EYE – DEVICE

(Introduction to Capstone Design Final Report)

-Group 9-

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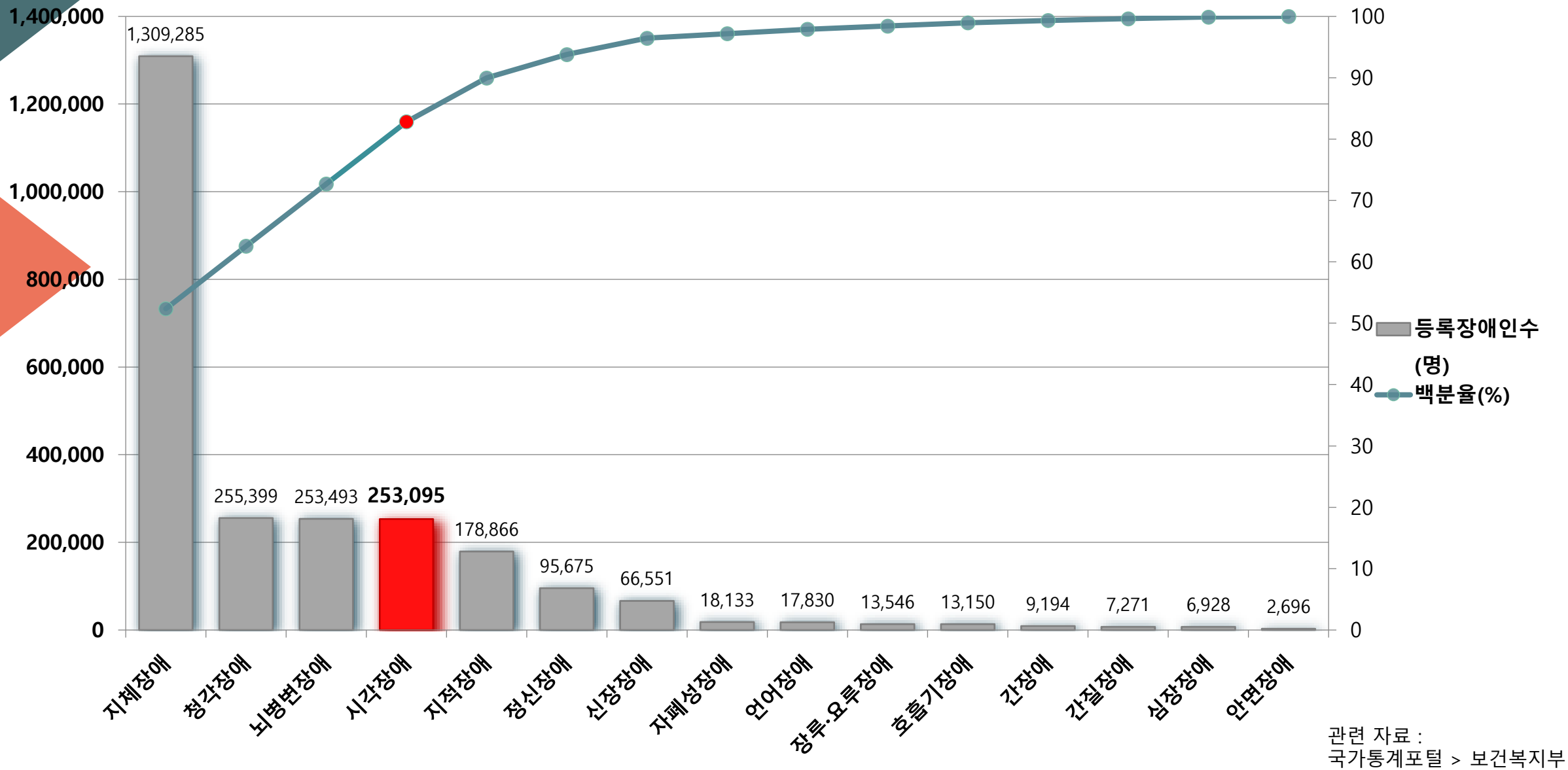
Smart Era

Smart Era

- Nowadays we are living in smart era.
- So, we are used to using the smart device such as smart phone, smart watch, tablet PC, so on.
- they make our life comfortable as much as they can.

