



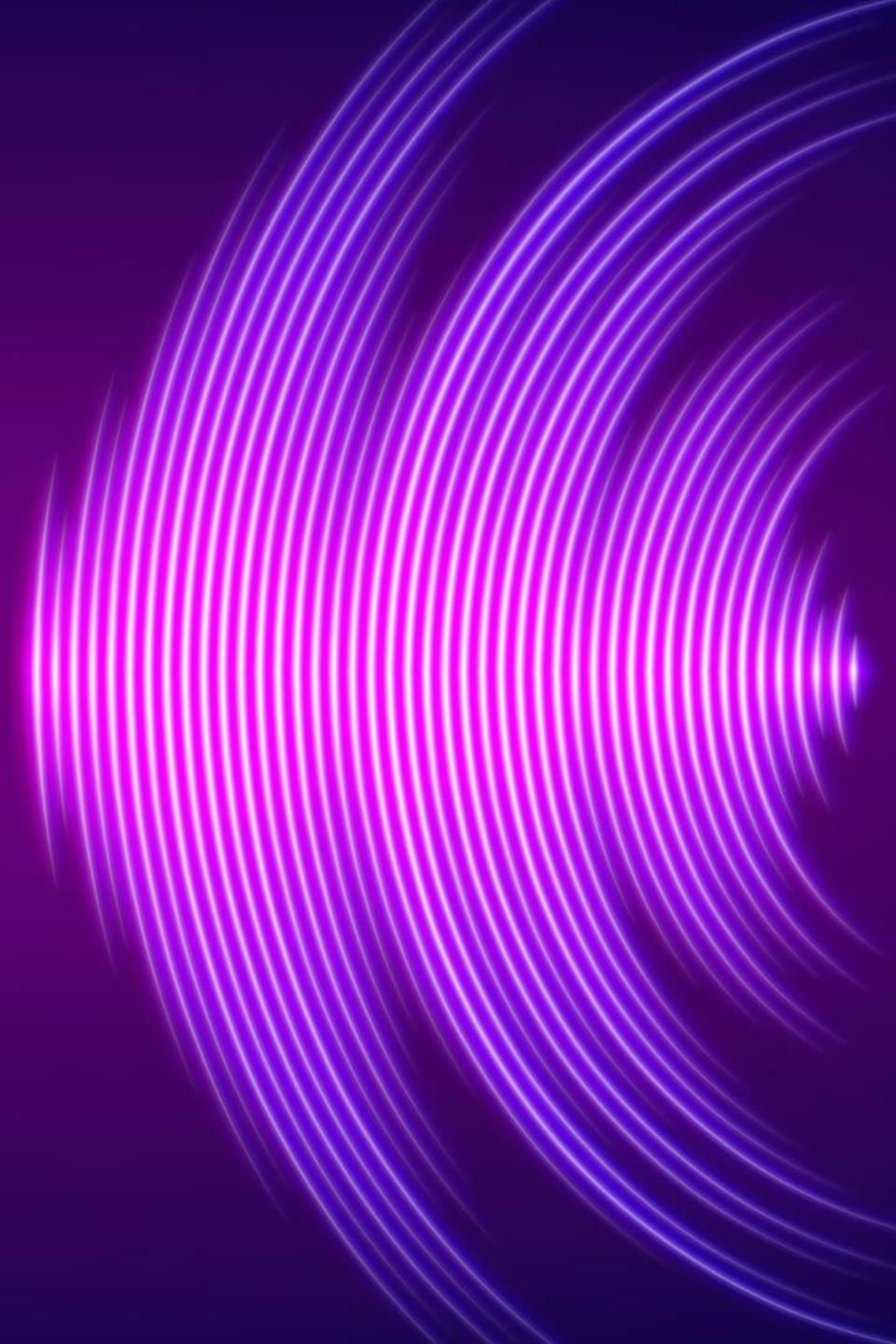
<Smart Noise>, Includes SRS and SDS

Smartphone based noise DB connection

Smart Home Healthcare Services

Team 7

2022. 5.



