# Self-driving car & Urban planning

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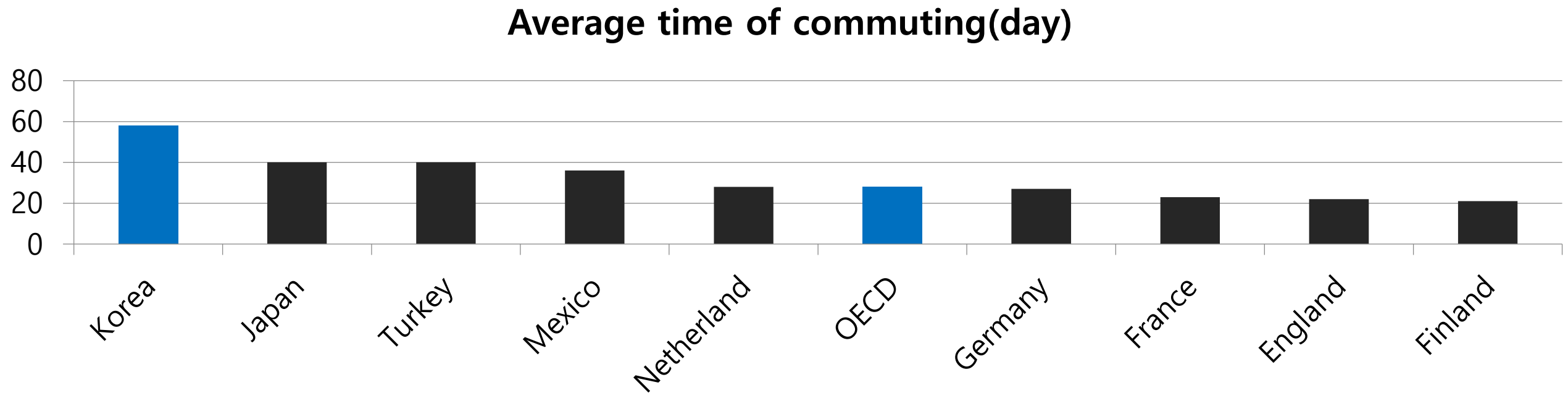
# Target definition

# Target definition

- It takes 1hour 36min in Seoul to go to work(2018.05.16. Hangyeorye)
- Average commuting time = 101min, Seoul = over 2hours(JobKorea, survey 820 people, 2017.07.17 Chosun)
- From Kyung-gi and Incheon takes 155mins to go to work (JobKorea)



KT 오후 3:39 52%

조회결과

< 이전날 12월 03일 (월) 다음날 >

부산 → 수서 | 일반/기본 | 1명

| 열차명 | 출발역 | 도착역 | 특실 | 일반실 |
|---|---|---|---|---|
| SRT 302 | 부산 05:00 | 수서 07:36 | 매진 | 매진 |
| SRT 304 | 부산 05:30 | 수서 08:03 | 매진 | 매진 |
| SRT 306 | 부산 06:00 | 수서 08:41 | 매진 | 매진 |
| SRT 308 | 부산 06:50 | 수서 09:26 | 매진 | 매진 |
| SRT 310 | 부산 07:20 | 수서 09:56 | 매진 | 매진 |
| SRT 312 | 부산 07:45 | 수서 10:15 | 매진 | 예약가능 |
| SRT 314 | 부산 08:00 | 수서 10:37 | 매진 | 예약가능 |
| SRT 316 | 부산 08:30 | 수서 10:55 | 예약가능 | 예약가능 |

KT 오후 3:34 52%

열차조회

예약설정 — 예약 — 결제 — 발권

가는열차 | 오는열차

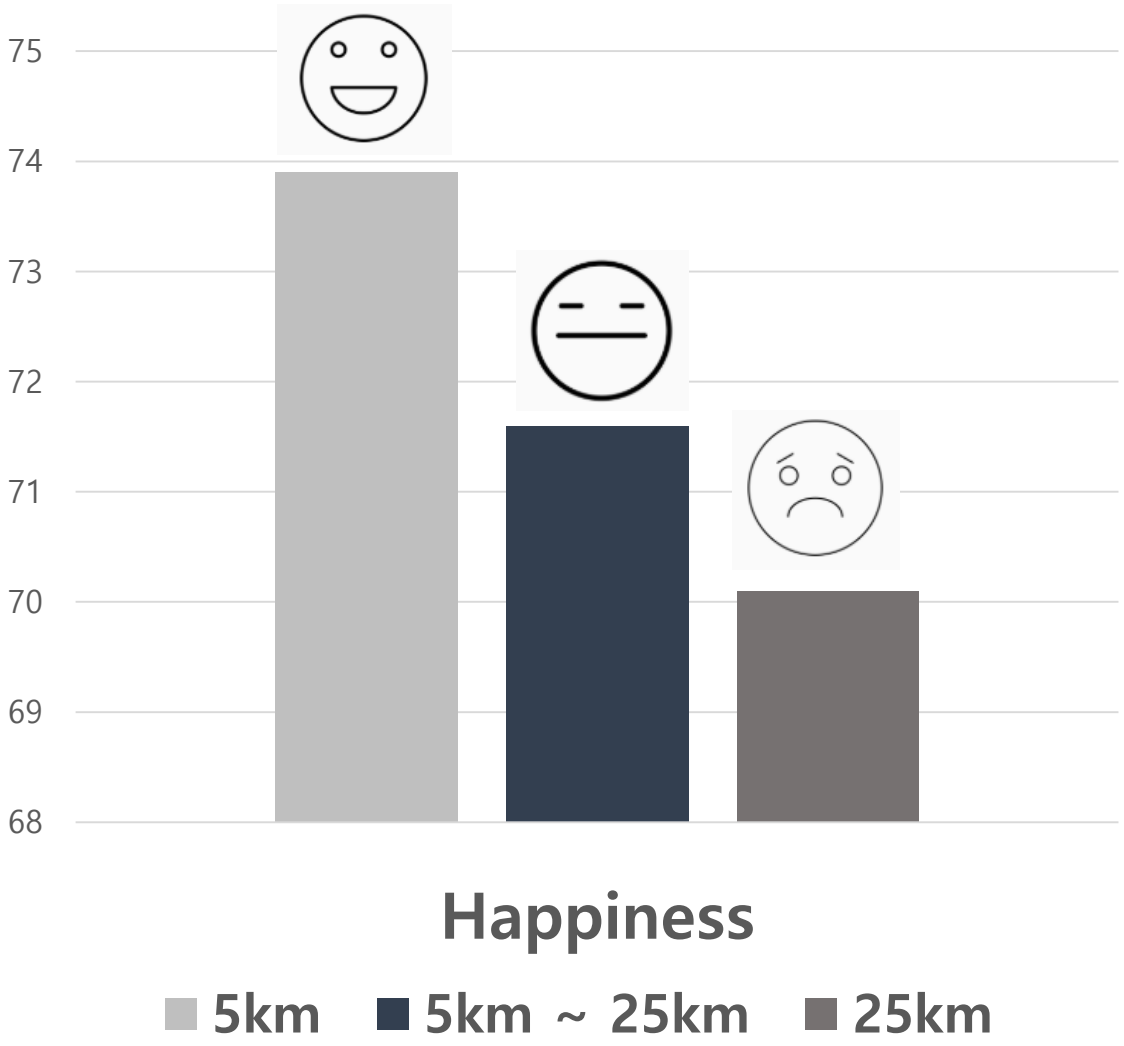
| 열차명 | 출발역 | 도착역 | 시간표 | 열차선택 |
|---|---|---|---|---|
| SRT 302 | 부산 05:00 | 수서 07:36 | 시간표 | 매진 |
| SRT 304 | 부산 05:30 | 수서 08:03 | 시간표 | 매진 |
| SRT 306 | 부산 06:00 | 수서 08:41 | 시간표 | 매진 |
| SRT 308 | 부산 06:50 | 수서 09:26 | 시간표 | 매진 |
| SRT 310 | 부산 07:20 | 수서 09:56 | 시간표 | 매진 |

