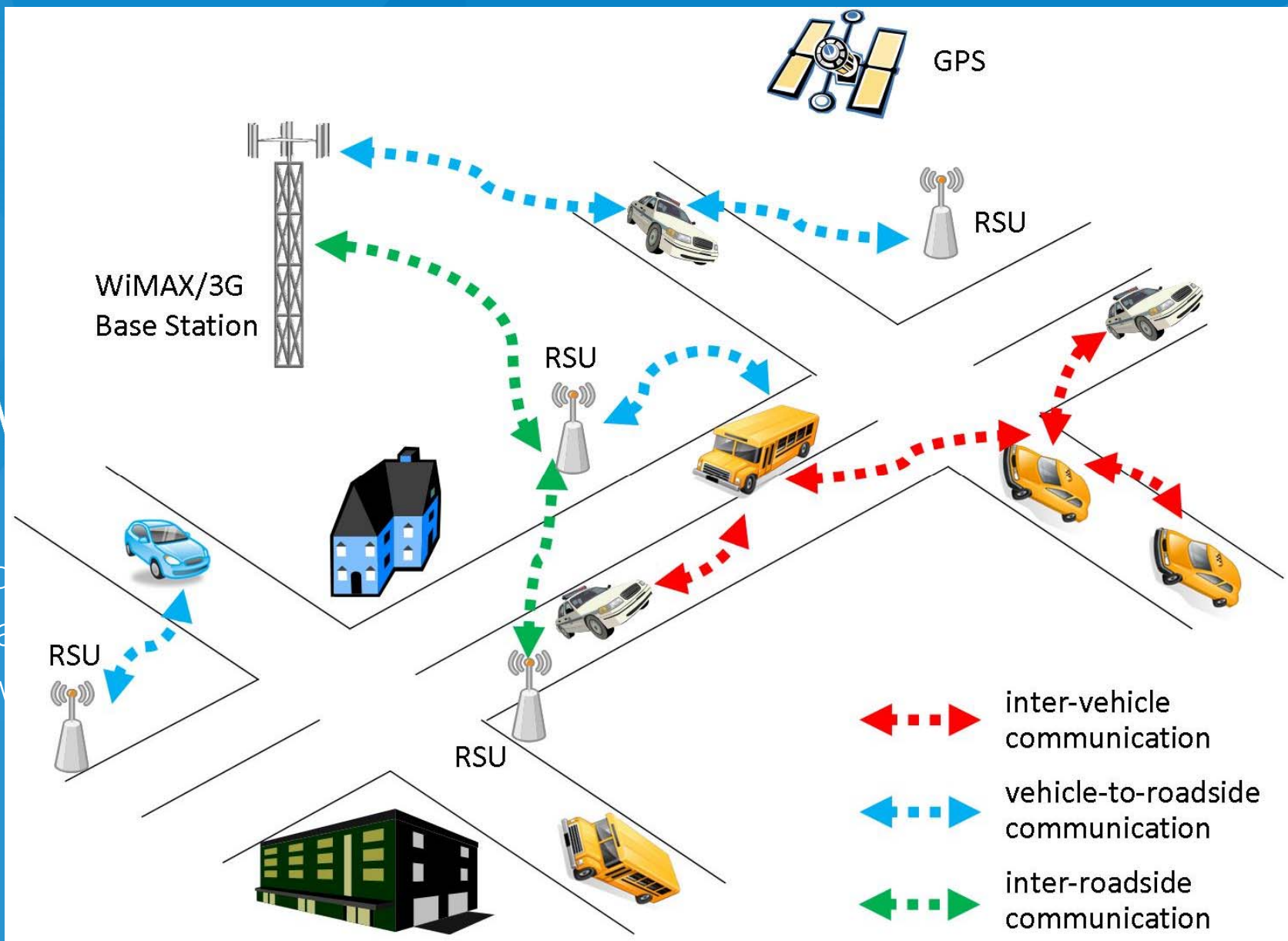
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Outline

← Brief introduction of VANET

← Pros and cons of existing multi-hop wireless broadcast routing protocols

← How to improve statistic broadcast routing protocols

← Method : Using SWANS to simulate and compare improved statistic broadcast routing protocol with other well-known broadcast protocols to modify threshold function to gain better performance

GPS

WiMAX/3G
Base Station

RSU

RSU

RSU

RSU

RSU

Vehicular a...
networks tha...
other or ...
information,
applications

inter-vehicle
communication

vehicle-to-roadside
communication

inter-roadside
communication

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Traditional Statistical broadcast routing protocols

← Deciding to broadcast data received based on the locally available variables and a cutoff threshold.

