

### **Towards Data-driven Blue Light Services**

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LONDON'S EVENING UNIVERSITY

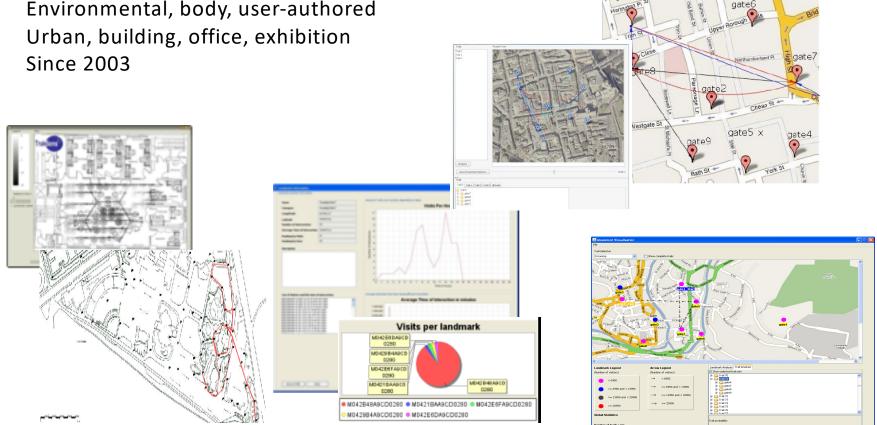
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# **Smart City Analytics**

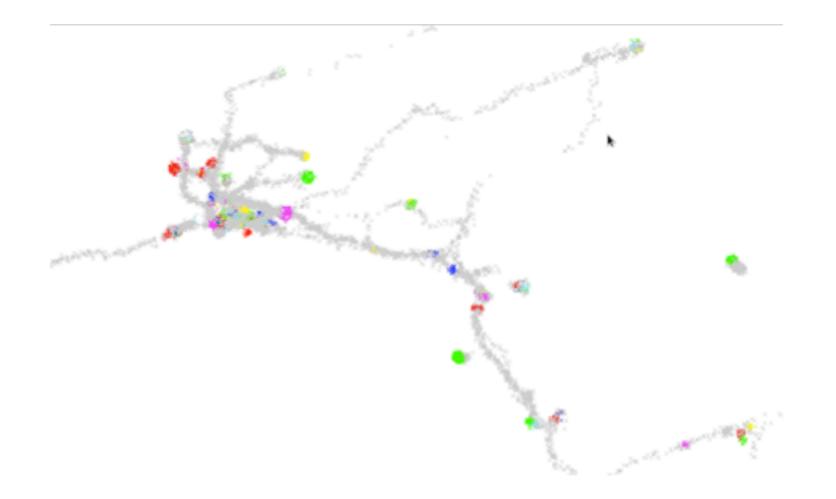
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Cellular, GPS, proximity, beacons, RFID Environmental, body, user-authored



