Project Ariadne – Use Case 3 / 3

RapidMiner Research

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Presentation Layout

- List of Use Cases
- Use Case 3 : Adhoc connectivity in moving network topology
  - Story Line
  - Functional and Non-Functional Requirements / Challenges
- Early phase ML modelling
- Stay in touch

List of Use Cases

- **Use case 1**: Outdoor backhaul/fronthaul networks of fixed topology
  - Scenario 1: Long-range Line of Sight (LOS) rooftop point-to-point backhauling.
  - Scenario 2: Street-level point-to-point and point-to-multipoint backhauling/fronthauling.

- **Use case 2**: Advanced NLOS connectivity based on metasurfaces
  - Scenario 1: Indoor advanced Non-Line of Sight (NLOS) connectivity based on metasurfaces
  - Scenario 2: Data kiosk

- **Use case 3**: **Adhoc connectivity in moving network topology**
  - Scenario 1: Dynamic front/backhaul connectivity for mobile 5G access nodes and repeaters
 - Scenario 2: V2V and V2X connectivity

Use Case 3: Adhoc connectivity in moving network topology

Functional Requirement

- Deploy a drone with a radio head to replace a failed radio head and serve area of affected coverage
- Provide high-capacity backhaul for mobile 5G Base Transceiver Station nodes and fronthaul to user equipments (like mobile phones) – see next slide.
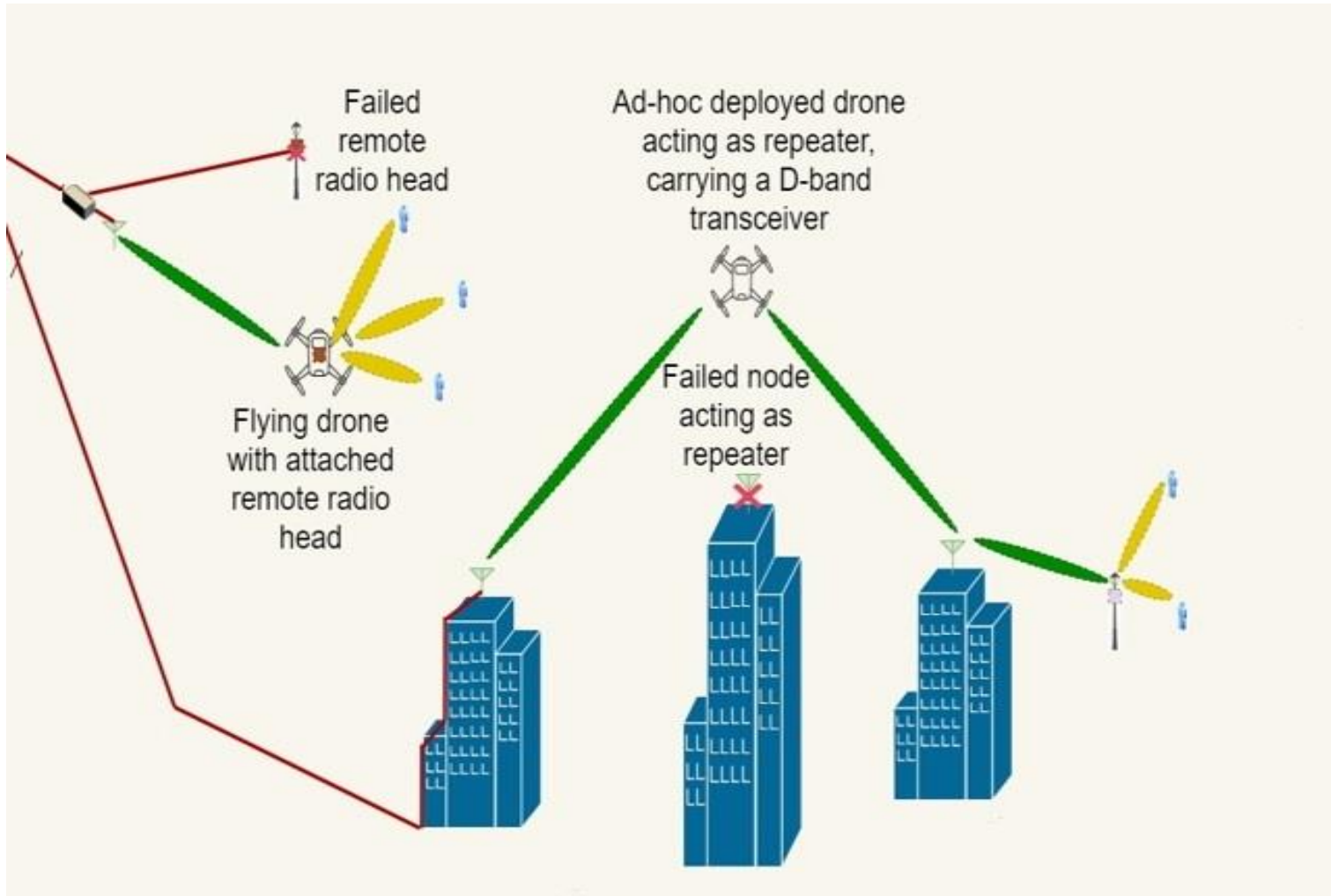
Non-Functional Requirements

