

Proposal:

行動裝置上的自駕貨車即時性 配送模擬系統

2019-03-18 (一)

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Outline

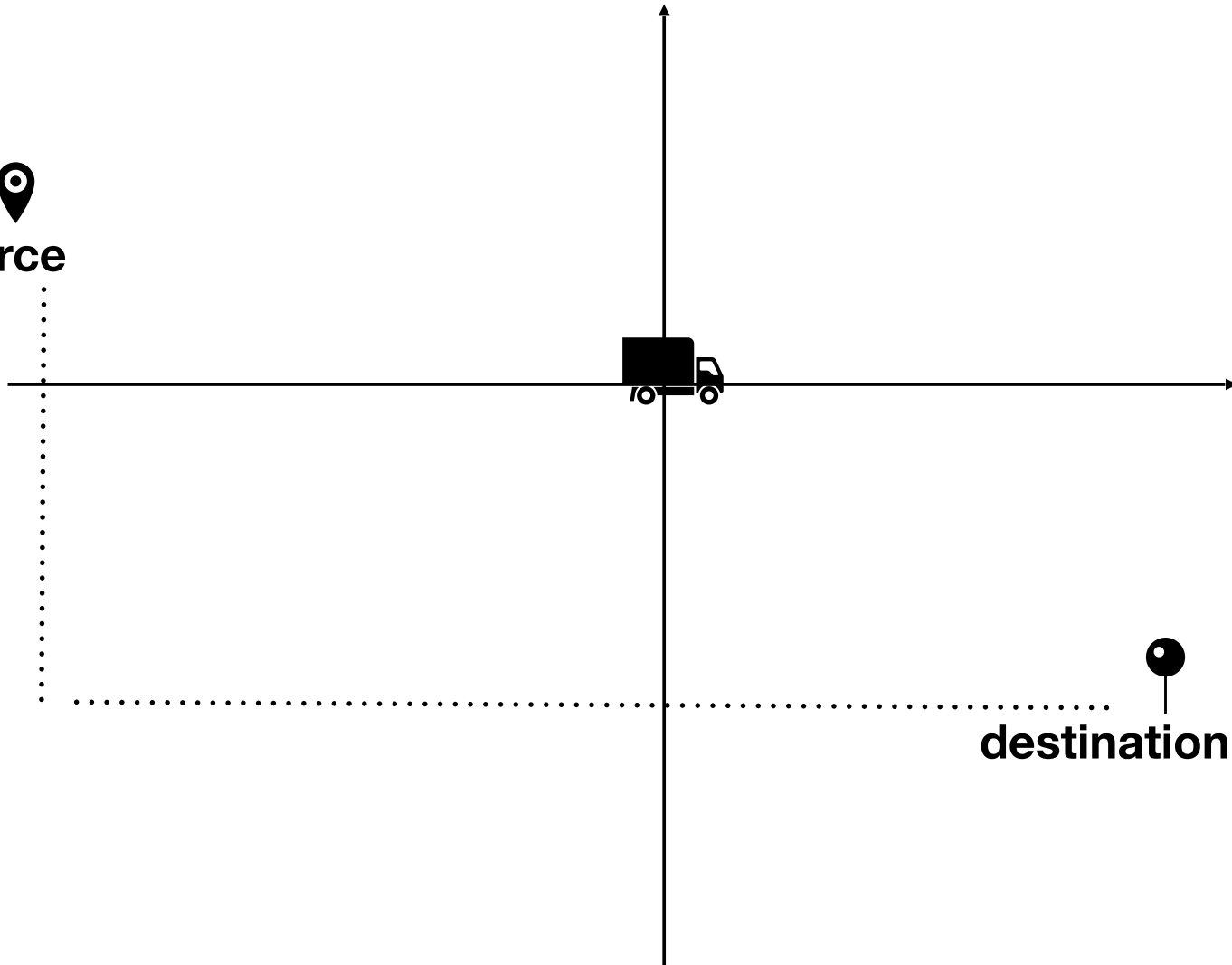
- Motivation
- System Overview
- Android Application
- Server
- SUMO (simulation of urban mobility)

Motivation

- We currently do not have driverless truck to send packages in the city of Taiwan.
- We want to develop a system which can simulate the real-world logistic condition on the scale of city.
- With real-world logistic simulation, we can reduce the gap between the real logistic condition and imagination to improve user experience.
- Our system also can provide a platform which has expandability.

