TEAM TRANSPOPO - APRIL 25, 2016

How can data optimize emergency services?

Dispatchers have limited amount of time and resources to make informed decisions to save lives.

How 911 Dispatch Works?

Individual calls 911

Call Routed to closest 911 center

Dispatcher asks questions

Dispatcher logs answers

Dispatcher notifies EMS crew

EMS crew prepares to respond and depart

Responders arrive at scene

Possible Routes

Exploration

- Visualizing data to gain insights on trends that can influence policy
- Figure out what pieces of information obtained by the dispatcher is most useful in responding to an incident

Predictive Decisions

- Real time tool to assist dispatchers and responders in determining the severity of an incident and how to best respond
- Use information obtained from caller to predict the circumstances at the scene of the incident

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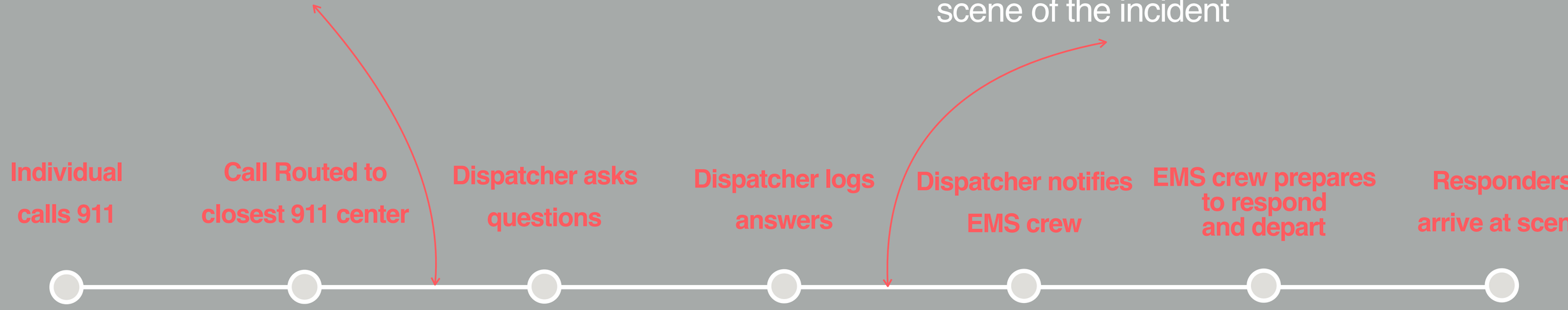

NEMSIS Dataset

- EMS response data for the year 2014
- Incident details about those involved
- Timestamps for key events during the crew’s response
- Vital signs of patients
- Incident and destination location at a coarse geographic level
- EMS response details

FARS Dataset (2014)

- Vehicle-related fatality data for the year 2014
- Granular location data
- Road conditions and features
- Weather conditions
- Crash details
- EMS arrival time
- Victim details

Initial Approach

- **Build a classifier to predict severity (Predictive Decision):** Use data given to dispatcher (NEMSIS) along with other observable data about the incident location (FARS) to predict the severity of the incident so that responders can act appropriately
- **Concerns:** How do we appropriately quantify severity? Do we need to limit ourselves to only traffic incidents? How do we use FARS without biasing the results towards the incidents involving fatalities?

Second Approach

- **Build a classifier to predict details of the scene of the incident:** Use data given to dispatcher (NEMSIS) to predict details that would be observed at the scene so that dispatchers and responders have a better idea of what to expect
- **Concerns:** Which (output) details are useful to predict? How do we deal with very severe class imbalance? How do we fail gracefully? How do we deal with all of the missing fields?
- **Method:** Used the “provider’s primary impression” label (the EMS personnel's impression of the patient's primary problem or most significant condition which led to the management given to the patient) as the output, and used reported injury and symptom information, as well as location details as the inputs
- **Results:** Overall accuracy: 70.71%. Average class accuracy: 48.25%

Some potential improvements

- Figure out a good way to deal with missing fields and severe class imbalance
- Find other datasets to supplement NEMSIS
- Find better ways to incorporate FARS, potentially as some sort of prior
- Figure out how to assess severity appropriately
- Investigate other models

Fin!