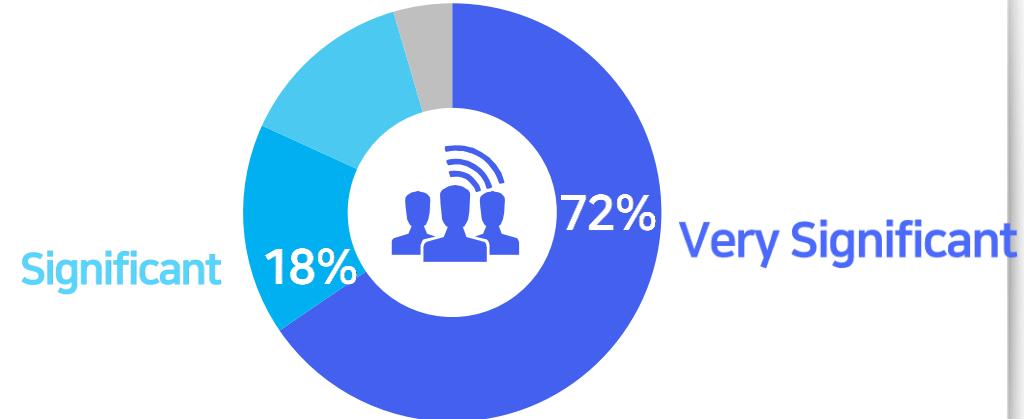


Market needs/problems

Breathless golden time accident that can be dealt with Smart Sensors

Respiratory arrest screening DB utilization for 10 seconds or more of respiratory arrest data

Q. Apnea response data, is it meaningful? _'22.3



(Seoul Catholic University, Major Emergency Medical Center
332 medical personnel. '22.3 Data- Team 7)

Cancer, acute death, apnea data associated with oxygen deficiencies can be reduced by one-third

In-house coral saturation activation and hazard readings abnormal

Breathing-free snoring utilizes data and immediately reflects on nearby medical institutions



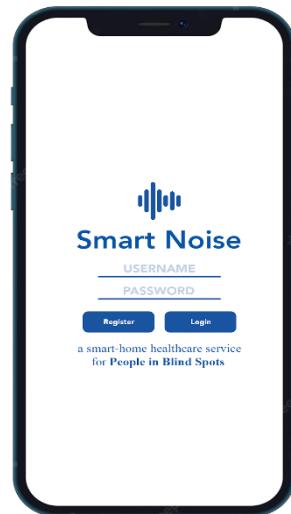
Item/Technical Overview

Smartphone-linked home smart home system utilization

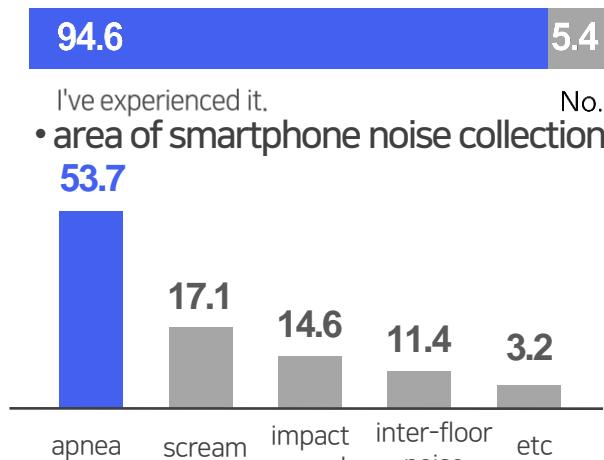
Noise data linkage, user emergency services linkage

Collecting Smart Noise That Is Essential

- Especially intellectual workers,
47% with no hops



- Domestic accident cases



(On the left is Google's notification service for limited sound collection.,
'22.3 Data - Graduate School of Medicine,
Kangwon National University)

Noise = Danger, measuring danger to notify guardians

Real-time response to dangerous signals such as screams, shock sounds, and respiratory abnormalities

Competitiveness and Differentiation



Those who wish to recognize and disseminate emergency situations
and pre-use emergency institution linkage (91% and 302 people)

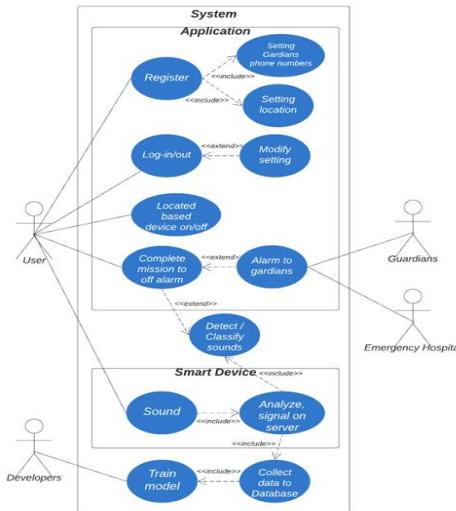
	Smart noise	Google Alarm Service	Galaxy Watch
Main customer	3569 Residence in the metropolitan area single-person household-centered (reconstruction area focus)	2539 An office worker living in the metropolitan area (Early adopter, domestic IT belly worker)	MZ generation women working in the metropolitan area (Sponsors to Women's Worker's Sports Competition)
Unit price	5,000 won per month SaaS model oriented Emergency vehicle association travel costs 30% commission	For free.	It's free. The device itself is free (equivalent to 150,000 won to 200,000 won)
PR	smart healthcare among single-person households distribution centered on households that require skills	Google's internal functions and collecting DBs in conjunction	Advertising for MZ generation celebrities. and public relations.
Primary subtarget	3569 Residence in the non-metropolitan area single-person household (Reconstruction area near Daejeon)	2539 An office worker living in the metropolitan area (Seminar focused on PR and marketers)	MZ generation office worker in the metropolitan area (Game company-oriented event)
Secondary subtarget	centered on 2035, single-person households living in the metropolitan area	2539 An office worker living in a non-metropolitan area.	1025 Women living in the metropolitan area
Tertiary subtarget	centered on 2035, single-person households living in the metropolitan area need smart home service provided to small and medium-sized construction companies and contractors (In Progress)	2539 A female office worker living in a non-metropolitan area.	1025 A man living in the metropolitan area
Quaternary subtarget	Not only smart home, but also smart home. Even if not, it can be used in conjunction.	A teenager living in the metropolitan area	women in their 40s or older living in the metropolitan area
Characteristics		Open Innovation Policy Affiliated with healthcare	when attached to the wrist availability of practical health check