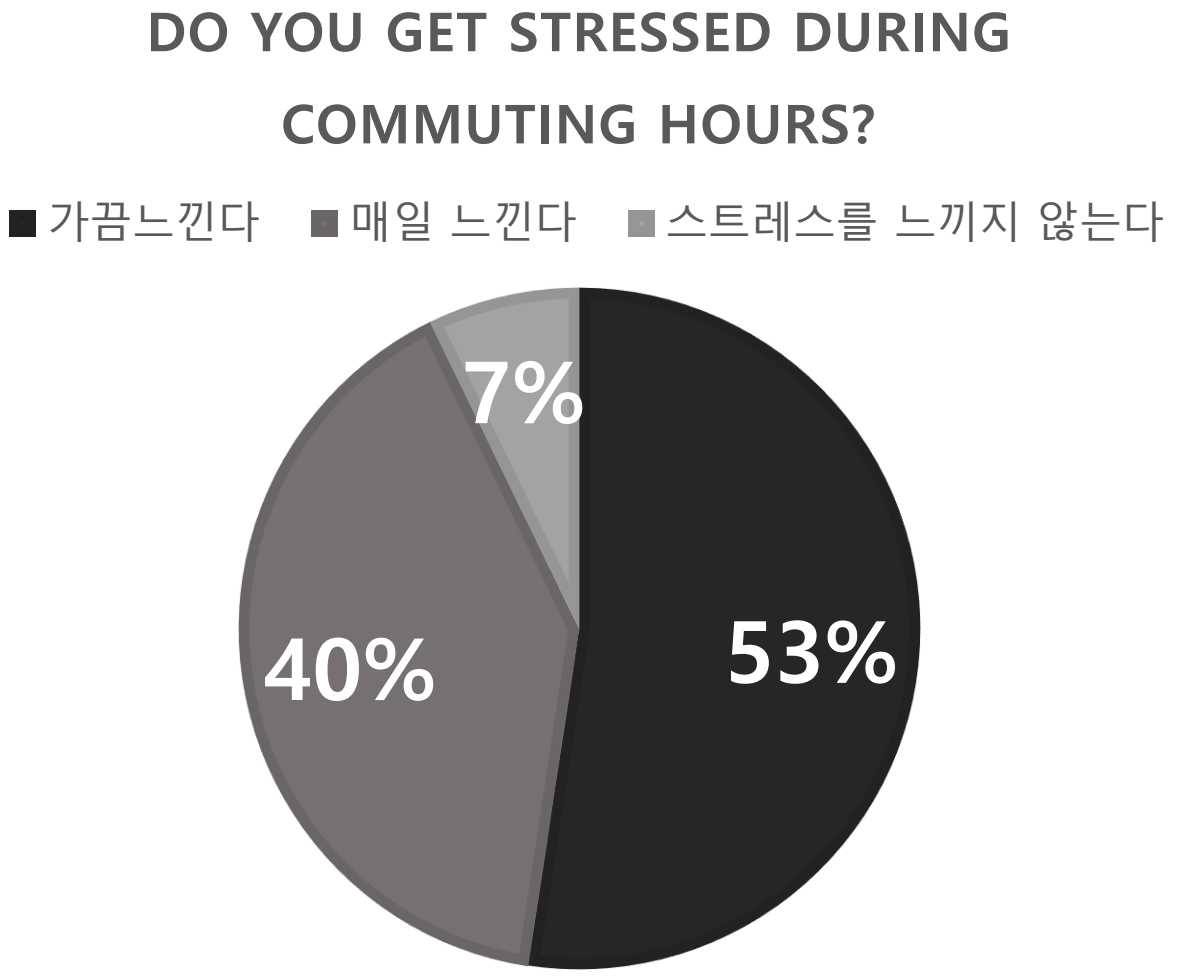
열차선택

| | | | |
|---|---|---|---|
| 가는열차 | SRT | __:__ | __:__ |
| 오는열차 | SRT | __:__ | __:__ |