Statistical Chart

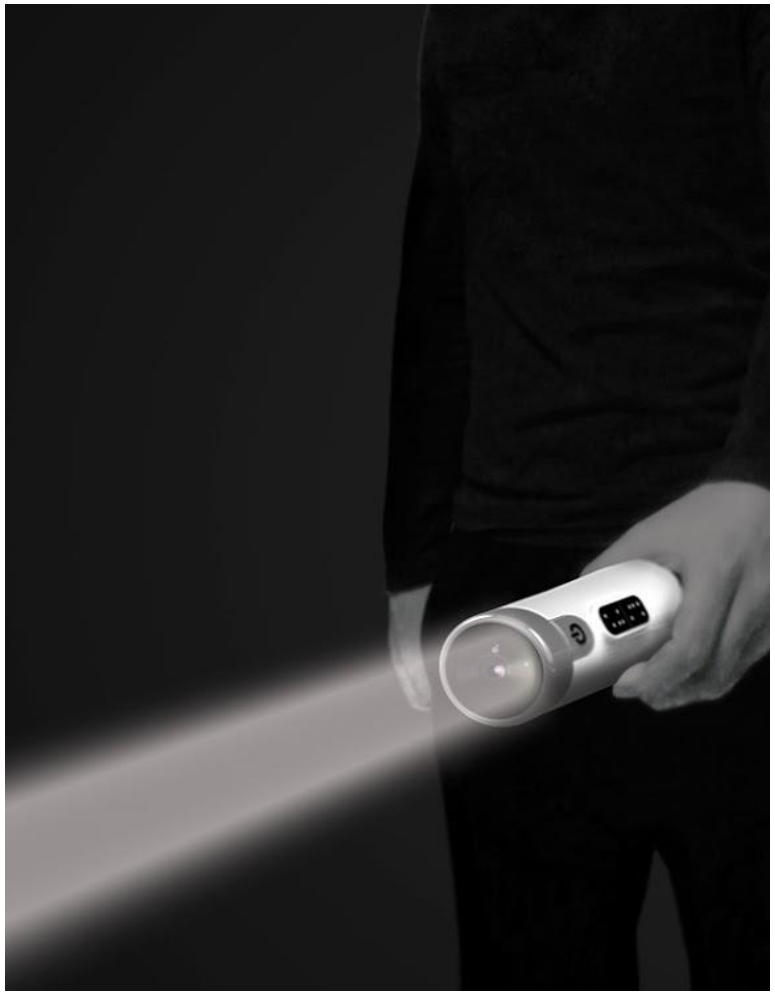


관련 자료 :
국가통계포털 > 보건복지부

Statistical Chart

•Meanwhile, according to the national statistic of population, About two million disability people are living in Korea with us, and among them, about two hundred fifty thousand people are blind persons.

First Our design & Goal



First Our design & Goal

- So our group decided to make the device which is comfortable and portable without a stick for blind person.

Why use the stick?

출처 : 한국시각장애인협회

우리나라에서 흰지팡이에 대한 규정이 마련된 것은 1972년 도로교통법에서이다.

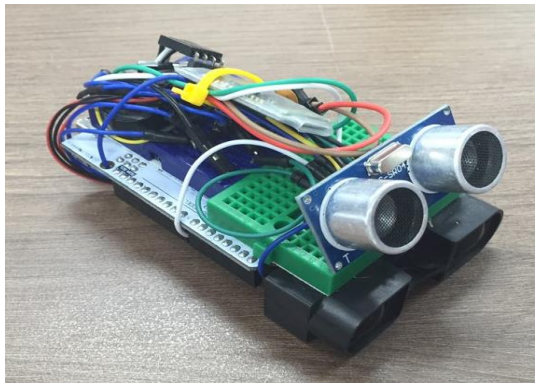
현재 도로교통법 11조에서는 "앞을 보지 못하는 사람이 도로를 보행할 때는 흰지팡이를 가지고 다녀야 한다." 로 되어 있으며,

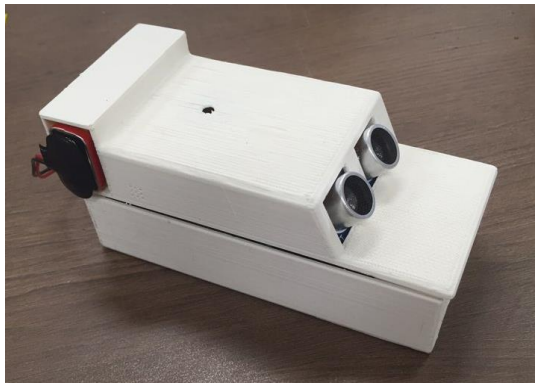
동법 48조에는 "모든 차의 운전자는 어린이나 유아가 보호자 없이 걷고 있거나 앞을 보지 못하는 사람이 흰색 지팡이를 가지고 걷고 있을 때에는 일시 정지하거나 서행한다." 로 되어 있다.

Why use the stick?

- However, the result of investigation the traffic laws, blind person must have the white stick when they go out.
- And, the white stick symbolize their independent and right to do activity with security.