- Drones are not fully stationary and cannot use pencil beamforming (as expected in 5G networks), so predict optimal beamwidth from expected drone movement in 1-10 milli-seconds.
- Decide on optimal carrying capacity of the drone with respect to the affected region (density) before deploying it.
- In V2V communication, vehicle viewing an accident through video camera may transmit this stream in real-time (1-2 milli-seconds) to preceding vehicles using LOS links, in collaboration with infrastructure (like 5G enabled signal lamp)
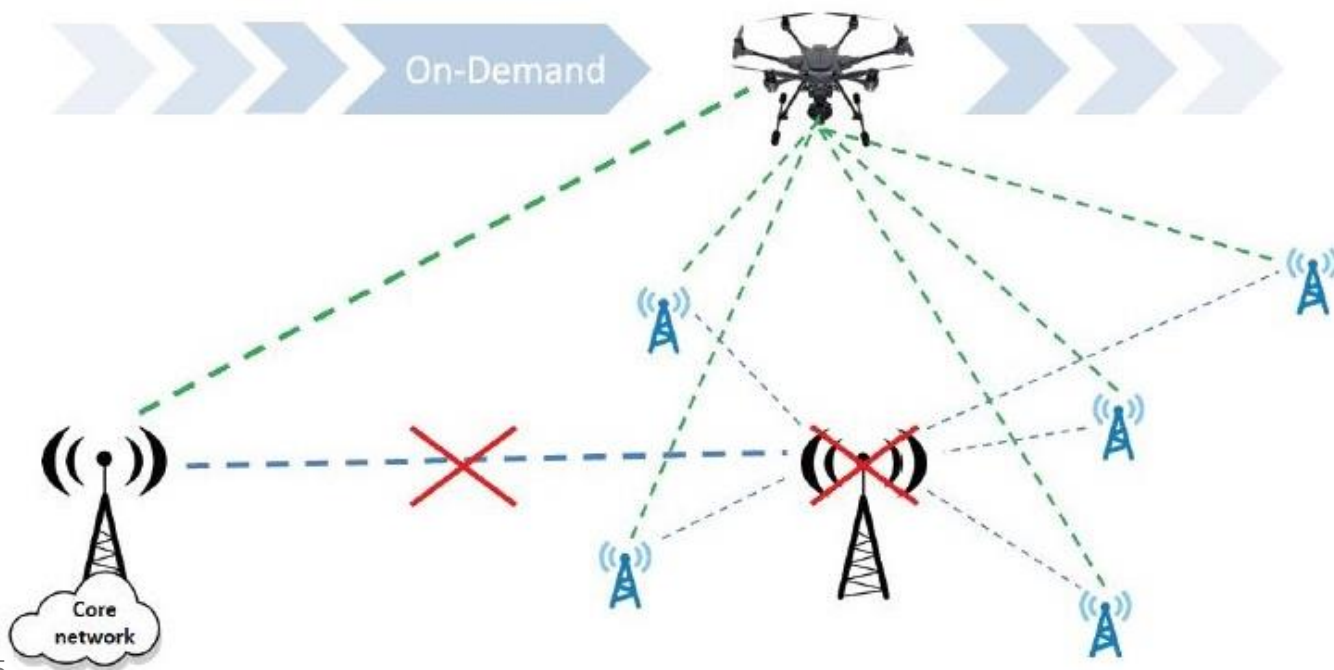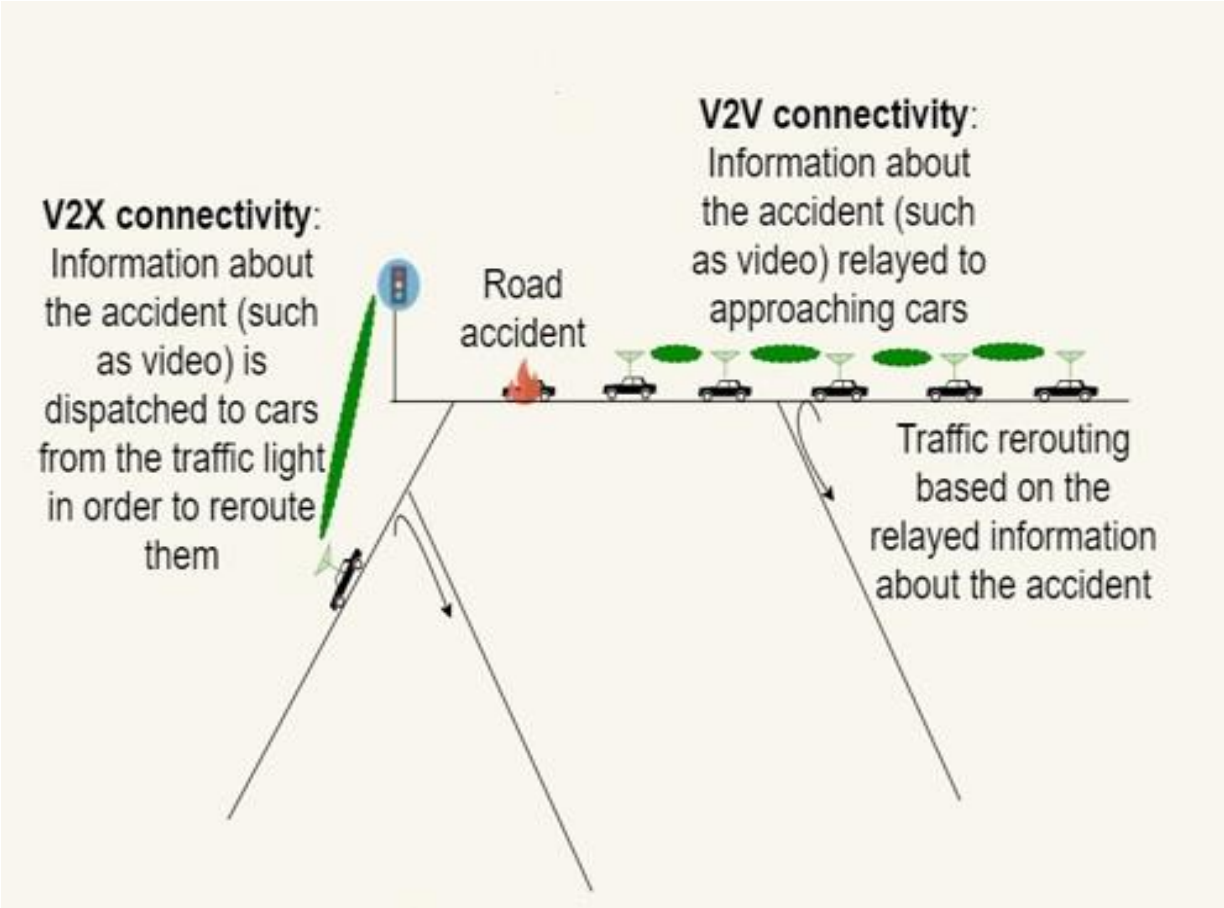
Use Case 3: Adhoc connectivity in moving network topology

Use Case 3: Adhoc connectivity in moving network topology

V2X connectivity: Information about the accident (such as video) is dispatched to cars from the traffic light in order to reroute them

Road accident

V2V connectivity: Information about the accident (such as video) relayed to approaching cars

Traffic rerouting based on the relayed information about the accident

Early phase ML Modeling

- Work on Use Case 3 is not officially started as of yet.
- Preliminary phase shows, ML models would be able to play a role for:
  - Predicting carrying capacity requirements of drones given density of region to serve
  - Predicting optimal beam width
  - Predicting alternate routes if road obstruction signals are received in V2V communication
  - Predicting congestion build-up in alternative routes.

Stay in touch

- If our work appeals to you, you may stay in touch by following us online

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THANK YOU VERY MUCH

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#1 Agile Predictive Analytics Platform for Today's Modern Analysts

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