선택하기

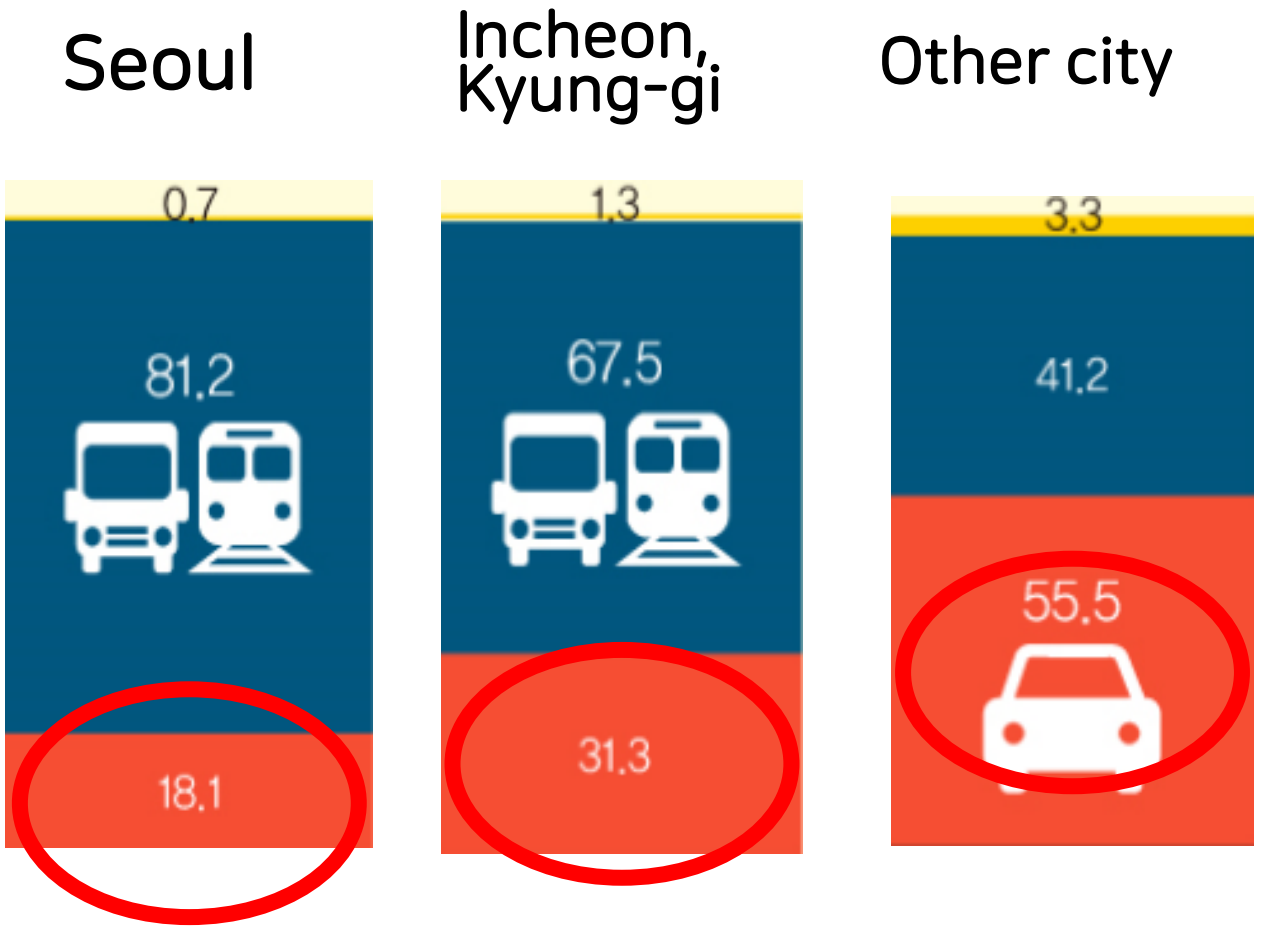
# Problem



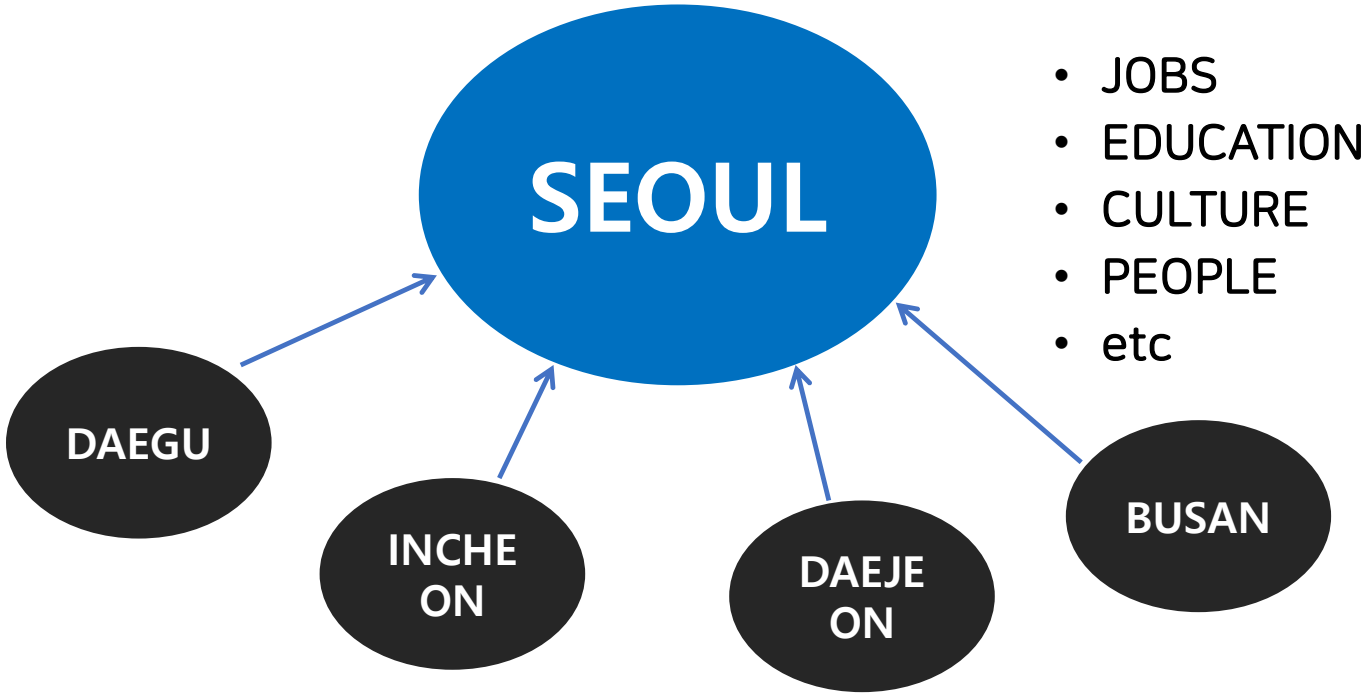

- Surveyed 626 people of 20's(벼룩시장)

# Commuting transportation ratio




- 26,907,000(total worker) x ½(half of Koreans live in Seoul and Kyung-gi) x 24.7%(average Seoul and Kyun-gi)
- **At least over 3,323,014 workers commute everyday by car**

# Problem

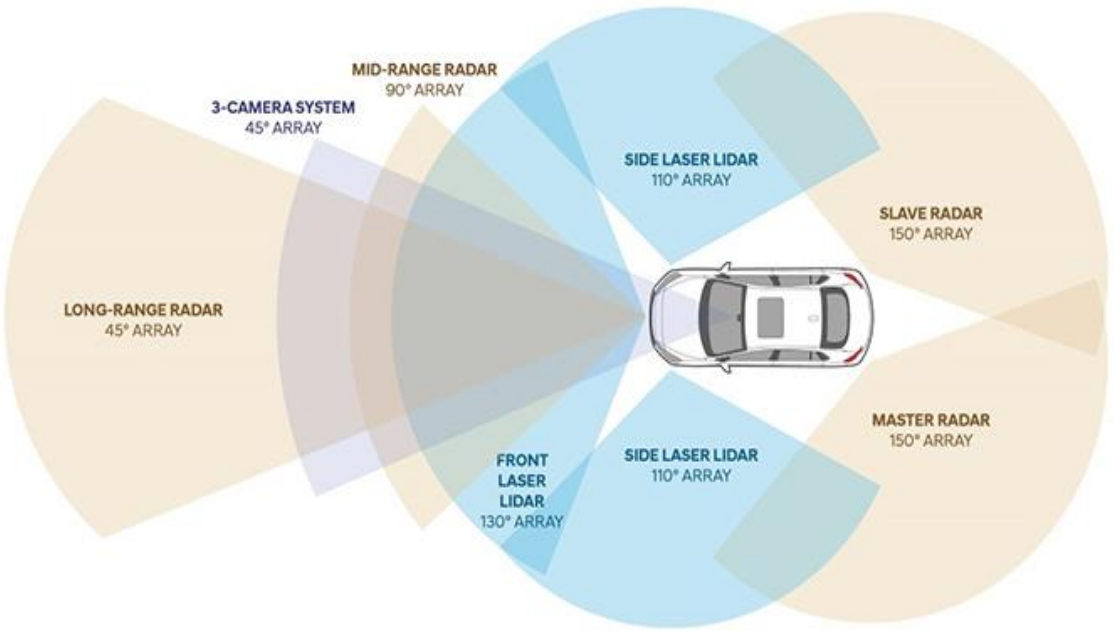



- JOBS
- EDUCATION
- CULTURE
- PEOPLE
- etc

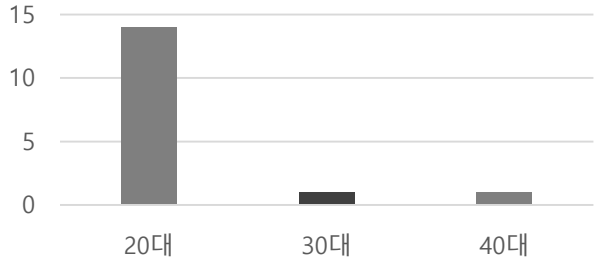
# Idea

Autonomous
IONIQ
HYUNDAI

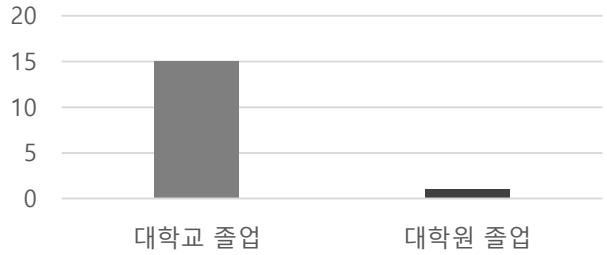
KIDS
HYUNDAI


MID-RANGE RADAR
90° ARRAY
3-CAMERA SYSTEM
45° ARRAY
SIDE LASER LIDAR
110° ARRAY
SLAVE RADAR
150° ARRAY
LONG-RANGE RADAR
45° ARRAY
MASTER RADAR
150° ARRAY
FRONT
LASER
LIDAR
130° ARRAY
SIDE LASER LIDAR
110° ARRAY