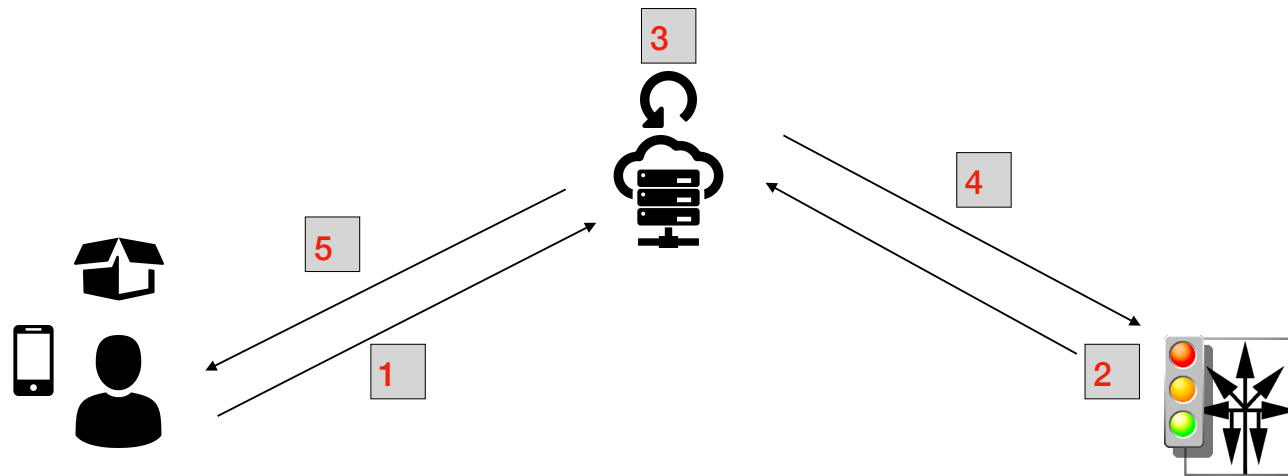
Real Life


source




destination

System Overview



1. Send the order request
2. Report the road condition to the server periodically
3. Select the car and arrange the route
4. Dispatch the selected car
5. Send the notification to user

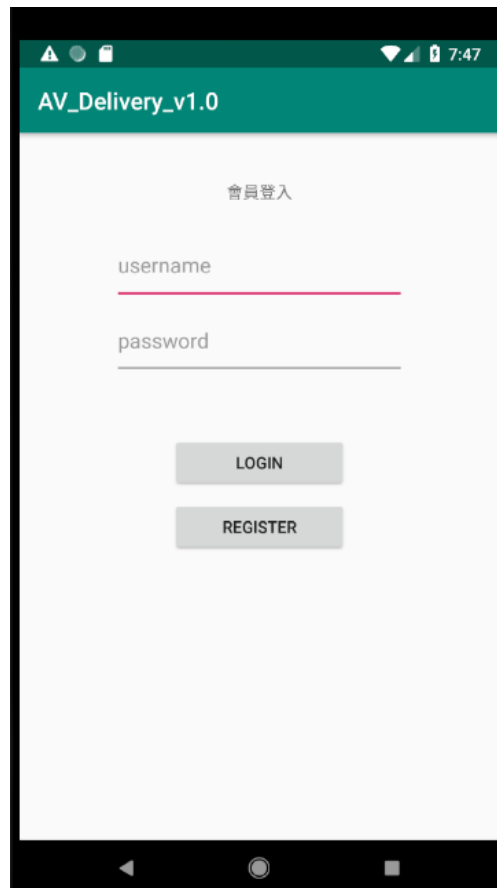
Android Application

- Register and Login
- Shipping
- Trace the sent and received parcel
- Track the parcel with waybill number



Register and Login

- Users can login the system by connecting Facebook account.
- They can login after verifying the Short Message Service.



Shipping

- Users can submit the parcel information.
- The app can build the addressing data according to different countries.

AV_Delivery_v1.0

貨品內容 請輸入貨品內容

貨品價值 NT

貨品重量 kg

貨櫃大小 L

收件人帳號 請輸入收件人帳號

貨車取貨地址 請點此選擇地區資料

請輸入詳細地址(路名、段數、號數)

貨車目的地址 請點此選擇地區資料

請輸入詳細地址(路名、段數、號數)

下一步 MAP_TEST

AV_Delivery_v1.0


台北市	新北市	桃園市
台中市	台南市	高雄市
基隆市	新竹市	嘉義市
新竹縣	苗栗縣	彰化縣

AV_Delivery_v1.0

新營區	鹽水區	白河區
柳營區	後壁區	東山區
麻豆區	下營區	六甲區
官田區	大內區	佳里區
學甲區	西港區	七股區
將軍區	北門區	新化區

Shipping (cont.)