← Merit : no need of neighbour information

←   ensure privacy security

← Shortcoming: cannot adapt to different traffic scenarios

Objective : Improve statistic broadcast routing protocols

← Key to improve the protocols is to find optimal value of the threshold to ensure high reachability of vehicles and efficient use of bandwidth in both urban and highway scenarios with varying node density and fading intensity.

Novelty: Measuring the Distribution Pattern

(a) $Q < 1$ (b) $Q \approx 1$ (c) $Q > 1$
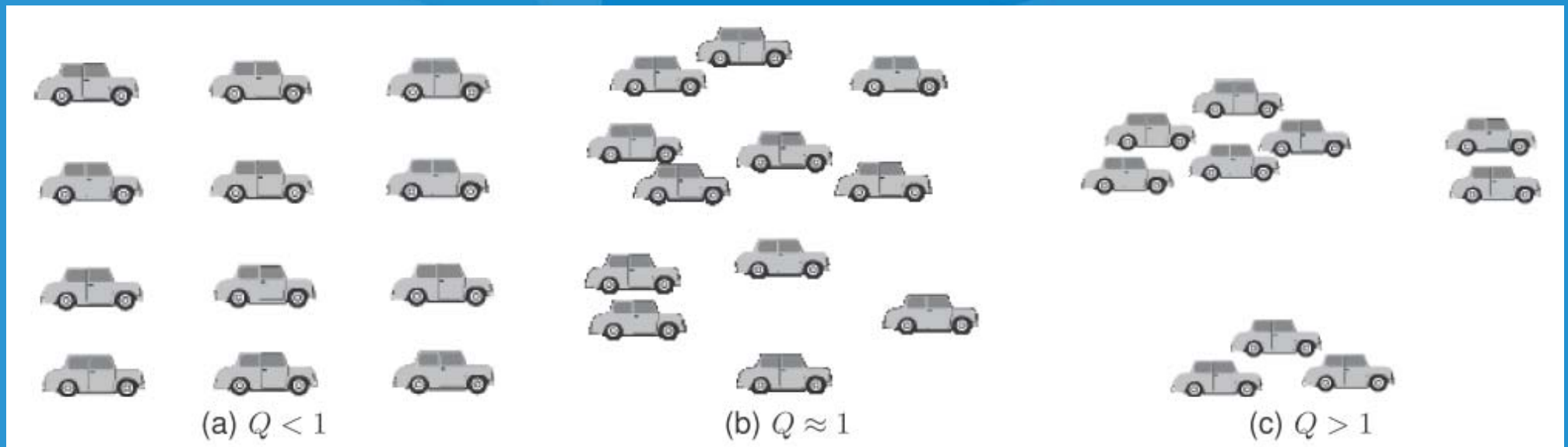
← Using Q to measure the distribution pattern

Measuring Channel Quality

← Using Rician fading to model fading

← Introduce parameter K to quantify the relative strength of the line-of-sight signal in Rician fading

← Designing the threshold function Dc(N,Q) by using K

Protocol Algorithm

← For each broadcast message, the nodes perform following procedures:

← When a broadcast message is received for the first time, calculate d as the distance to neighbor the message was received from, and initialize D = d/r.

← Set a random backoff timer with duration chosen uniformly between 0 and Tmax.

← If the message is received again before the timer expires, calculate d (distance to the sender) and update D = min{D, d/r}. Cancel the timer and go to procedure 2.