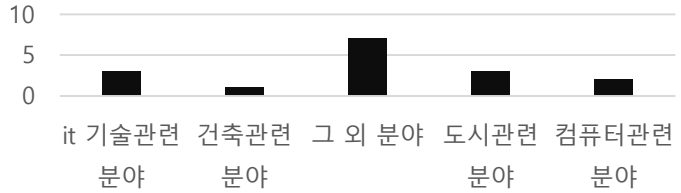
## Q1. How old are you?



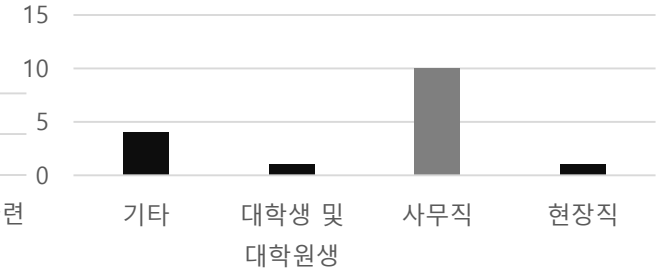

## Q2. Last education?




## Q3. Which field are you interested in?

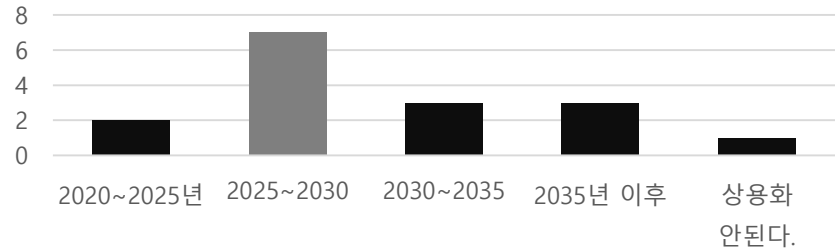



## Q4. What is your job?




## Q5. How do you well know about self-driving car?

## Q6. When will self-driving car is commercialized?



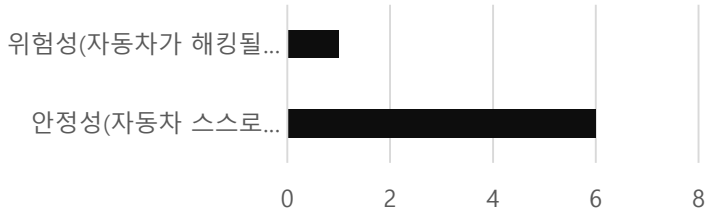

## Q7. Did you know that Hyun-dai motors succeed in driving autonomous car?

## Q8. Are you going to buy self-driving car, if it is commercialized?

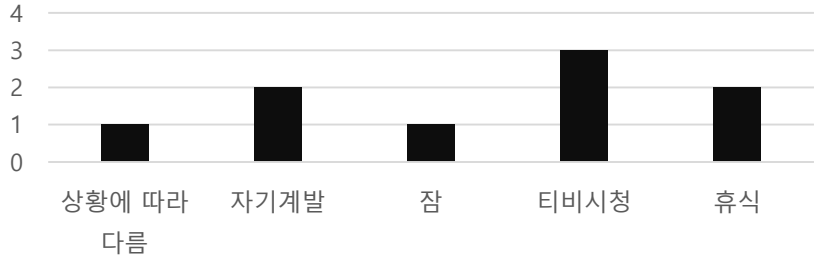
## Q9. Why did you choose to buy?

## Q10. What is proper price of self-driving car?

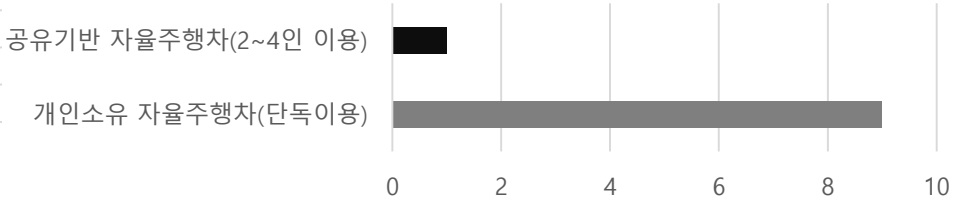
## Q11. Why did you choose not to buy self-driving car?



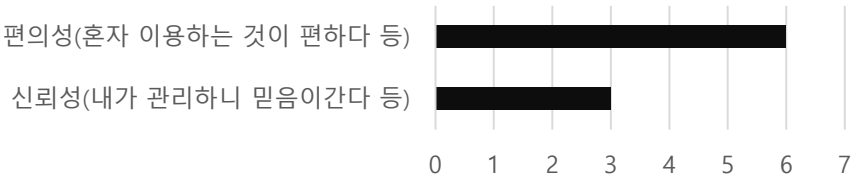

## Q12. what are you going to do in Self-driving car?



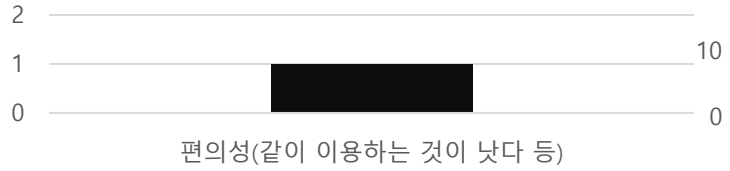

## Q13. Are you going to use Car-Sharing service with autonomous car or use your own autonomous car?



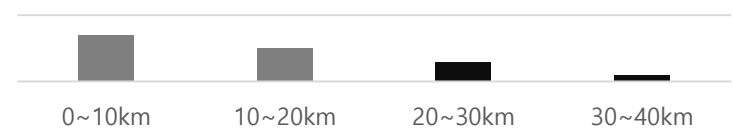
Q14. Why did you choose to use private self-driving car?



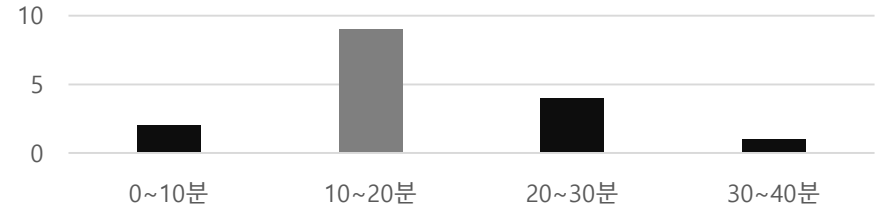

Q15. Why did you choose to use sharing service with autonomous car?