Use Case Analysis



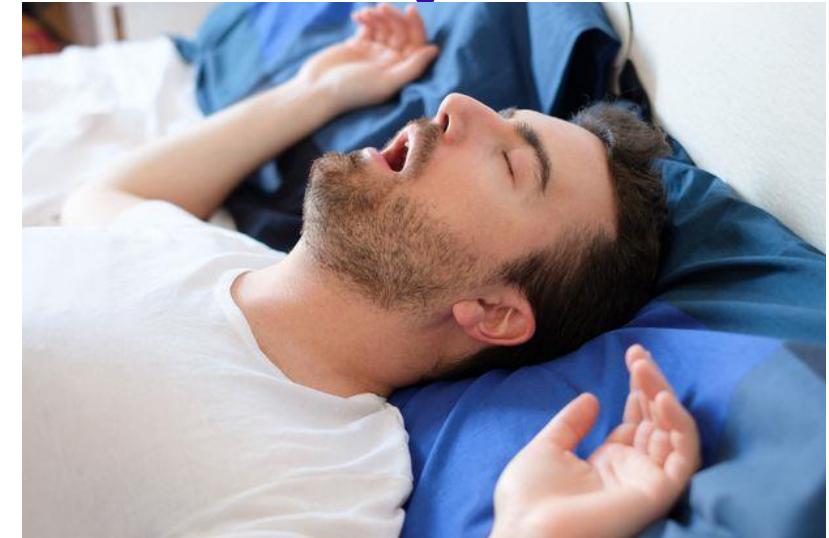
Users who want to check their breathing information, including Use Case,
If the user's condition is considered dangerous, the guardian receives a notification

Check the app for information about
your breathing difficulties



Securely store user-registered data by encrypting it
Data-Team7

119, Hospital-Included Officials Access
User Location Information



Store high-predicted data in DB of sounds detected as dangerous
Data-Sleep Apnea Male/Getty Images

Smart noise is the breathing analysis received from the server and
Data sharing confirms this for users and stakeholders

Customer Requirements Technical Operations Plan



Smart noise apps work with devices in the event of an emergency
Mission performance, alarm and volume notation reflection for user consciousness check

names, blood types, allergies, disease, etc



1. Login screen 2. Registration screen 3. Main screen 4. Access screen (left to right) Data-Team7

Connection information such as parent name, relationship, contact, etc



5. Emergency contact screen 6. Mission accomplished 7. Mission passed 8. Mission failed (left to right) Data - Team7

Observe user response when mission analysis indicates danger
Protector mobile phone, 119 automatic connection
from server in case of emergency



Requirements Traceability Matrix

Share solutions via subscription email if user ID, password is incorrect
Location tracking on-off button, breathlessness frequency reflected above graph

Modifying emergency information, utilizing EDIT INFO



Device interworking, using Connect near desired device



Right screen, select one of the three missions from the bottom
Choose Mission box, Data-Team7

