

System Load Proposal

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Approach

System load definition: **percentage of times an ambulance needs to come from a different station than the regional one** (e.g. receive call from south but no available ambulance in south, thus ambulance comes from central).

System load Implication: The higher this percentage, the higher the load on the system, since the ideal scenario would be to have the closest ambulance respond to each call.

Computations

Our proposed system load can be calculated by **counting** the number of records whose **call region != dispatched ambulance region** (e.g. call from south but a central ambulance responds) and **dividing** it by the **total** number of observations.

This would be a straightforward calculation for the current ambulance allocation. For different hypothetical scenarios, however, since there is no existing data — the ambulance being dispatched every time could be very different from the current data, depending on the new ambulance allocation — we would first need to run a **record-by-record** (sorted by call time) **simulation**, due to the fact that **subsequent** missions are dependent on **previous** ones (**data dependency on time etc.**), to determine 1) from **which station** to dispatch the ambulance, 2) **which ambulance** to dispatch, depending on availability, and 3) its **travel-related timestamps** calculated by Google API (use original data's on-site time, assuming this to be independent of ambulance dispatched). Once we have this simulated data, we could easily calculate the system load just as we would for the current data.

Pros

- 1) The proposed system load definition is easy to calculate once simulated data is available and has a very intuitive interpretation
- 2) We can extract the caller location, ambulance destination, on-site time, etc. from the existing records for simulation since these won't change by ambulance allocation

Cons

- 1) Google API's est. times differ from records, so it might be better to do a simulation for the current allocation as well, instead of using the existing data (apple for apple)
- 2) Potential technical difficulty regarding simulation: it might be hard to keep track of which ambulance is available for dispatch & if none is available, how long to wait, which might require some OOD or other methods