- App would transform the address to latitude and longitude by using Geocoding API.
- Server can compute the time interval which can be selected by the user.



AV_Delivery_v1.0

貨品內容	請輸入貨品內容
貨品價值	NT
貨品重量	kg
貨櫃大小	L
收件人帳號	請輸入收件人帳號
貨車取貨地址	新北市永和區
安樂路248-2號	
貨車目的地址	新北市板橋區
請輸入詳細地址(路名、段數、號數)	

下一步 MAP_TEST



貨車目的地址

貨車取貨地點

貨車抵達時間選擇：

☐ 12:00 ~ 14:59

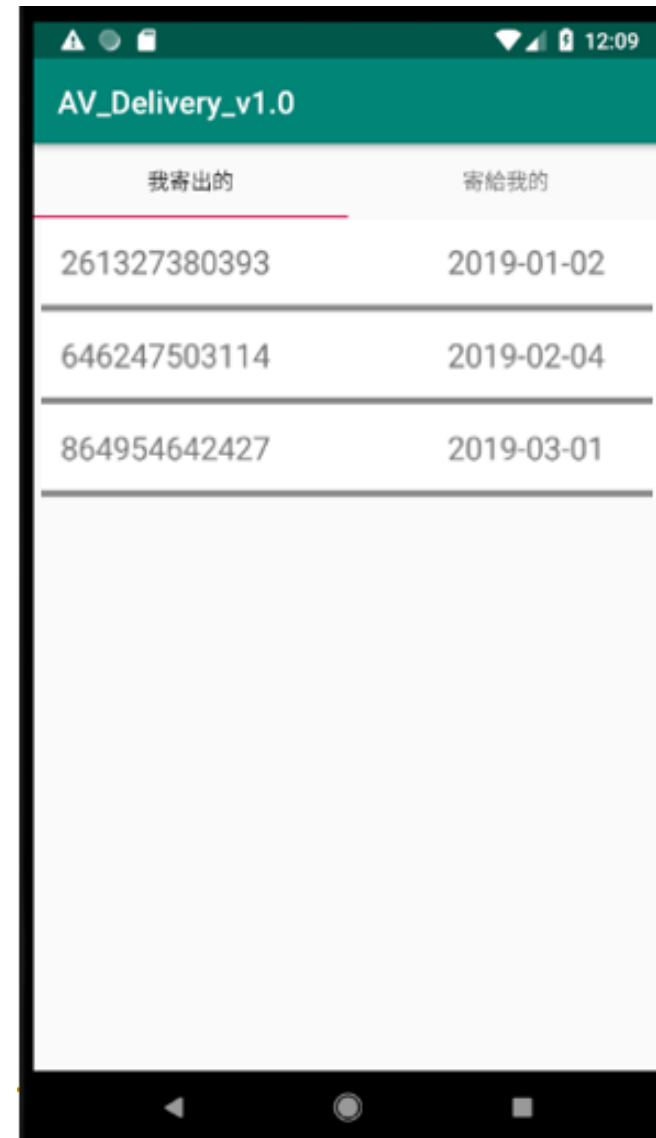
☐ 15:00 ~ 17:59

☒ 18:00 ~ 20:59

確認

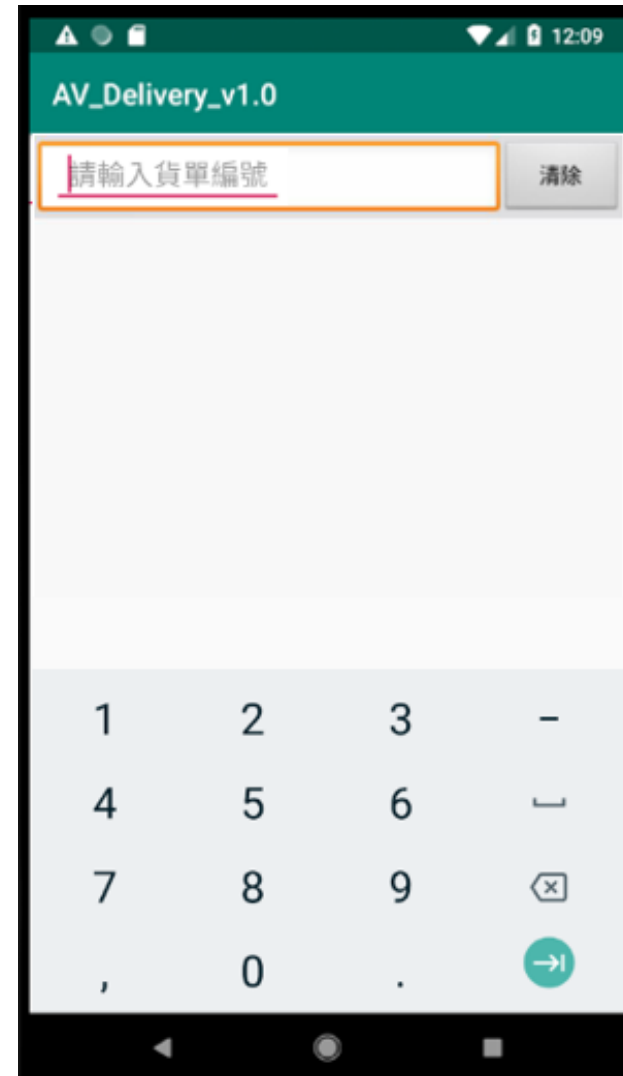
Trace the Sent and Received Parcel

- Users can track the order status.
- The status information includes the current location of the sent parcels and the expected arrival time.



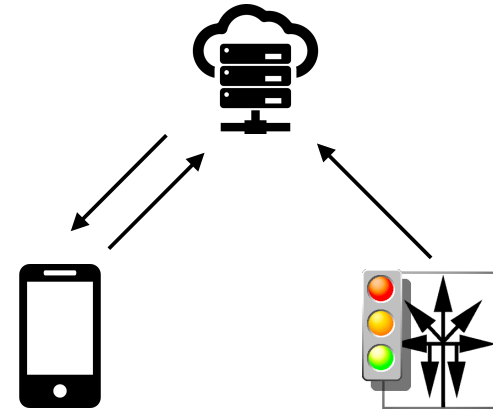
Track the Parcel with Waybill Number

- Users can track the parcel with waybill number in non-login status.
- This function focuses on the users who use batch ordering for reducing the searching time.



Server

- The server is viewed as a database to save all data.
- The server receives the request from Android Application and computes the time interval which can be selected by the user.
- The server would receive the arrival notification of the car when the car arrived to the delivery place.
- The server sends Google Cloud Messaging to the Android Application.



SUMO

1. Create a new map of Tainan
2. Generate random cars in the map
3. Label the car parameter
4. Send the car Information to the server periodically
5. Receive the command from the server and dispatch the suitable car to the user's location
6. Export a coming signal when the car arrived to the destination