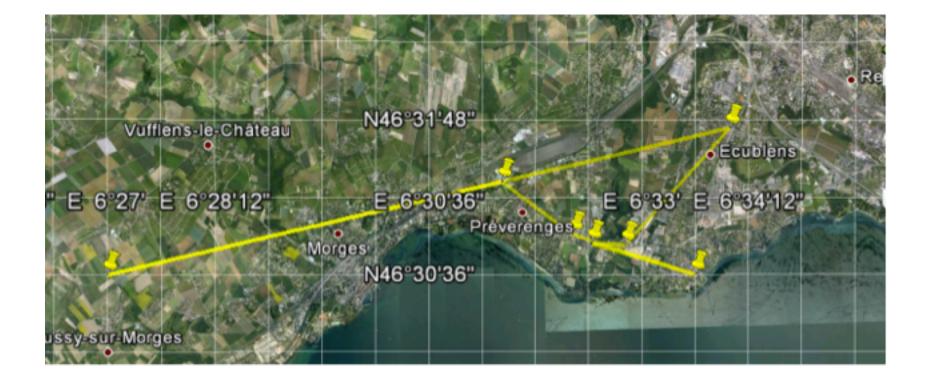


# Significant Places



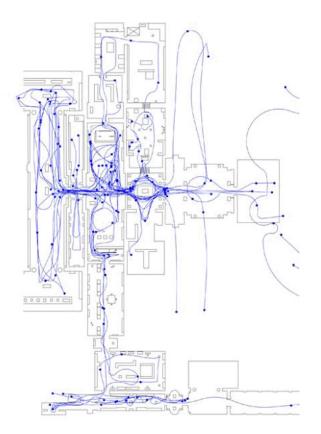


# Daily Rhythms





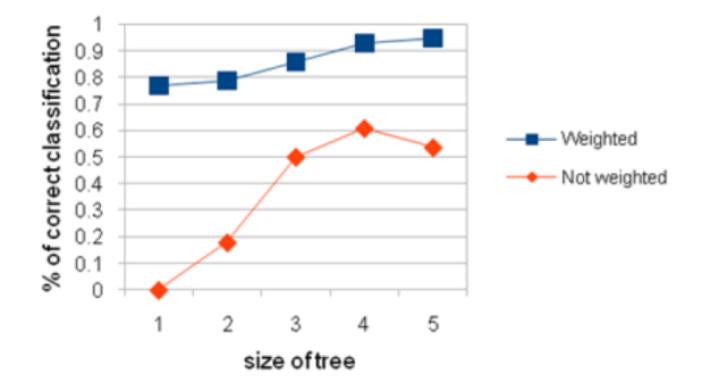
# **Dynamics**







# Fingerprinting

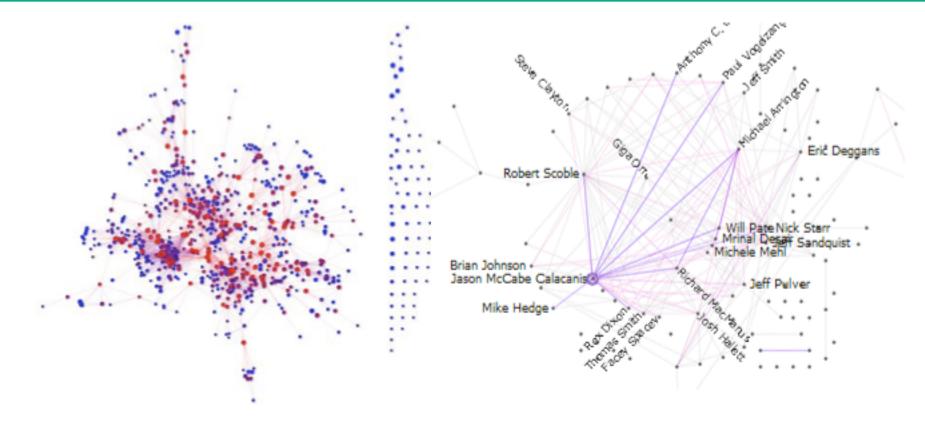


Reality-mining data set

Identify user 39 using 2 months for training and test on next month



# **Social Interaction**



Real-world social network inferred via BT

Facebook personal social graph

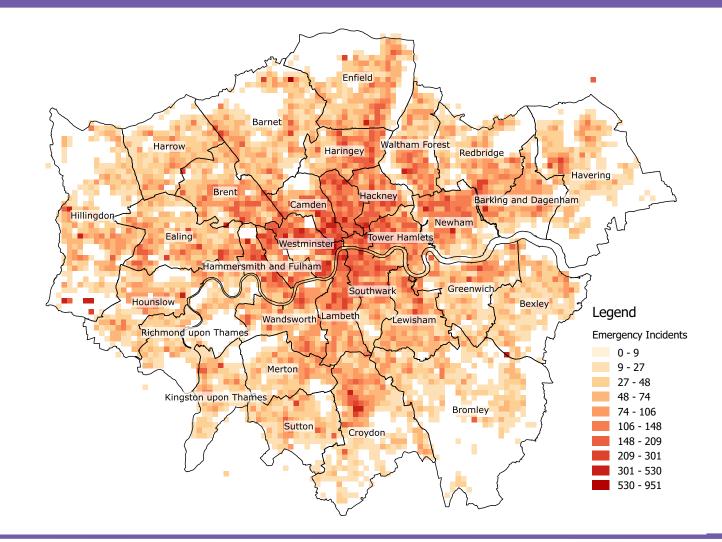


### **Emergency response**

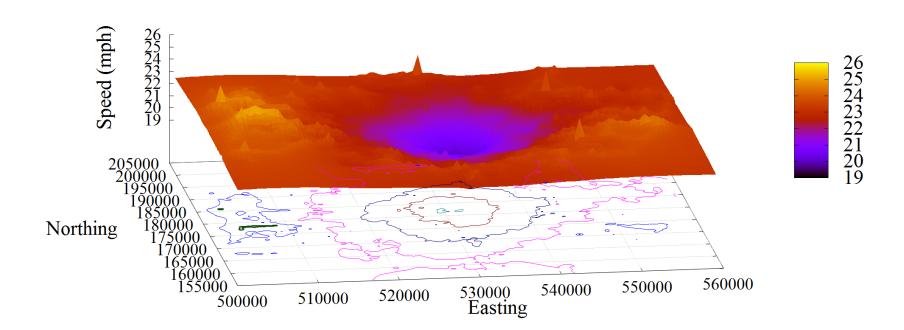
- 30,000 UK annual cardiac arrest incidents (Class A Red 1)
- Survival rate for OHCA is 7%
- Survival chances reduced by 10% for every minute elapsed
- Regulatory requirement to reach 75% within 8 minutes
- In 2017, only 68% reached within requirements
- Data from LAS:
  - 3 million incidents
  - 2.5 million activations
  - 400 million AVLS records
  - 72 million VLA under Blue Lights