Redesign





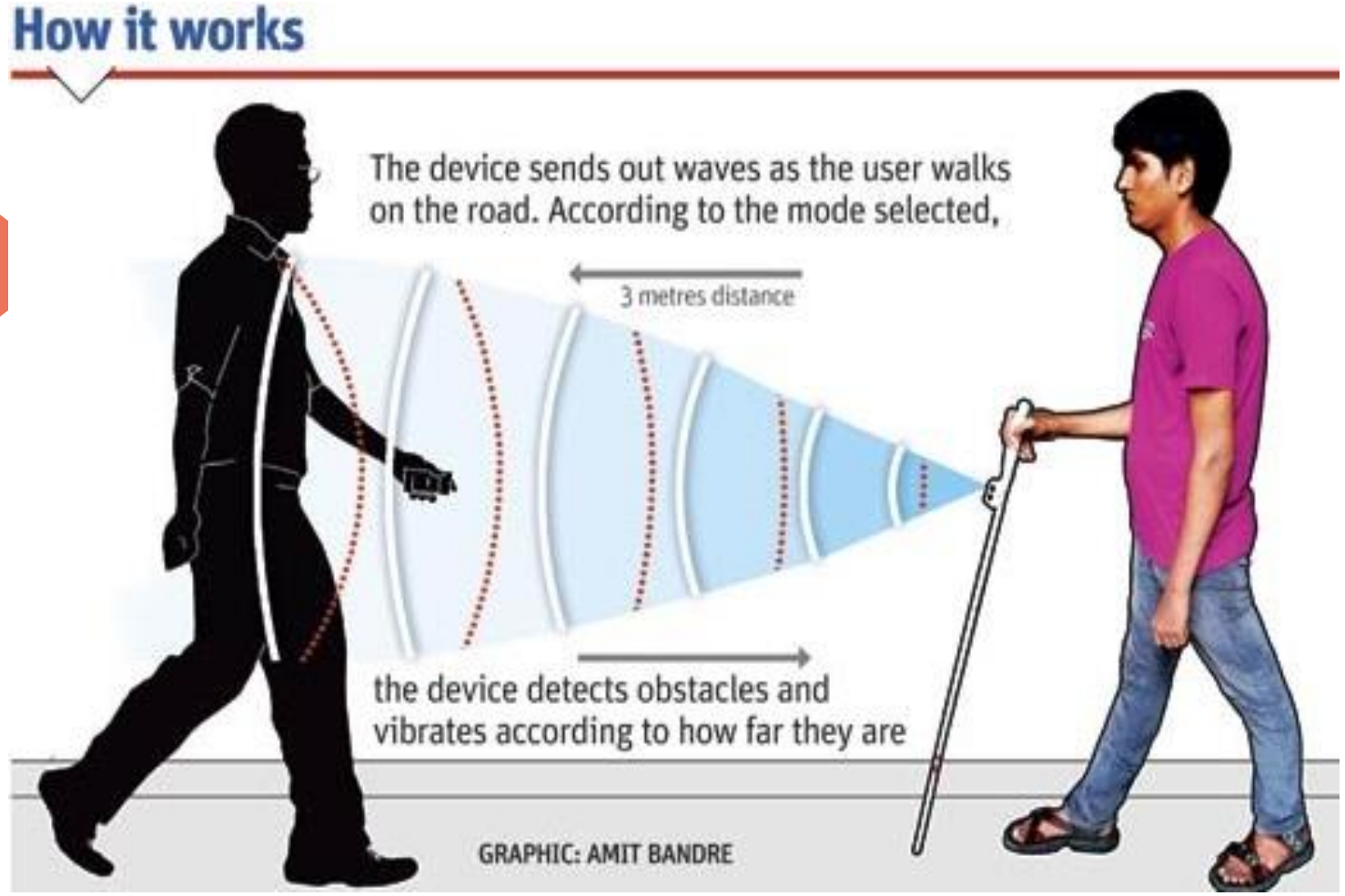
Redesign

- Thus, we redesigned the device up to be possible detachable on the white stick for keeping the symbol.

Introduction of EYE-Device

Ultra Sonic

Ultra Sonic Sensor (HC-SR04)



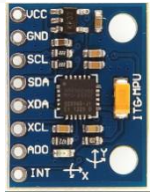
Working Voltage	DC 5V
Working Current	15mA
Working Frequency	40Hz
Max Range	4m
Min Range	2cm
Measuring Angle	15degree

Ultra Sonic

- First , this is ultra sonic sensor.
- This sensor give the alarm to us if the sensor are in a range of that we designated.