Create a New Map

匯出

23.0033

120.2091


120.2259

22.9893

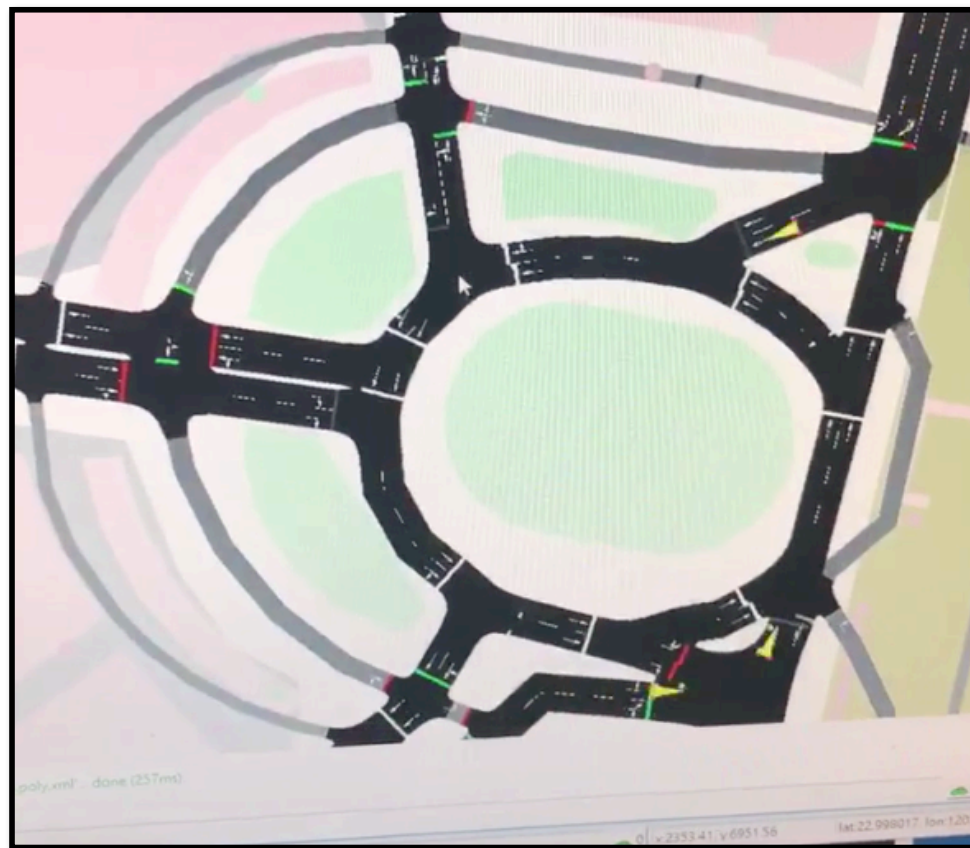
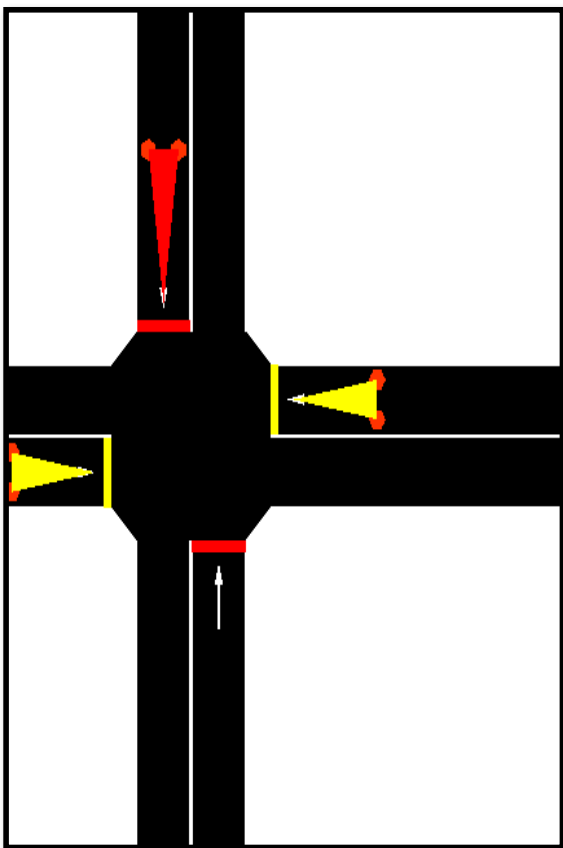
授權

