To develop a simulation engine leveraging the NFID in order to provide fire departments across Canada with a data driven tool for evidence-based planning and response to fire incidents.

- Very significant amount of missing values (blanks) in NFID.
- E.g., relevant data field for modelling and simulation (M&S) of FD operational performance: RESPONSE (time to respond to incident).
  - available only for the jurisdiction of Alberta (13.2% of reported incidents).
- Proportion of fires and fire related incidents in relation to other types of emergencies that fire departments respond to.
- Gaps in key operational data (incident location, time of alarm receipt, response time, etc.), as currently reported in the NFID
- Collaboration with Vaughan Fire & Rescue Service (VFRS) in Province of Ontario in order to be able to develop a simulation model.
- 88% of data found utilizable after clean-up process (set of key data fields related to incidents and responses).
INTEGRATION OF EMPIRICAL DATA FOR SIMULATION

RESPONSE SIMULATION MODEL

DEVELOPING A FIRE RESPONSE SIMULATION TEST BENCH BASED ON NFID
Adriano O. Solis, Ali Asgary, Jenaro Nosedal-Sánchez and Beatrice Zaccaro
We propose including in the NFID relevant information about all types of emergency incidents responded to by Fire Departments.

Key relevant data fields: RESPONSE, DISTANCE, INCIDLOC (longitude/latitude coordinates), YEAR, MONTH, DATE, DAY, TIME, CREWSIZE, NUMBER OF ENGINES, NUMBER OF AERIALS, NUMBER OF TANKERS.

We recommend encouraging fire departments, especially those of major cities, to share relevant information in order to learn about, and gain insights on, overall performance in responding to emergencies.

Incident Generation Model (Discrete Event Simulation): appears to simulate occurrence of emergencies more or less following actual patterns arising in historical data.

Incident Response Model (Agent-Based Simulation): appears capable of reproducing performance of the system in terms of responding to emergencies.

Simulation of protocols for numbers of responding units depending upon types of emergency incidents.

Developing more extensive experiments to evaluate different scenarios
- impact of demand fluctuations on response times and operational resources (crews/vehicles),
- comparison between assignment of responding units according to responsible district/region vs. geographically closest station(s).

POSSIBLE EXTENSION/IMPROVEMENT OF THE NFID

We propose including in the NFID relevant information about all types of emergency incidents responded to by Fire Departments.

Key relevant data fields: RESPONSE, DISTANCE, INCIDLOC (longitude/latitude coordinates), YEAR, MONTH, DATE, DAY, TIME, CREWSIZE, NUMBER OF ENGINES, NUMBER OF AERIALS, NUMBER OF TANKERS.

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