Right screen, ALERT converts to CALLING 119 if mission fails
Data-Team7

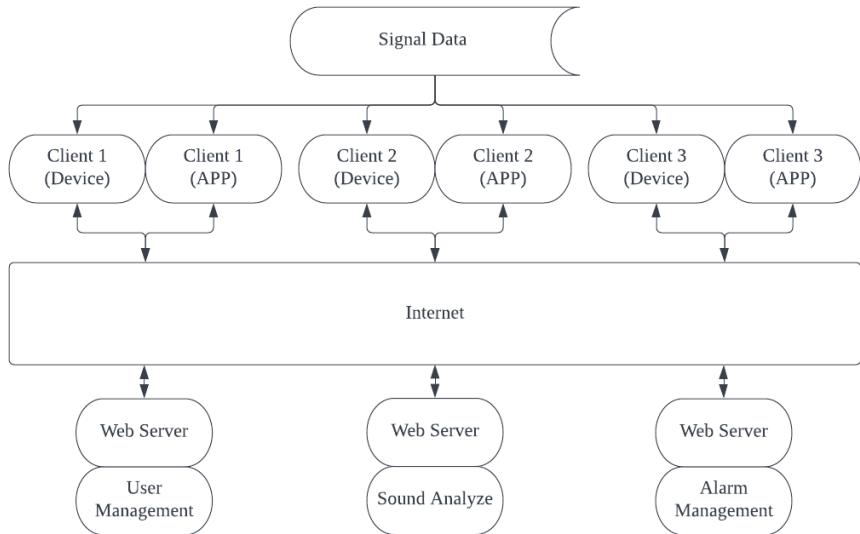
Standard for classifying and reflecting consciousness ratings
Mission accomplishment mistake
= 119 calls can be cancelled within 150 seconds

System Configuration

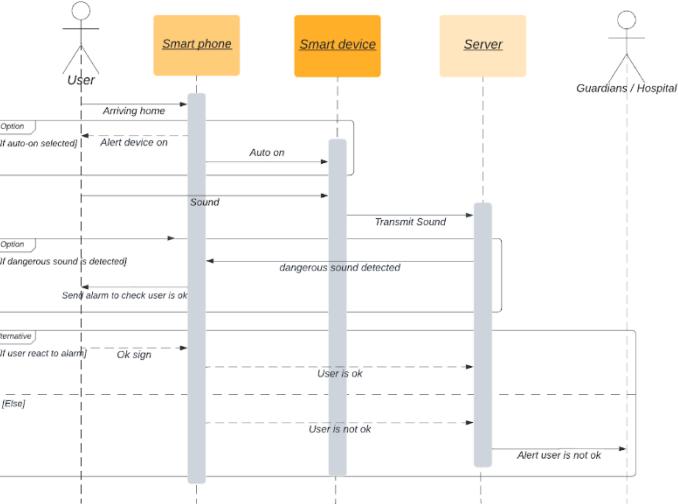


User management services, data management, and their servers include admission, Provides primary user information-related services such as login/logout, device management, etc

There are three main services:



Take advantage of the server-client architecture



Right screen, select one of the three missions from the bottom
Choose Mission box Data - Team7

If the service detects shortness of breath, the server requests oxygen emissions from the smart noise device
Data-sequence diagram, Team7

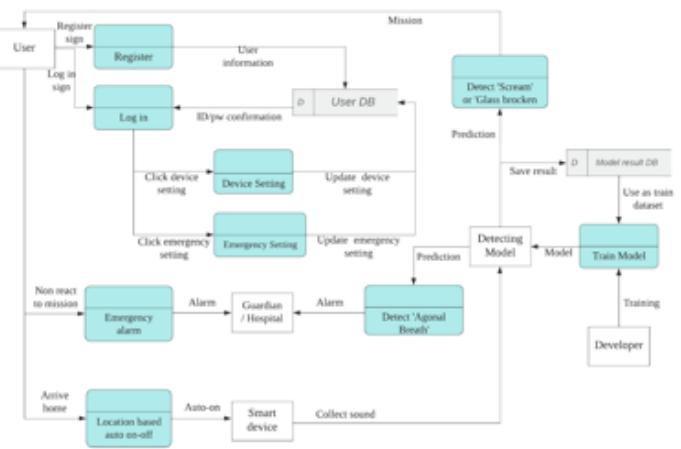
Hazardous sound detection and classification services;
And Equipped with a management system
in the event of a hazardous situation



System Configuration

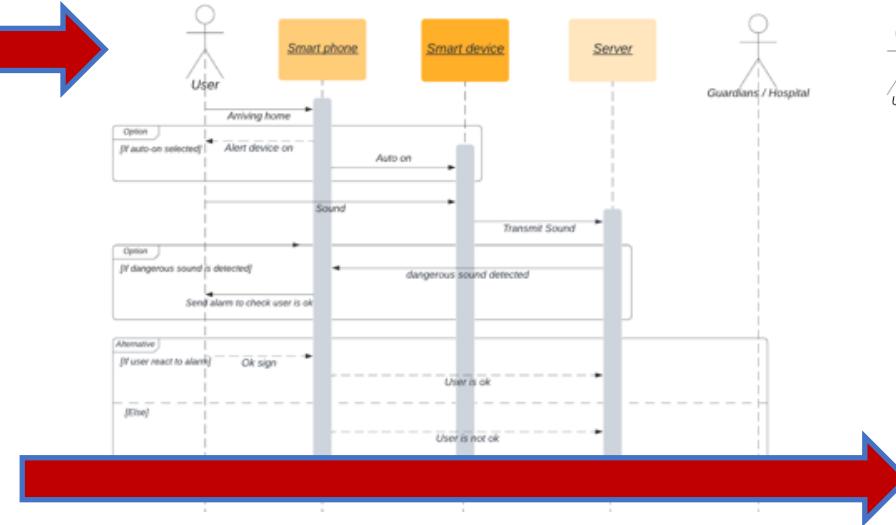
User accesses profile screen, requests information from system with GetInfo() function
The system returns user information from the User Data database

When you want to view user data...