OpenStreetMap 的資料採用 [Open Data Commons 開放資料庫授權條款](#) (ODbL) 授權。

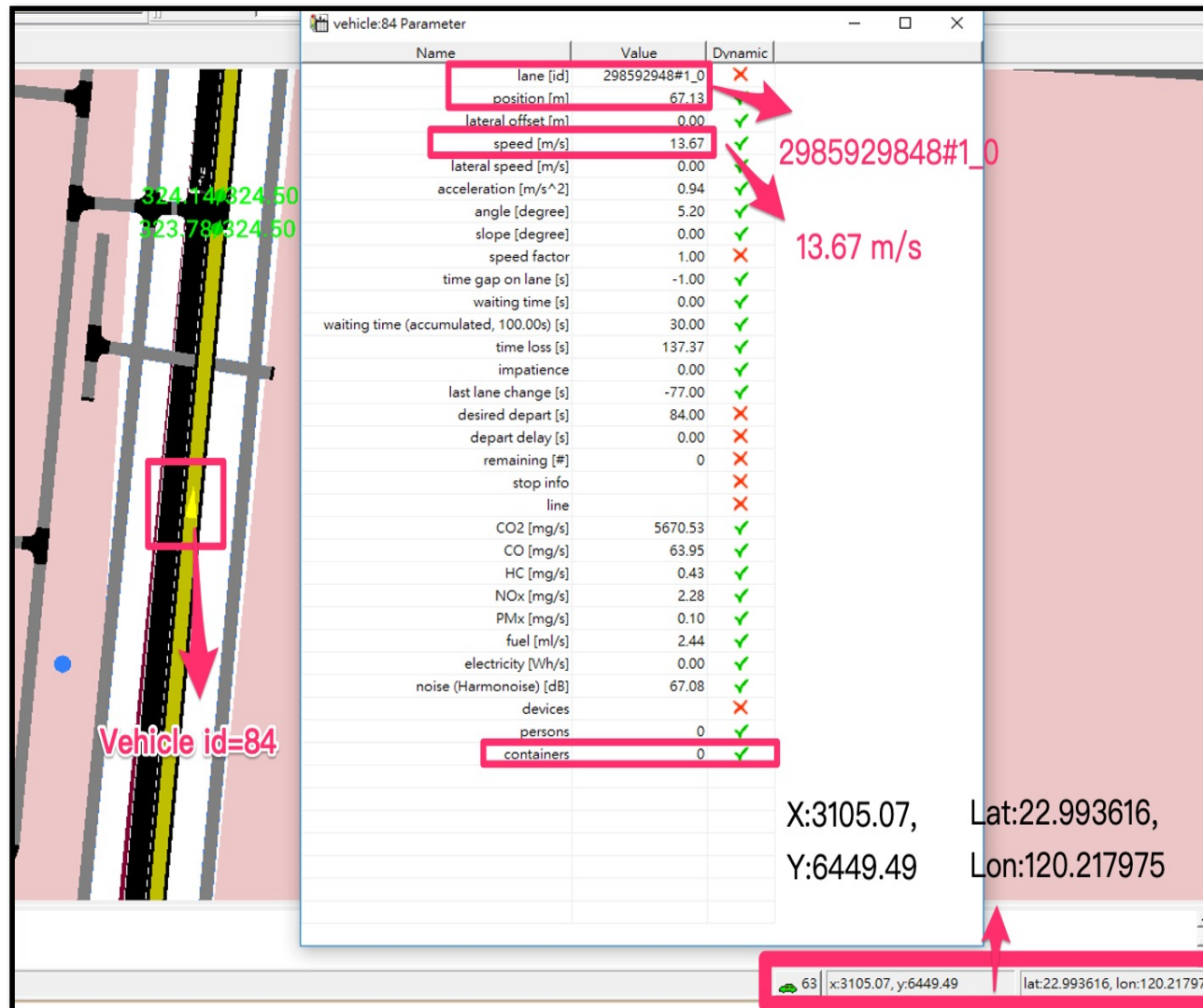
匯出



Generate Random Cars

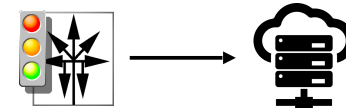


Label the Car Parameter



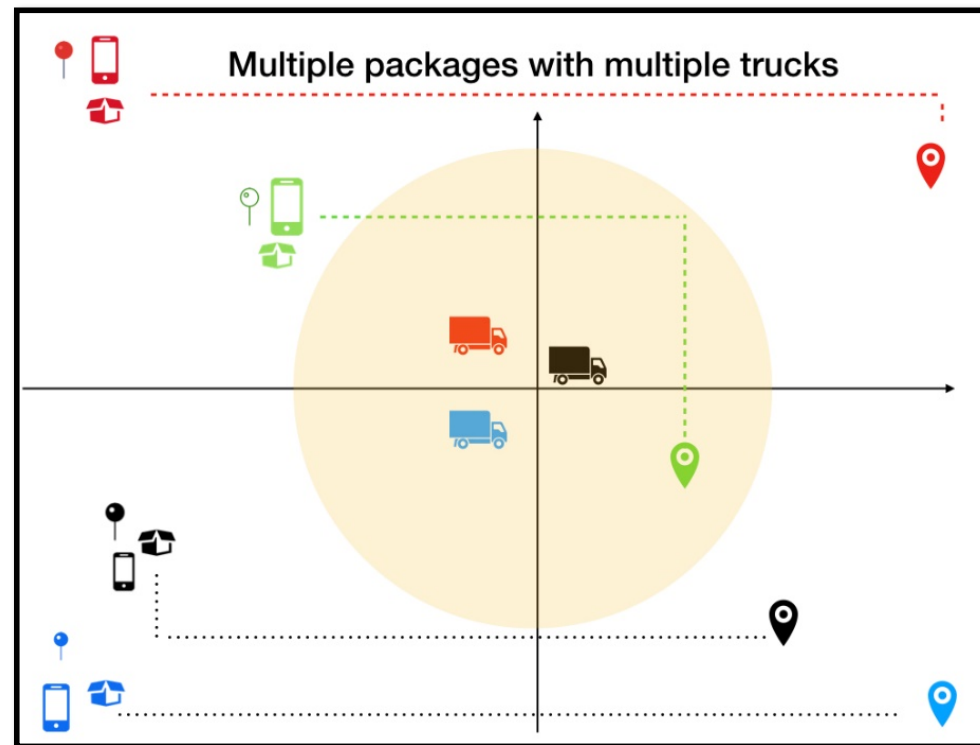
Send the Car Information to the Server

- `<timestep time="0.00"> <vehicle id="flow0.0"
x="120.227513" y="22.982579"
speed="0.000000" pos="5.100000"
lane="307244665#2_0" />`