### **Class A Incidents**



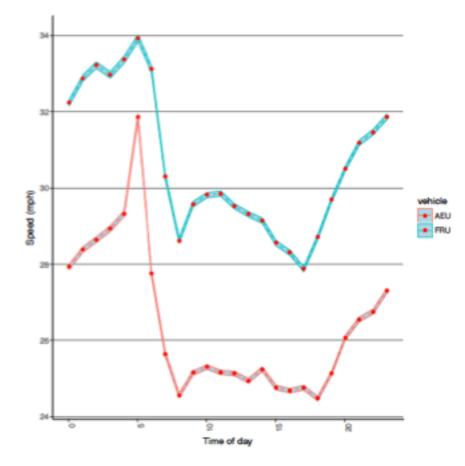
# **Ambulance Speed**





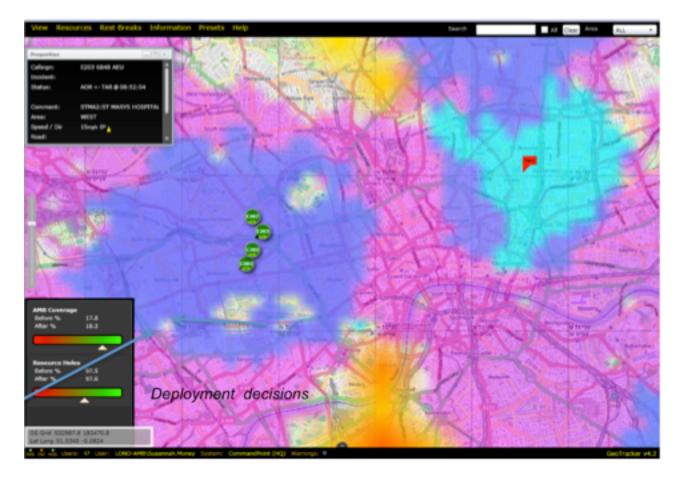


# **Daily Speed Variation**





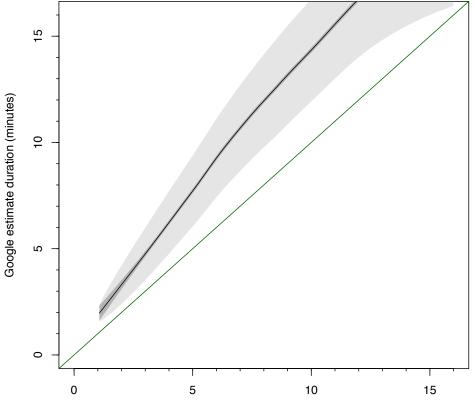
# **Operational Area Coverage**



Geotracker Dashboard © Marcus Poulton, LAS



### Ambulances vs. Civilian Traffic

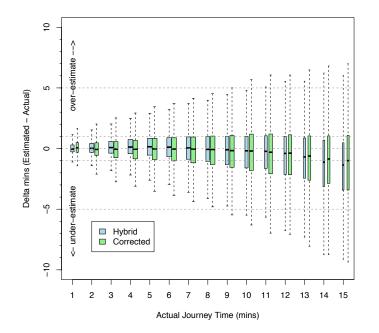


Actual duration (minutes)



