SESAR INNOVATION DAYS 2015
ASDA Research Tournament

Challenge 2 Increasing trajectory prediction accuracy under bad weather conditions

Team Maserati

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FROM INNOVATION TO SOLUTION

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CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #1*
  Developing approaches for uncertainty management in trajectory prediction.
- *Sub-Challenge #2*
  Identifying the need for prediction accuracy and defining the required level of certainty.

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #1*
  Developing approaches for uncertainty management in trajectory prediction.

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #1*
  Developing approaches for uncertainty management in trajectory prediction.
  - "Increasing prediction accuracy" means some kind of "optimization". The disturbance ("weather") however is somehow chaotic and not deterministic. Is it the right concept to optimize against chaotic influences?
- *Maserati:*
  - Perhaps replace "somehow" with "sometimes"? As for any fixed area the weather (disturbance of the atmosphere) is most of the time nominal, and can be forecast accurately, and with low uncertainty.
  - We think it is the right concept, if one considers the impact on ATM (DST) from a stochastic point of view.

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #1 (continued)*
  Developing approaches for uncertainty management in trajectory prediction.
  - "Increasing prediction accuracy" means some kind of "optimization". The disturbance ("weather") however is somehow chaotic and not deterministic. Is it the right concept to optimize against chaotic influences?
- *Maserati:*
  - Assess the weather forecast uncertainty
  - Assess other sources of uncertainty
  - Assess the impact on TP, and its clients
  - Decision making based on level of uncertainty and impact
  - Data analysis of past experiences may be used for tuning DST parameters

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #2*
  Identifying the need for prediction accuracy and defining the required level of certainty.

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #2*
  Identifying the need for prediction accuracy and defining the required level of certainty.
  - The main challenge implies that it is desirable to increase the prediction accuracy. What if future ATM concepts might be independent from the prediction accuracy?
- *Maserati:*
  - Perhaps replace “independent from accuracy” with “more resilient to uncertainty”?
  - Weather prediction uncertainty can be reduced. Huge effort: modelling, observations, computation complexity.
  - Increasing the prediction accuracy, will pay off only if it increases the client ATM application accuracy.
  - Similar for reducing weather prediction uncertainty.

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- *Sub-Challenge #2 (continued)*
  Identifying the need for prediction accuracy and defining the required level of certainty.
  - The main challenge implies that it is desirable to increase the prediction accuracy. What if future ATM concepts might be independent from the prediction accuracy?
- *Maserati:*
  - Weather isn't the only source of uncertainty to ATM/AU DST, there are many other sources. Reducing the level of weather forecast uncertainty past a certain lower limit might have no effect on ATM performance (statistically).
  - One may look into the propagation of local uncertainty (airport) to the network level and compare its impact with the uncertainty the network (manager) allows.

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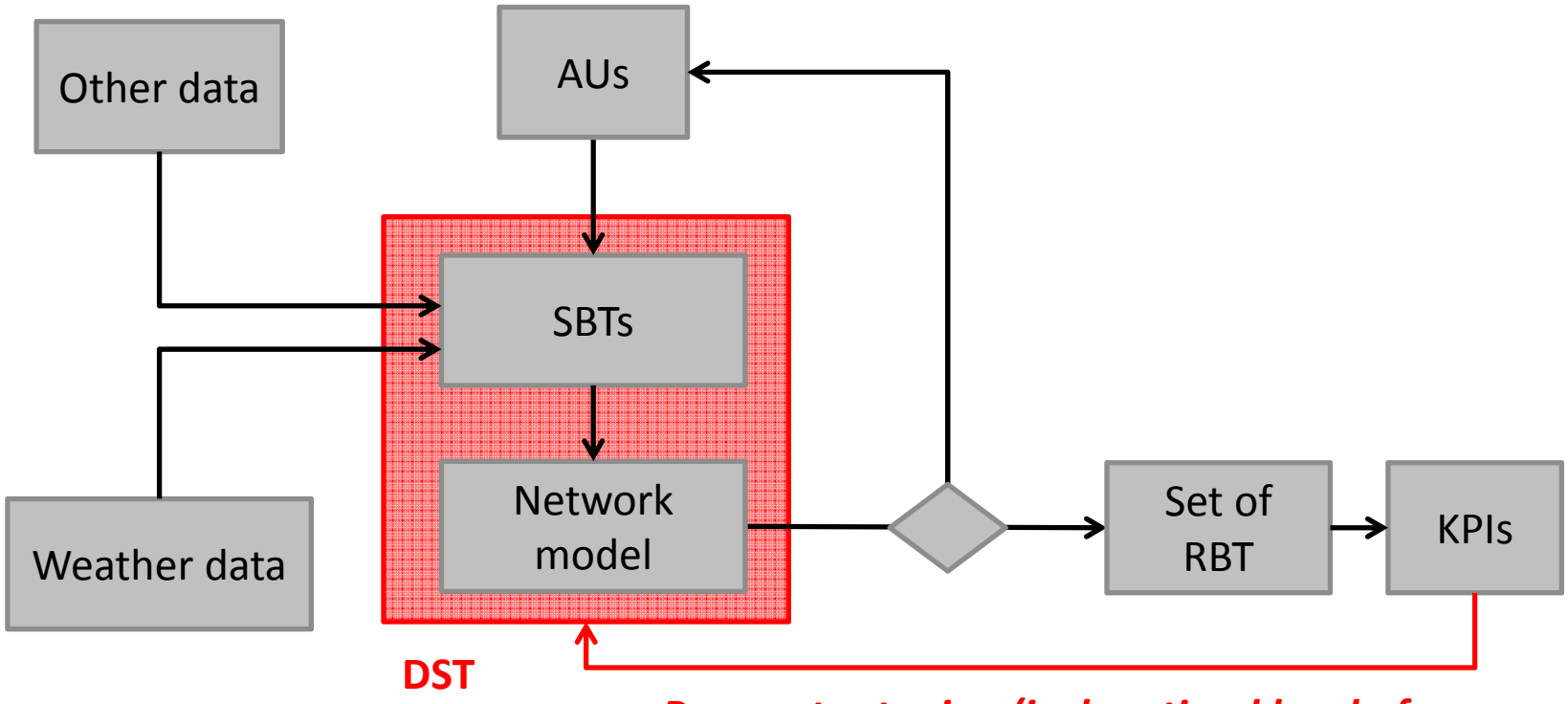
  Identifying the need for prediction accuracy and defining the required level of certainty.
  - The main challenge implies that it is desirable to increase the prediction accuracy. What if future ATM concepts might be independent from the prediction accuracy?
- *Maserati:*
  - There might be a need to introduce level of uncertainty as a trajectory preference: pay more for allowing more trajectory uncertainty (more generally: pay for quality of service level, including more flexibility).
  - How to influence user preferences to optimise on network level?

Back up slides

CHALLENGE #2 increasing TP accuracy under bad weather conditions

- *Sub-Challenge #1 (continued)*



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