IR Sensor & Gyro Sensor

- Application of cosθ

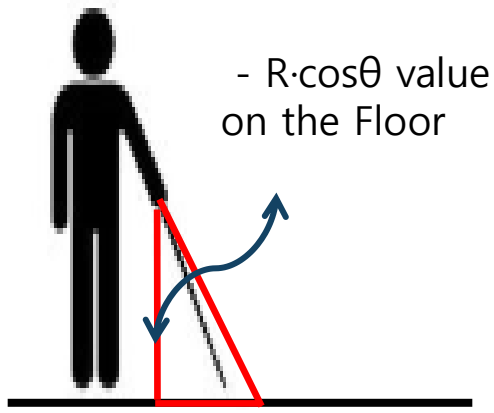


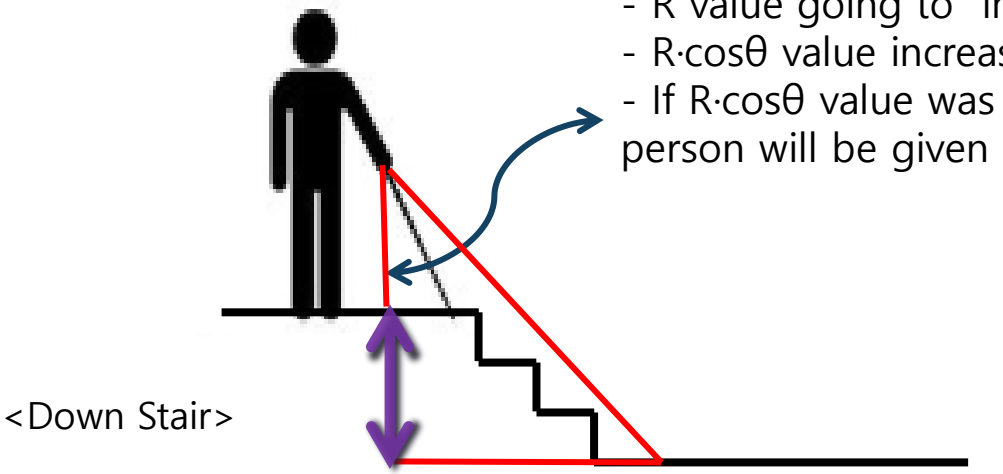
> IR sensor is going to measure length of hypotenuse(R).

> Gyro sensor is going to measure angle(θ) between person and the floor.

> R·cosθ value is usually constant or very slight variations on the floor.

> If user's came across a stair, R·cosθ value will be turned big variation and give a warning alarm to user.





IR Sensor & Gyro Sensor

• Second, let's think about it. if we were the blind person, and then we can not know a downhill road in advance while we were using the stick.

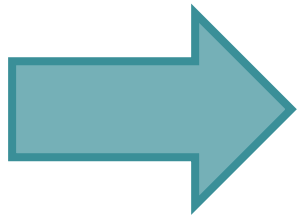
• Because the stick's distance to detect is pretty short. how uncomfortable is it? so we designed our product to have an ability to give an information to us in advance.

• This sensor is IR sensor. and this maximum range is about 5m. So, we use IR sensor, we can know down hill load in advance. but, when we have done several experiment. in fact, IR sensor have many error like horizontality and verticality.

• So, in order to improve an error, we add gyro sensor on the device. so use gyro sensor we measure angle between the float and me.

• Then use trigonometric function, multiplication distance of IR sensor by cos(angle) then finally we can detect of down hill load safety. it will give a precise information to us with alarm.

Bluetooth



Bluetooth

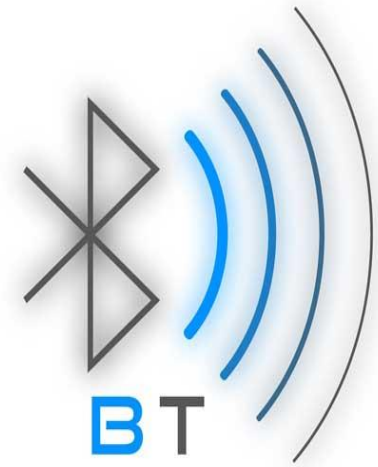
- Third, what if they lost the stick somewhere, imagine, it gonna be horrible happening ever.
- So, we make a connection between Bluetooth and stick.
- And then, if we push the button on smart phone, the stick is going to bell.

Detect Puddle

Detect Puddle

- last, what if there is puddle in front of me while I am walking. then we didn't realize the things and it happen to us to wet on our shoes. it make us feel bad. and maybe you guys too.
- So, we made the application to detect how much deep it puddle by stick for avoiding this uncomfortable.

Future outlook & Improvement



Future outlook & Improvement

- First, our device's strength is to connect to Bluetooth. in the future, add GPS Application on our device such that GPS Application, it speak out where we are and information of around location, navigation while we are using them.
- Second, now we use a disposable battery. it is better to change a disposable battery to charged a battery. it can be used long time with comfortable.

Q & A

Thank you!