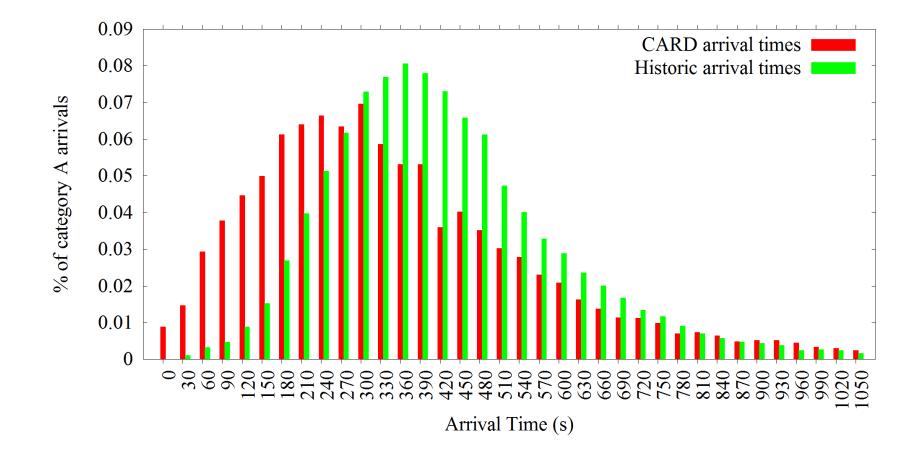
# Über for Ambulances

- Historical incident and response route record (3 years)
- Augmented street map (left turns)
- Map-matching GPS traces
- Tested 5 alternative routing metrics
- Hybrid method: first decide route and then estimate travel time (with correction)
- Average accuracy to within 10 seconds for trips up to 11 minutes (limited data beyond that)





# **Automated Dispatch**



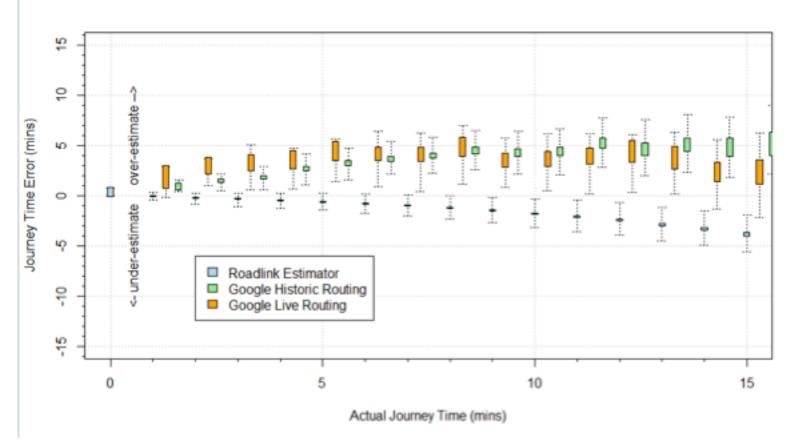


# **Exploring Strategies**

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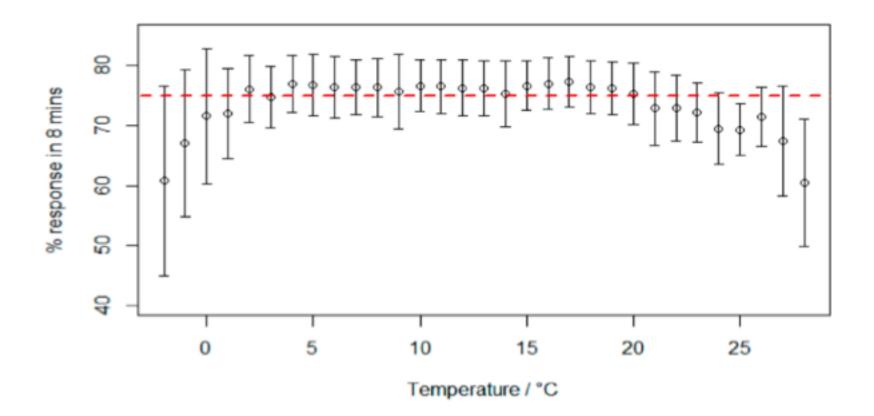


Variation of real-time travel duration estimates with Google routing for civilian traffic.

Birkbeck



# When is rt info valuable?



Mahmood, M.A.; Thornes, J.E.; Pope, F.D.; Fisher, P.A.; Vardoulakis, S. Impact of Air Temperature on London Ambulance Call-Out Incidents and Response Times. *Climate* **2017**, *5*, 61.



# Summary

- A data-driven approach can offer distinct advantages in improving emergency response performance
- Bespoke design needed to reflect the distinct requirements of emergency services (compared to consumer/civilian applications)
- Can provide the basis for the development of both operational and strategic intelligence tools
- Historic data go a long way towards predicting best tactics
- Role for real-time information especially at the extremes
- Much more to be done: integration between Blue Light services, synergies with TfL, synergies with consumer apps



# With thanks to

#### **Blue Lights Model and Toolkit**

Marcus Poulton (BBK) David Weston (BBK) Tassos Noulas (NYU)

#### LAS

Leanne Smith John Downward

#### **Analytics Tools**

Muawya Eldaw (BBK), Dikaios Papadogkonas BBK), Lukas Zamboulis (BBK), Mark Levene (BBK)