Ambulance Simulator

Takuhiro KAGAWA
Naoya YABUKI

Graduate School of System Informatics, Kobe University
Nakamura Lab.
Dispatch of Ambulance in Japan

- These are Statistics in 2016
  - Number of Dispatch: 6.2 millions
  - Average arrival time: 8.5 minutes
  - Both are increasing year by year

- Arrival time of ambulances influences death rate
  - Cardiac arrest
    - 50% dies after 3 min
  - Respiratory arrest
    - 50% dies after 10 min
  - Heavy bleeding
    - 50% dies after 30 min

Important to minimize the arrival time of ambulance
Data recording ambulance dispatch

- Kobe Fire Department collects data for every dispatch
  - Time of emergency call (119)
  - Time of dispatch
  - Time of departure
  - Time of arrival at scene
  - Time of arrival at hospital
  - Time of return
  - Dispatched squad
  - Address of destination
  - Type of disease
  - Severity
  - Personal profile
  - Hospital sent

- Kobe city wants a data-driven approach to
  - Grasp the current situation of ambulance dispatch
  - Improve the strategy of ambulance dispatch

- Our team at Kobe Univ. has started collaboration
Ambulance Simulator

- Considering the best way of dispatching an ambulance
  - **Visualize by animation** when and where the ambulance moved
    - In which area are ambulances called frequently?
    - Which of squads is busier than others?
    - How long does each dispatch run?
  
  - **Simulate** the dispatch strategy
    - What happened if different squad had been assigned for the call?
    - What happened if another call had occurred?

- Ambulance Simulator is currently under development
  - This presentation covers “visualize by animation” feature only
Demonstration
System Architecture

- Implement as Web application, adopting SOA
  - **Step1**: For every minute, for every squad calculate position and status, and insert into database (ETL: Extract, Transform, Load)
  - **Step2**: Develop **Web-API** to retrieve the data for every minute
  - **Step3**: **Mash-up** the Web-API with Google maps to visualize

---

[Diagram showing the system architecture: Raw Data is transformed through an ETL process into a database. The database feeds into Web APIs, and these APIs interact with Google Maps.]
Conclusion

- **Ambulance Simulator helps better ambulance dispatch**
  - Visualize by animation when and where the ambulance moved
  - Simulate the dispatch strategy

- **Currently implemented as Web application**
  - Web-API to retrieve the data for every minute
  - Mash-up the Web-API with Google maps to visualize

- **Future work**
  - Develop feature of simulation of dispatching ambulance
  - Evaluate how Ambulance Simulator helps