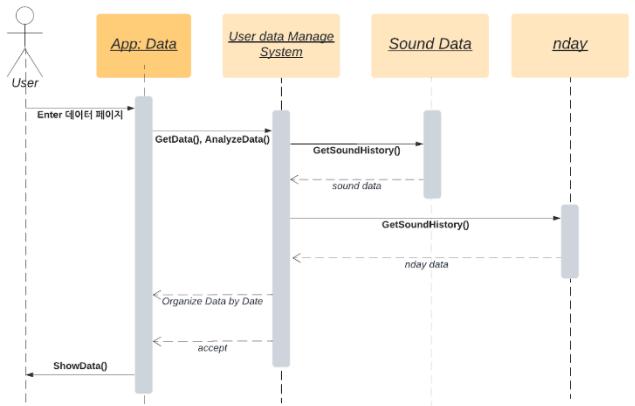


Data Flow Diagram, Team7

Interactions between components, shared as sequence diagrams



User Information Registration System
Data - Team7



User Data Management System
Data - Team7

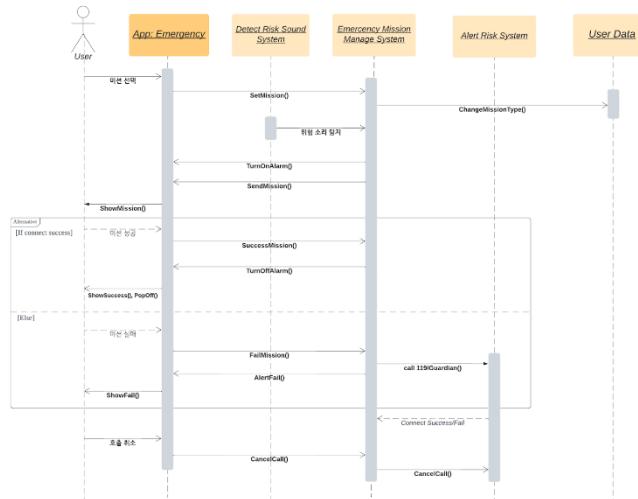
Among the noise detected by the device and smartphone,
the web server is Graph the number of breathlessness detections

System Configuration



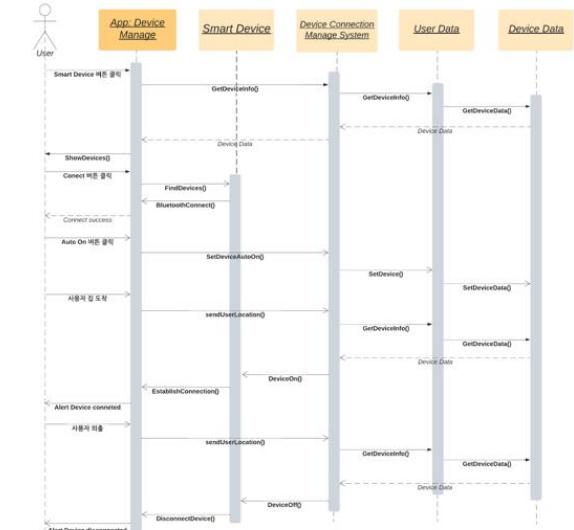
When selected, request to change mission type to SetMission() Change user mission information in User Data DB to ChangeMissionType()

Deliver mission to check user response



TurnOnAlarm(), SendMission() to deliver mission to user
Source - Emergency Mission Management System, Team7

Identify devices that can be connected to



If you have a connectable device, use BluetoothConnect() to link devices and apps - Device Connection Management System
Data- Team7

If the mission is successful, check the system
or user response with SuccessMission()