- `</timestep> <timestep time="1.00"> <vehicle
id="flow0.0" x="120.227502" y="22.982587"
speed="1.441689" pos="6.541689"
lane="307244665#2_0" />`
- `</timestep> <timestep time="2.00"> <vehicle
id="flow0.0" x="120.227479" y="22.982604"
speed="3.115447" pos="9.657136"
lane="307244665#2_0" />`



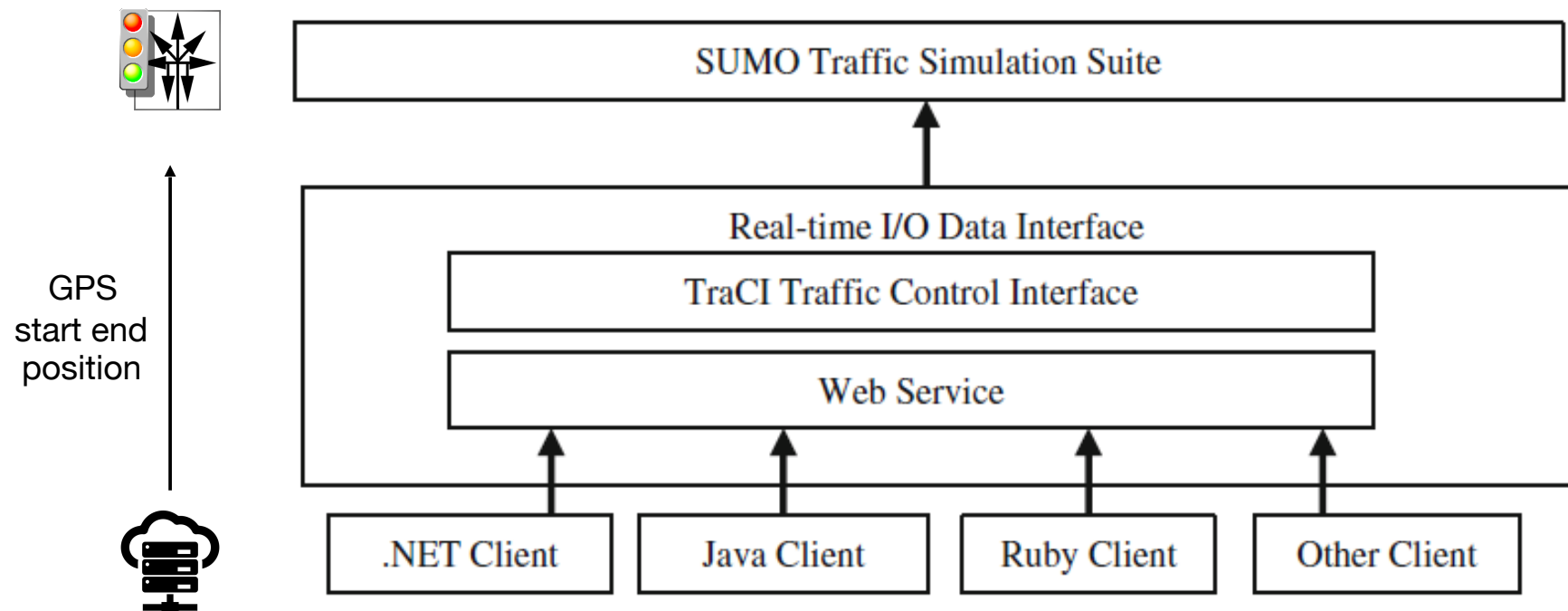
The Car Information includes the time-step, the vehicle id, the geo-position and the lane id.