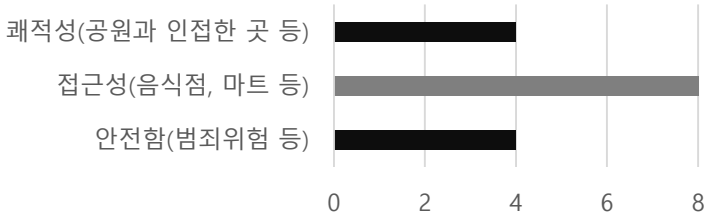

Q16. What is the proper distance from work place to home?, if you take perfect self-driving car.



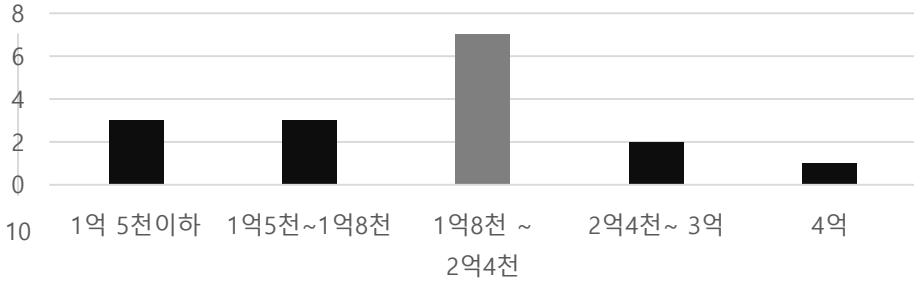

Q17. What is ideal commuting time? If you take self-driving vehicle.



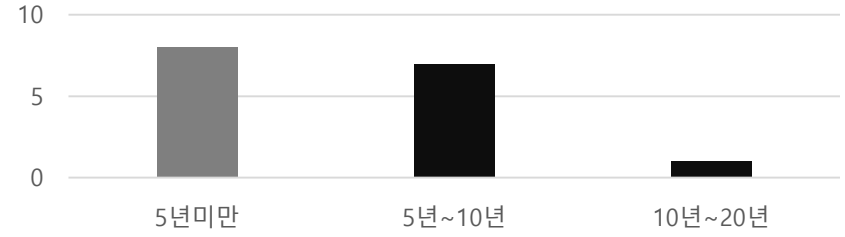

Q18. What is the most important thing when you choose the place to live?



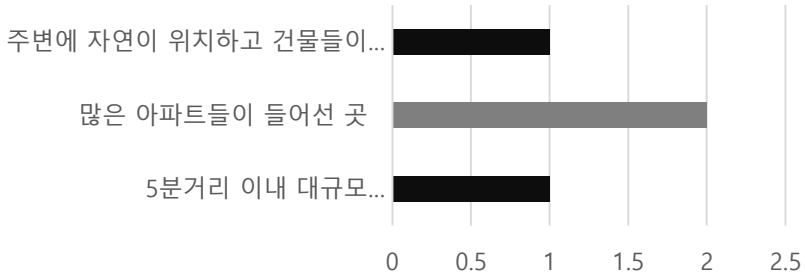

Q19. What is proper price of the house?(30pyung = 99.1736m^2)



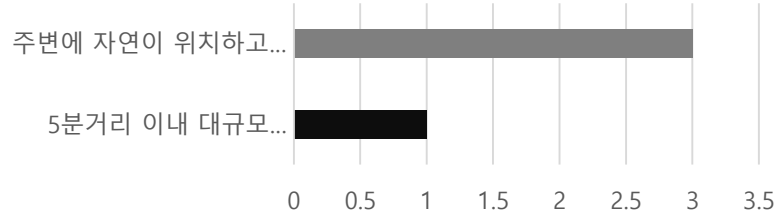

Q20. which apartment or house do you want to live?(time)




Q21. where is the most safety place to live?




Q22. where is the most pleasant place to live?




Q23. what is the proper moving time to go to convenient facilities?(by car)

# Recent news in Self-driving tech

- Mobileye was taken over by intel with 15.3 billion dollars(collision detection system, image recognition assistant system etc)

- Increase alliance and cooperative relationship with Calling car service and car manufacturing company
- Achieve 8 million miles drive mileage with self-driving system

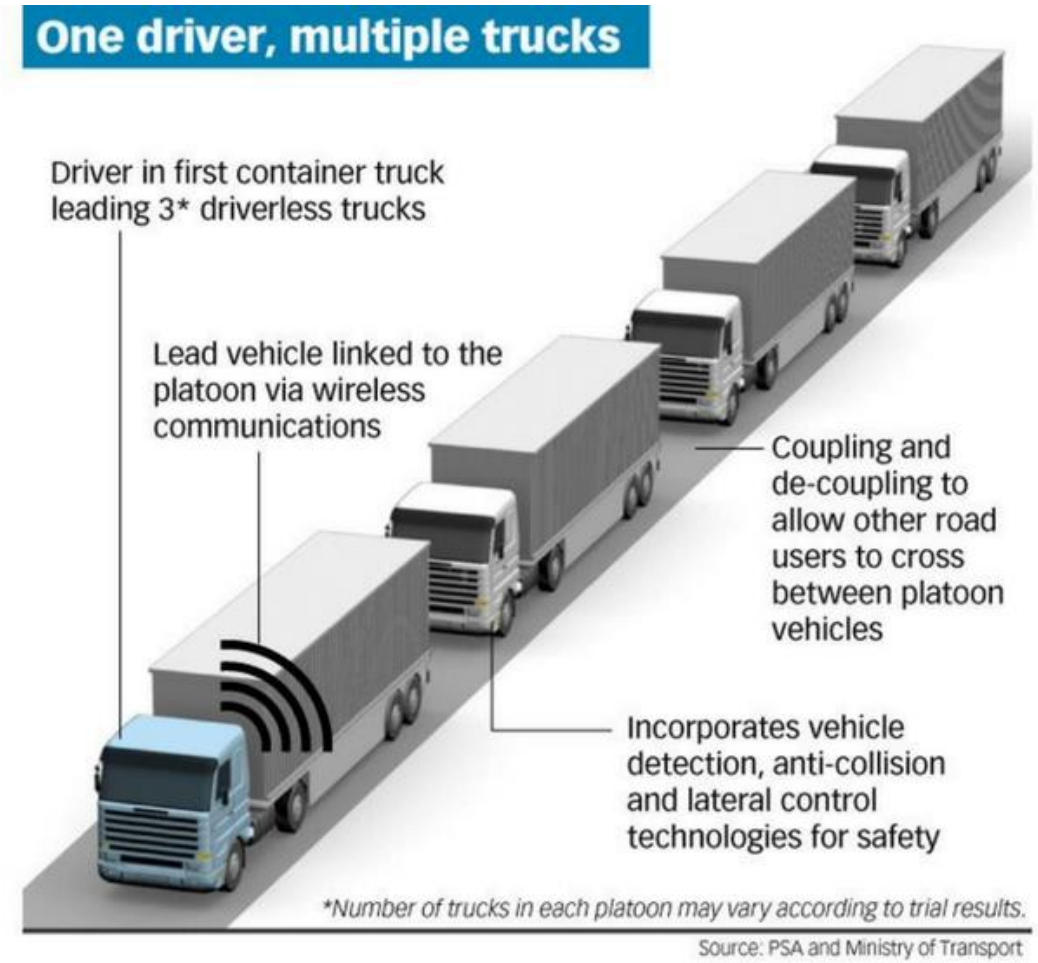
- Take over SAIPS and Chariot(Machine learning, commuter bus startup etc)
- Invest Velodyne and Civil maps(Lidar and 3d maps etc)
- Take over Argo ai(Self-driving tech)