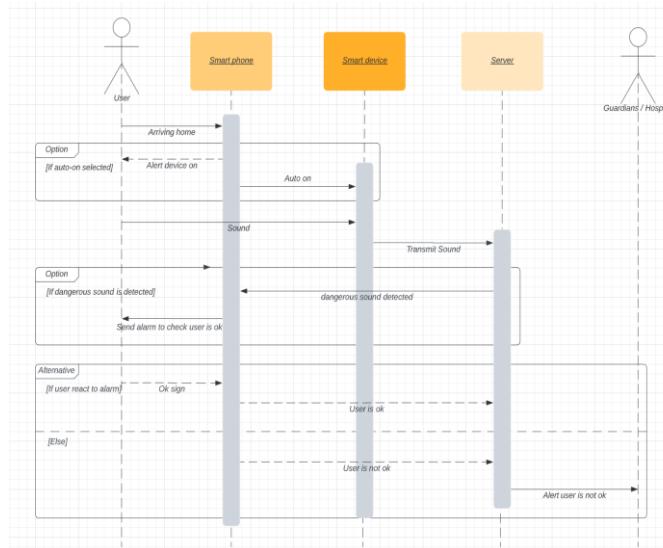
SendUserLocation() recognizes the system when the user returns home

Product Requirements Operational Proposal



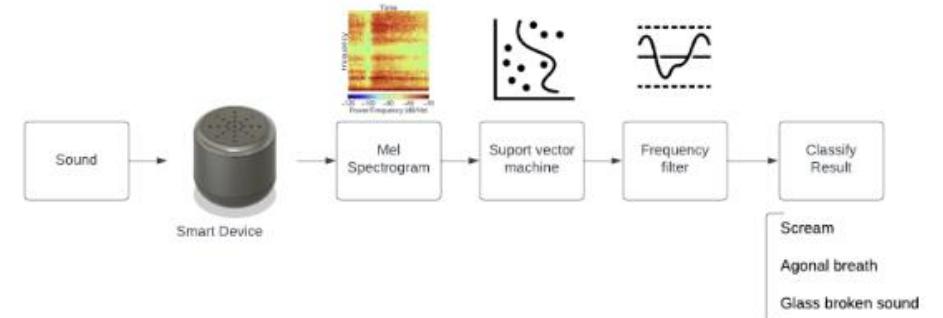
User sleep time operation, can be operated for at least 8 hours on a single charge
Reflecting systems for average battery life

Built-in detection technology without loss of sound data



2GB or more RAM, 1TB or more SSD, 512 CUDA Cores,
GPU Memory 2GB Environment Required,
Data-Sequence diagram, Team7

Government Policy for IoT Home Appliance Business to Encourage Technology Reflection



Dangerous sound detection. The sound of the house delivered to the classification model
Pre-processing in Mel Spectrogram form, Data-Team7

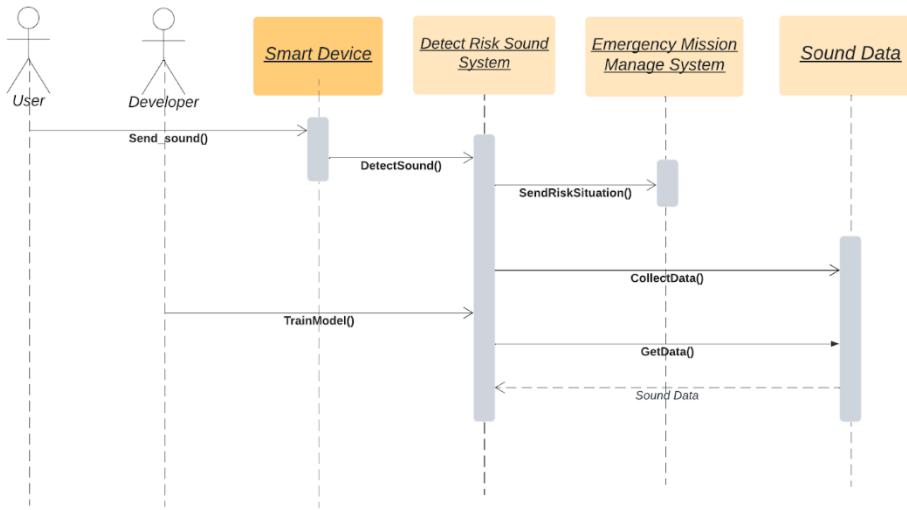
Android 6.0 or higher, iOS 9.0 or higher, developed as a Flutter
Enhance technical and service expertise with smartphone connectivity



Product Requirements Traceability Matrix

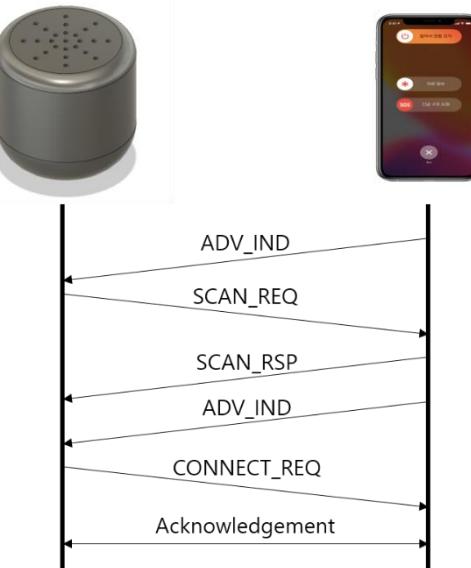
Automatically enable your system with GetDeviceInfo() Obtain device information
Automatically activate that device with DeviceOn()