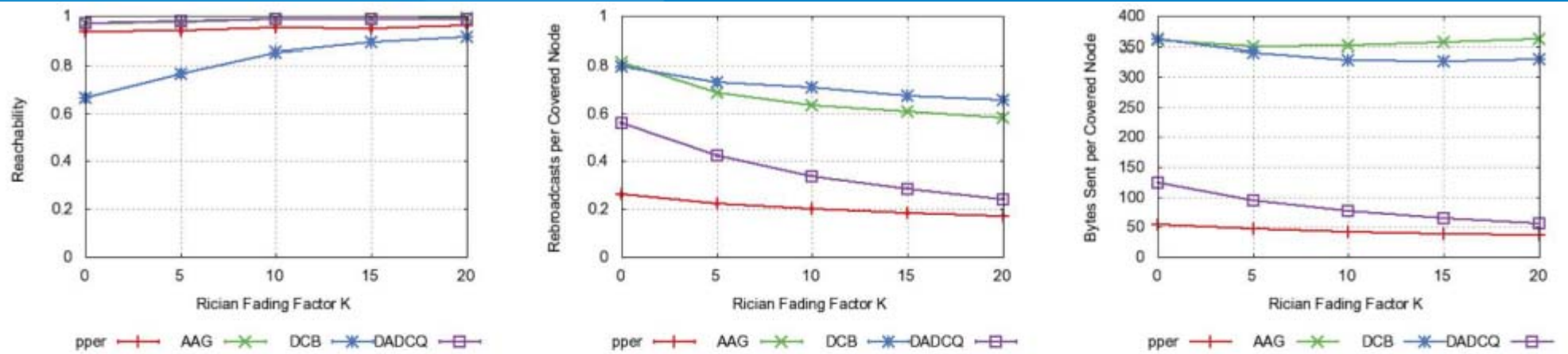← When the backoff time expires, calculate t=Dc(N) and rebroadcast if D>t.

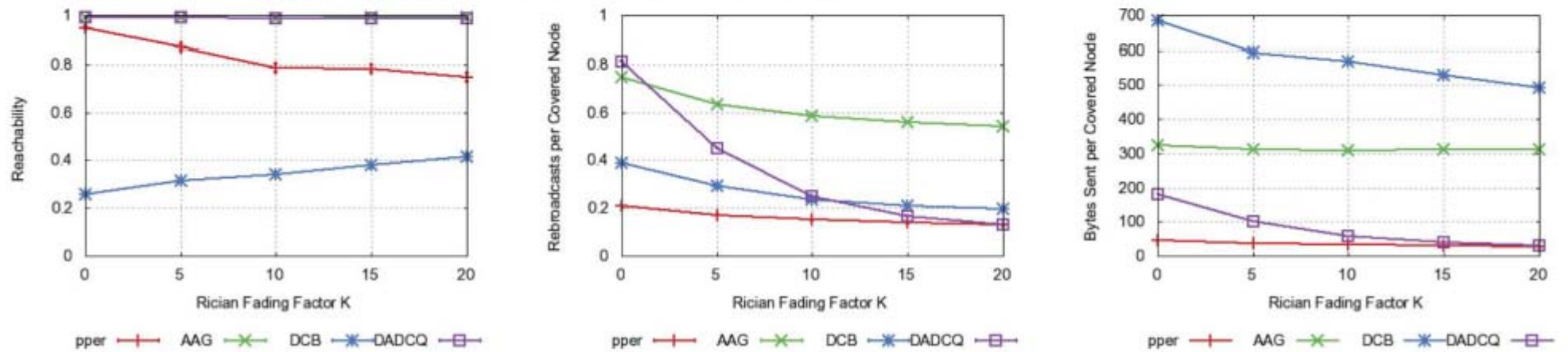Fig. 8. Performance versus K of the broadcast protocols in the urban scenario.

Fig. 9. Performance versus K of the broadcast protocols in the highway scenario.

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←Conclusion

← Improved statistical protocols provides high reachability and efficient use of bandwidth in different scenarios with varying node density and fading intensity.

← The improved statistical protocols computes a decision threshold value that is simultaneously adaptive to the number of neighbors, the distribution pattern and the channel quality, which enables the protocol be adaptive to various scenarios.

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Thank you!