- Take over Harman(electric device of automobile, self-driving, audio etc)
- Get approval self-driving car test run from ministry of land and transport

- Start to test self-driving system at 2017
- Take over XRCE and Epipolar geometry(ai, 3D maps etc)

- Take over Kimgisa and Luxicar(navigation and carpool startup etc)

# Platooning



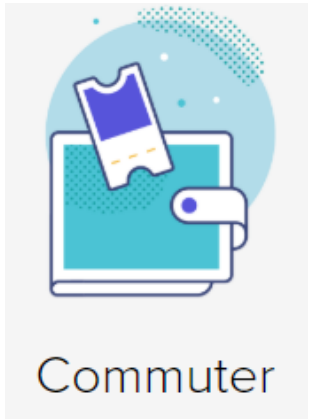

- Decrease the distances between Cars or trucks
- Allow many cars or trucks to accelerate or brake simultaneously
- 2.7 times larger capacity of road
- Lower the commuting time

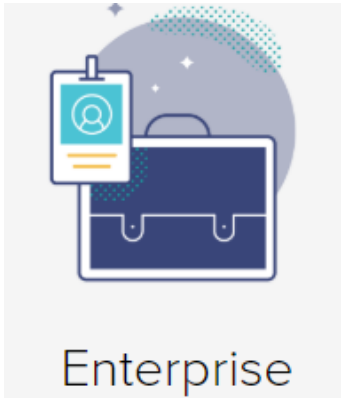
# Similar examples

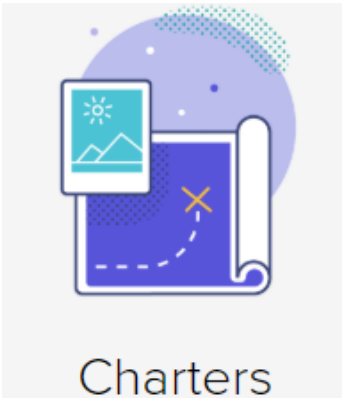
# Autonomous Bus

- Through 5G and LTE network
- Implement V2X(vehicle to everything)
- Ridar, camera + 5G network (improve safety)

# Chariot



- Reserve a seat and ride quickly, comfortably and inexpensively to work
- Fleet of vehicles allows for faster employee pickups, more flexible schedules and fewer empty seats
- Holiday party, office outing or a large off-site sales meeting. Provide entire chariot hourly

## Improve your commute

Add home (17 Main St.)

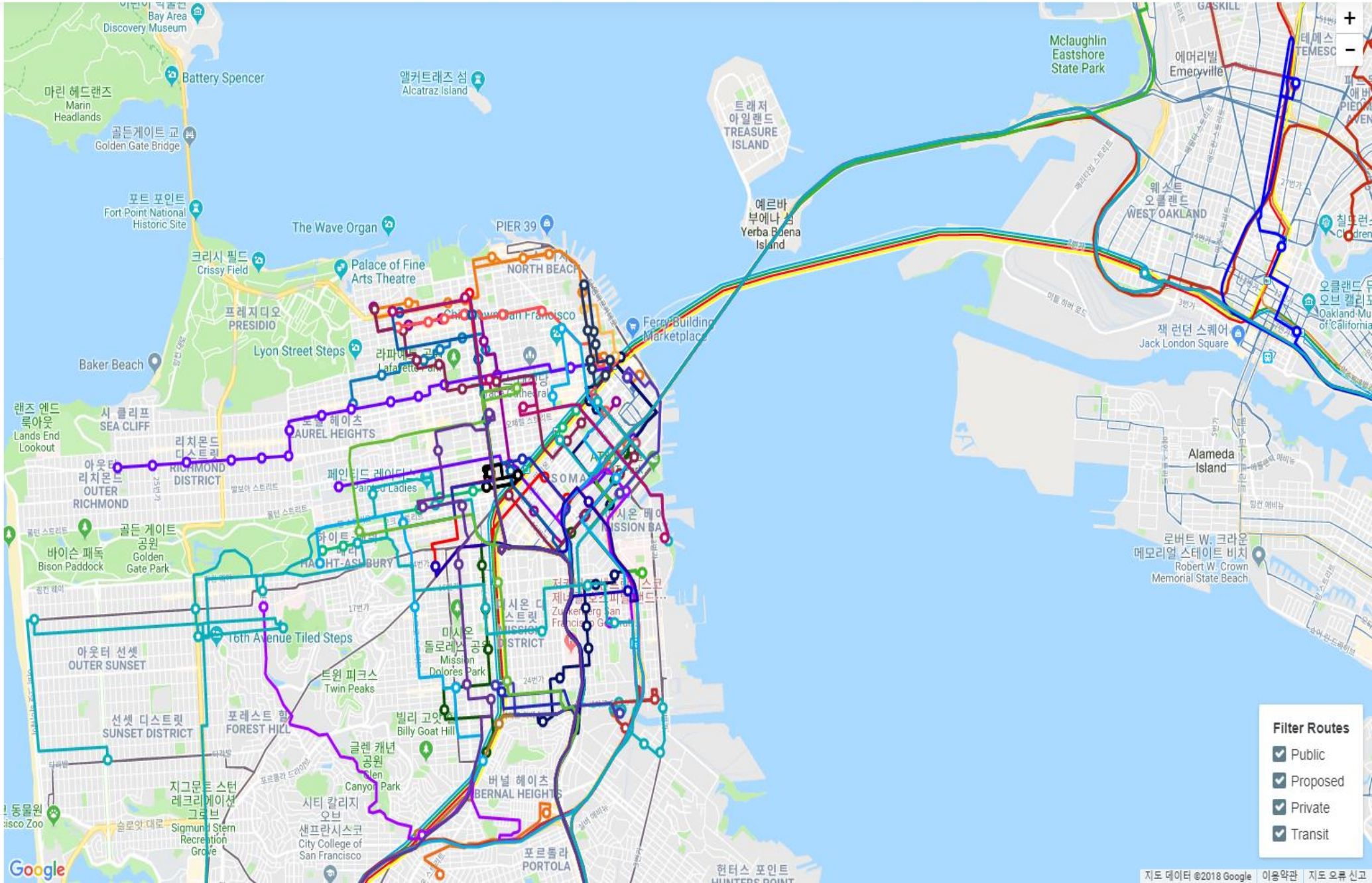
Transit stops (eg: Penn Station, etc)

Add work (100 1st St.)