Improved detection after model learning with new data



Hazardous sound detection system. Based on the sound database, Use this as learning data, Data-Team7

Troubleshooting with Bluetooth Smart



In smart noise systems, applications and devices send and receive small amounts of data, so use Bluetooth Smart, Data-Team7

Classification model processing time less than 1 second;
sound detection in the presence of user distance;
Classification performance remains 98% (AUC)



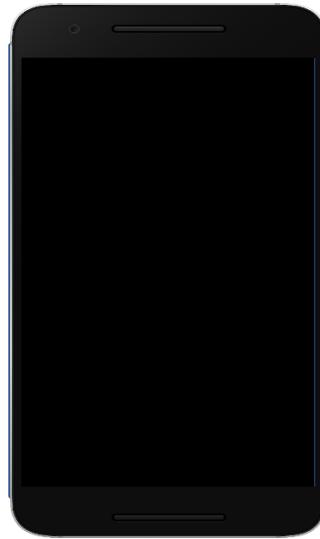
Practical examples of technology applications

When the user notification is exposed for a certain period of time during Golden Time, the response is insufficient

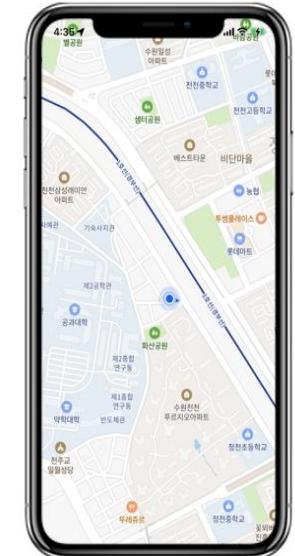
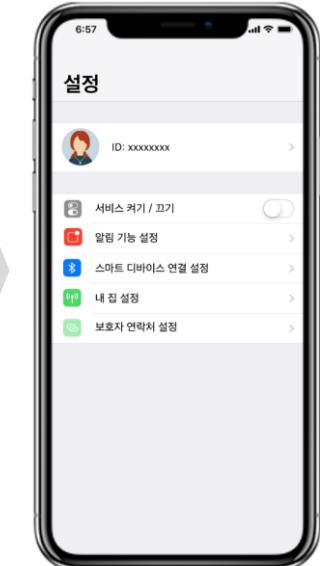
Recognizing that he is unconscious, call 119 immediately

After collecting smartphone microphones, to the server...

Utilization of location-based automatic operation capabilities



Save guardian contact information to share
when exposed to dangerous situations Data-Team7



Save your personal location on your way home.
Smart Device Recognition Notification Data-Team7

Provides location-based services in smartphones
for automatic sound detection in dangerous situations



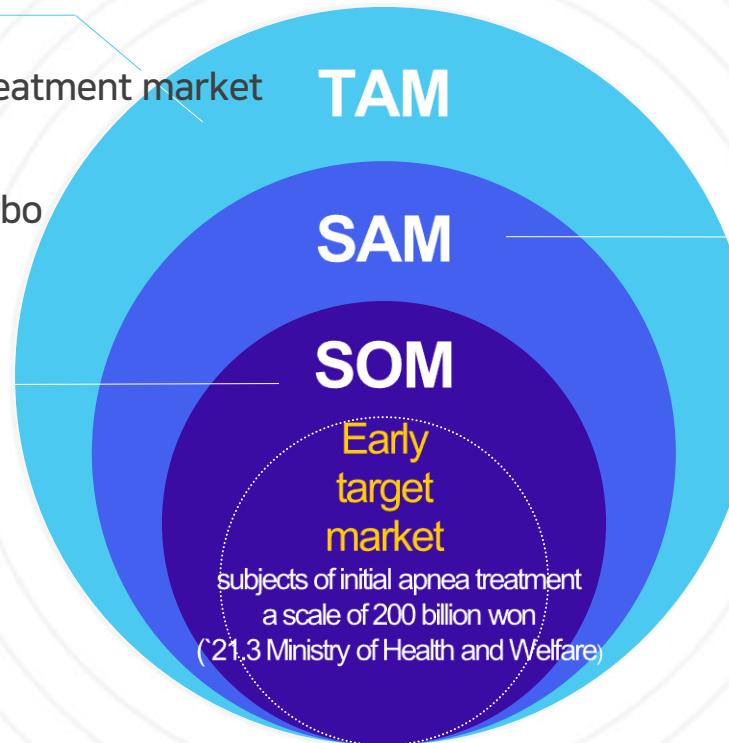
LG Electronics, Hanwha Life Insurance, etc. Smart Home, Healthcare
Expand and align projects with linked companies