Receive the Command

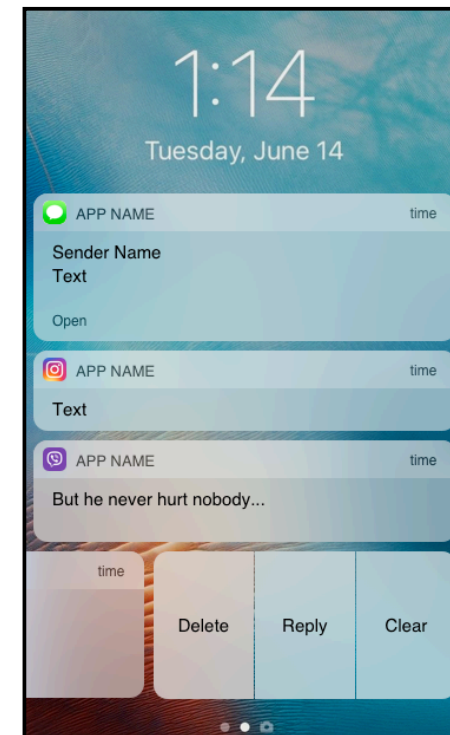
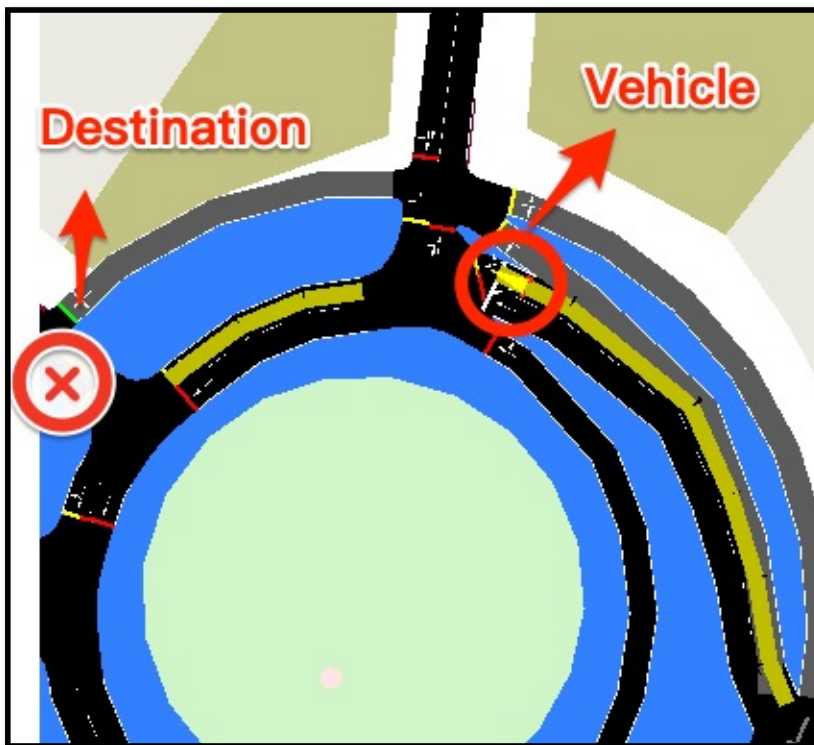
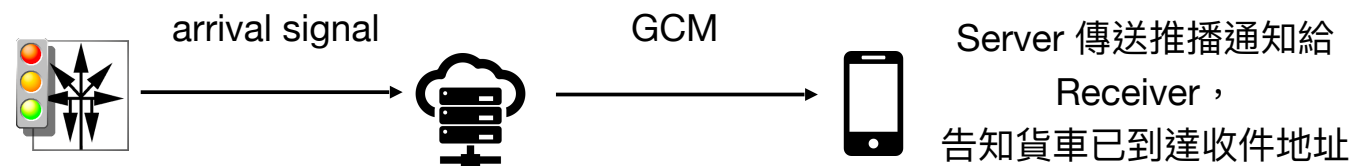


Concept of the Web Service

Arrange the route



Export the Signal



Time Schedule

	二月	三月	四月	五月	六月	七月
Android UI + 資料庫建立 + Android API connecting to Server						
SUMO 文檔閱讀 + TraCI 研讀 + 模擬環境參數設計與建立						
利用 TraCI 設計 Server 與模擬環境之間的 API						
Web Server 的派遣演算法設計						
整合 Android, Server, SUMO						
論文						

Related Work

- Krumnow, Mario. "Sumo as a Service—Building up a Web Service to Interact with SUMO." *Simulation of Urban MObility User Conference*. Springer, Berlin, Heidelberg, 2013.
- “內政資料平台”[Online]. Available: <https://data.moi.gov.tw/MoiOD/default/Index.aspx>, 2019.
- “TraCI - Traffic Control Interface.” [Online]. Available: <http://sumo.dlr.de/wiki/TraCI>, 2018.