Arrive by 6:00 PM

Search Routes

All Routes



# Adapting images

강남대로 서울특별시 강남구 역삼동 | 2018. 4 촬영
주변항공
주변정보
2018. 4 최신
3412
MBUS
M4403
현재 위치의 항공뷰가 준비되어 있지 않습니다.
강남점
국민은행
수인재한의원
춘하추동
성모아이 한의원
삼성화재 서초시옥
농협은행 우남빌딩
IMT모텔
SK허브블루 오피스텔
라임하우스원룸 강남역점
역서치인센터
한국정보통신 진흥협회
서초동삼성 쉐르빌2
서초롯데 골드로즈
우성아파트앞 사거리
아그레아빌
기업은행
유신
역삼초등학교
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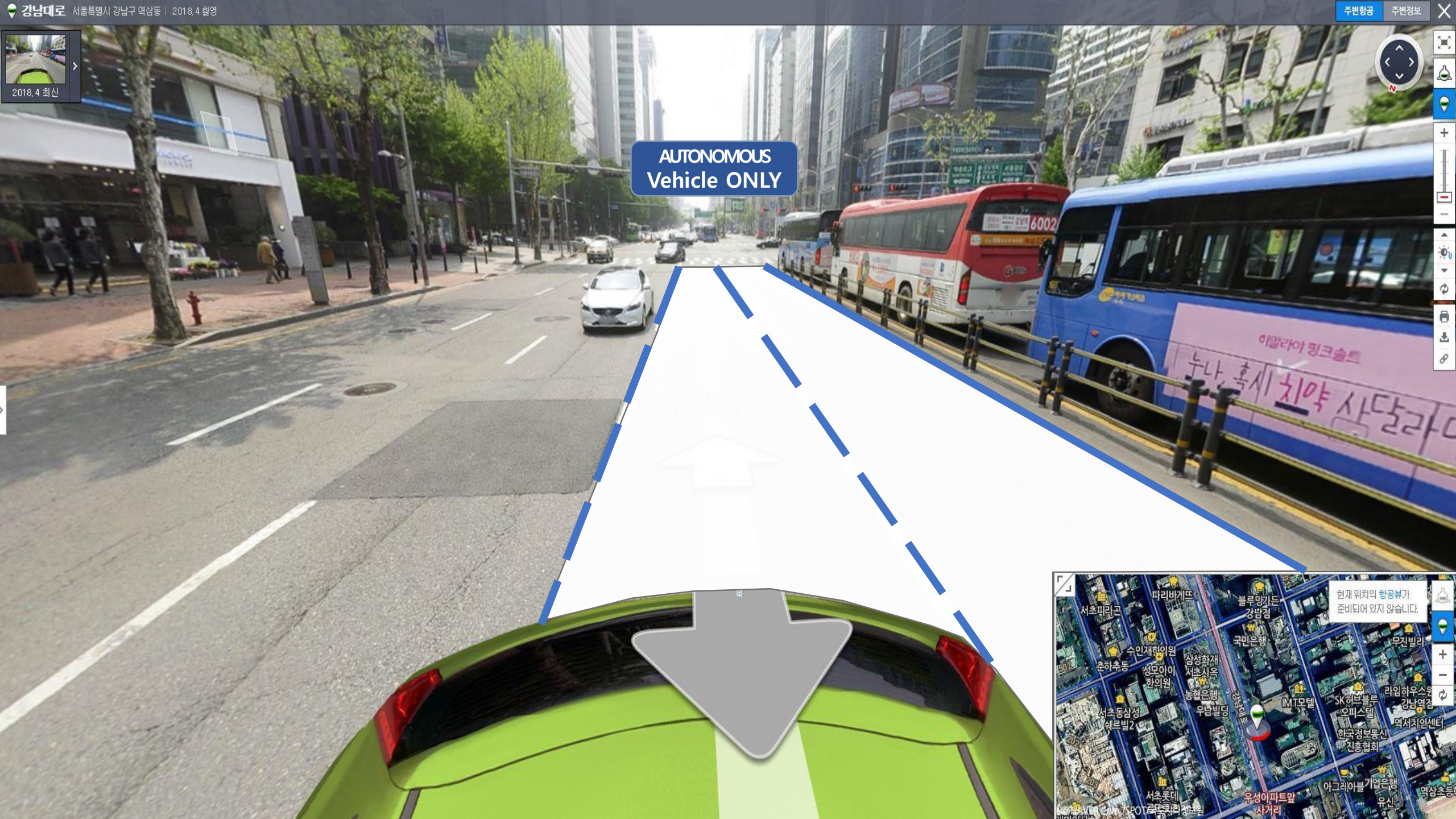
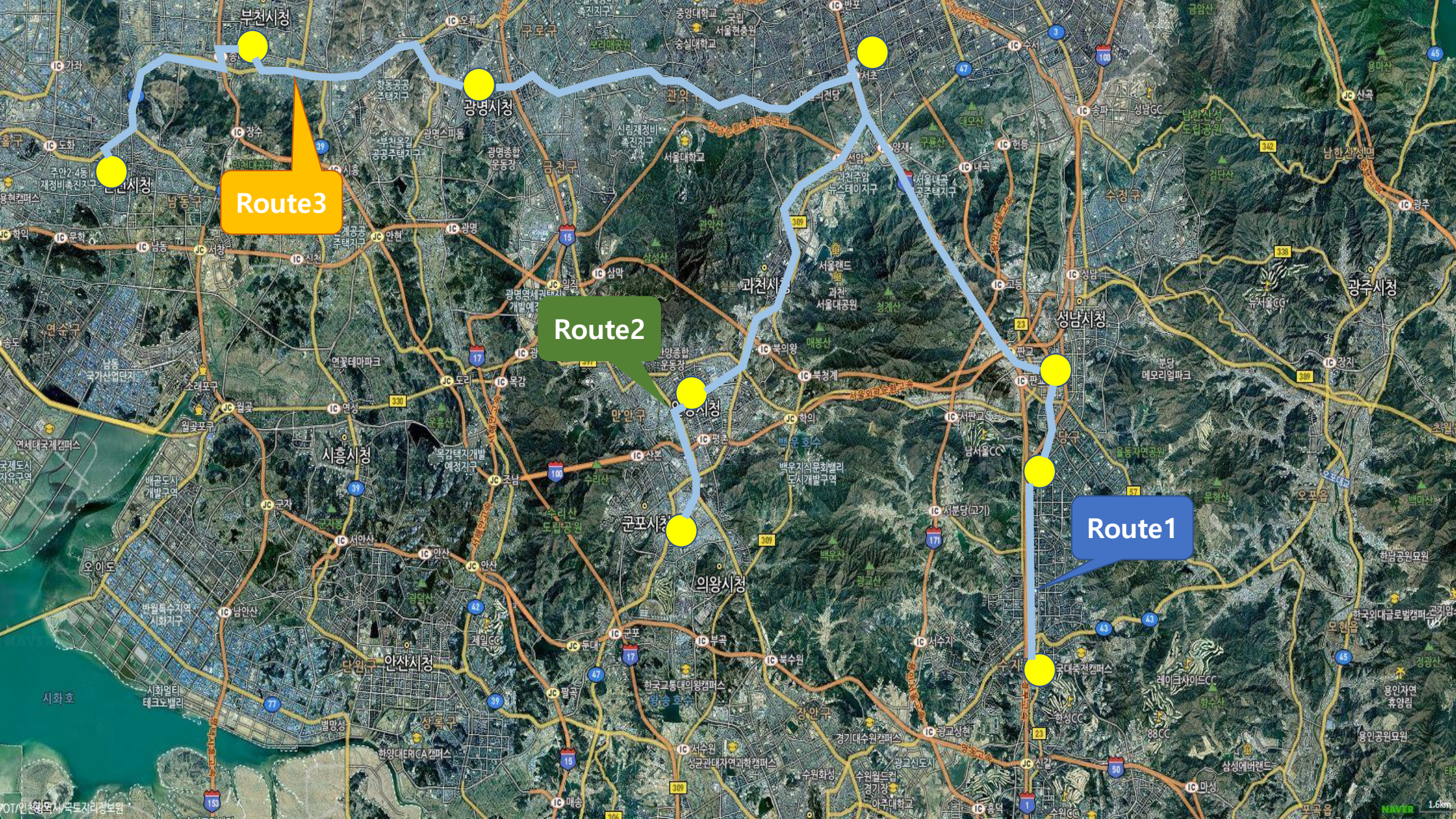
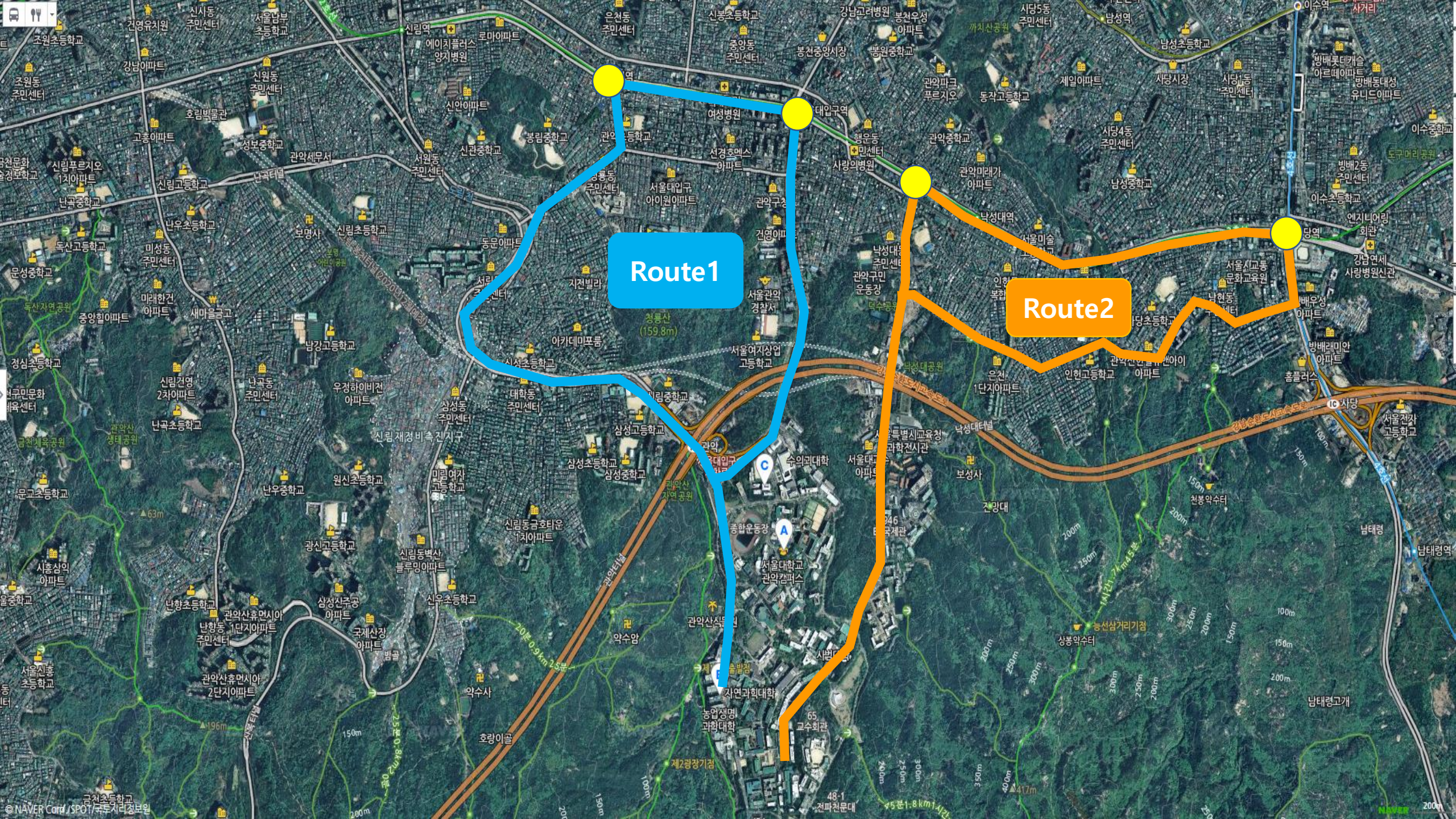

강남대로 서울특별시 강남구 역삼동 | 2018.4 촬영
주변항공
주변정보
2018.4 최신
AUTONOMOUS
Vehicle ONLY
현재 위치의 항공뷰가
준비되어 있지 않습니다.
서초파라곤
파리바게뜨
블루망기든
강남점
국민은행
무진빌라
수인재한의원
춘하추동
성모아이
한의원
삼성화재
서초사옥
농협은행
우남빌딩
IMT모텔
SK행복블루
오피스텔
라임하우스원
강남역점
역서치인센터
서초동삼성
쉐르빌2
한국정보통신
진흥협회
아그레아빌
기업은행
유신
서초롯데
우성아파트앞
사거리


Route3
Route2
Route1
부천시청
광명시청
인천시청
과천시청
성남시청
광주시청
시흥시청
군포시청
의왕시청
안산시청


Route1
Route2

P
567 P
100 P
0 P
1186 P

# Detailed plan & reference

# Detailed plan(text)

## 2020~2025

- From gang-nam to other city, designate 2 self-driving vehicle priority lane
- Introduce self-driving bus to this lane gradually
- Considering publicity, induce people to use public transportation first.

## 2025~2035

- All buses are subsituted to self-driving buses
- Bus drivers always on the bus to prevent accident and for customers safety
- Finish introducing self-driving vehicle priority lane to all cities
- Adopting self-driving buses to rural area.

## 2035~

- Reduce self-driving vehicle priority lane to one lane
- There will be a lot of self-driving vehicles so platooning effects will happen on anywhere
- Introduce reserving bus(people reserve before they take) and maintain existing bus system

# Detailed plan(text)

- Bus type
  - Categorize Small self-driving bus and Regular self-driving bus
  - Small self-driving bus : rural areas, short distance courses, cheap fare
  - Regular self-driving bus : middle and long distance courses, cities
  - Based on electric charge
- Publicity
  - Adopt bus design for the transportation vulnerable
  - Make this design as standard for all transportation
  - Adopt self-driving buses to the place where people can not get benefit from public transportation
- Fare
  - Early step of the plan, receive the same fare of current bus
  - When self-driving buses substitute normal buses, reduce the fare about 20%
  - Make sure that having self-driving car is more expensive than taking buses

# Detailed plan(text)

- Route
  - Early step : run the existing route
  - Middle step : introduce reserving bus and run the courses where people want(reservation from passengers)
  - Last step : separate reservation bus and normal bus.
- Convenience
  - Make passengers to input their destinations so that we can prevent redundant  stop  and go
- Policy
  - Impose tax to people who have self-driving cars more than one(per household)
  - Through the tax, government should provide more self-driving buses to people who can not afford to buy the car

# Possible effects

- Transportation
  - Considering the publicity, introducing public self-driving buses reduce traffic jam and commuting time
  - However, if people prefer to buy private self-driving car and considering that self-driving car make more people(elders etc) to use it
  - There will be more cars on the road than now, but we can still reduce commuting time
- Urban planning
  - People start to move to the other places where they can buy house at cheap price(less than 8million won/3.3 m^2)
  - From work place, people prefer to be within 30km
  - There will be more bed towns with small convenient facilltes around major city center.
  - There will be less people in the city than now and Lower the price of land and houses in the main city
  - Due to super high speed train and hyperloop, there will be more traffic between city and city.
  - The new urban sprawl will start

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