Service-wide expansion market

- Domestic noise and interlayer noise stress treatment market
 - Mental and behavioral disability costs approximately 7.2 trillion - 21.7 JoongAng Ilbo

Primary service expansion

- arteriosclerosis, stroke, heart disease, kidney disease, over 300 billion
 - 21.3 Ministry of Health and Welfare



Secondary service expansion

- Korea's 3 trillion-scale loss of foot in the disease market caused by personal damage in the house, etc.
- 21.7 Ministry of Health and Welfare



Development Testing / Initial Target Application Plan

Verification and data collection of services centered on the first leading site

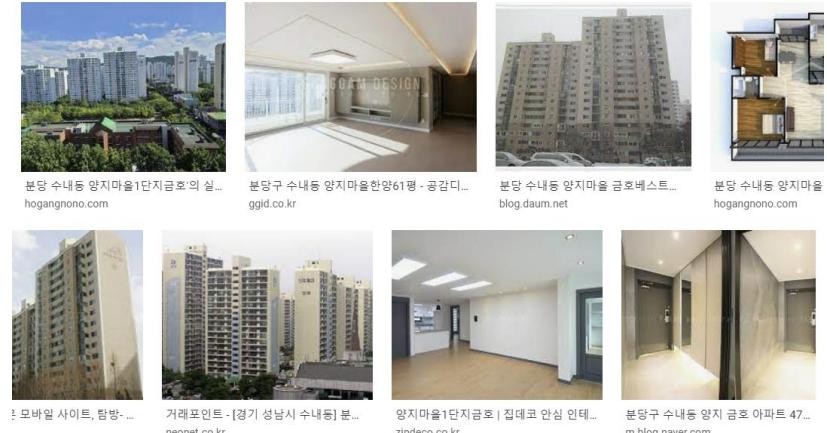
for reconstruction in Bundang and demonstration complex

The largest number of 3569 households in Korea + 2nd Army Construction Complex

Selection of areas where many patients with apnea + significant indicators are derived



Additional verification focused on one person and households in their mid-30s and older



Collaboration with nearby Bundang Jesaeng Hospital, CHA Hospital, and Bundang Seoul National University Hospital 6 months of emergency apnea patient visitor sharing and release testing
Data-Bundang-gu Office

Yangji Village, the second most influential site for reconstruction in Bundang, Seoul, and some construction projects
Discussion and requirement testing of technology alliances within Smart Home Data-Bundang-gu Office

Jesaeng Hospital has the largest number of apnea emergency patient clinics nationwide -19.7 Ministry of Health and Welfare
Joint Test with Professor Yoo Woo-sung's Team of Emergency Medicine at Bundang Jesaeng Hospital

Evolutionary processes/market production measures



Linkage of primary new towns such as Pyeongchon and Ilsan + Seoul Rapid Integrated Planning Complex
Platform application and mass production after service enhancement, beta and acquisition testing

Expansion into primary new towns such as Pyeongchon, Ilsan, and Sanbon



Pyeongchon is in the Milky Way, Sanbon is in Halla Jugong,
Final fault correction and system improvement followed
by release planning Data-Seoul City

Seoul Metropolitan Rapid Integrated Planning and Development Complex Meeting



민간재개발 1차 후보지 선정결과

위치 (면적, m ²)
① 종로구 창신동 23/승인동 56(8만4354)
② 용산 청파 2구역(8만3788)
③ 성동 마장동 382 일대(1만8749)
④ 종내동 청량리동 19 일대(2만7981)
⑤ 종로 면목동 69~14 일대(5만540)
⑥ 성북 허임곡동 70~1 일대(7만9756)
⑦ 강북 수유동 170 일대(1만2124)
⑧ 도봉 쌍문동 724 일대(1만619)
⑨ 노원 상계5동 일대(1만2670)
⑩ 은평 불광동 600 일대(1만3004) ⑯ 금천 시흥동 810 일대(3만8859)
⑪ 서대문 흥제동 8~400 일대(7만1860) ⑯ 영등포 당산동 6가(3만1299)
⑫ 미포 공덕동 A(8만3320) ⑯ 동작 삼성 14구역(5만142)
⑬ 양천 신월7동 1 구역(11만5699) ⑯ 관악 신림7구역(7만5600)
⑭ 강서 방화2구역(3만4906) ⑯ 송파 마천5구역(10만6101)
⑮ 구로 가리봉2구역(3만7672) ⑯ 강동 친호A1~2구역(3만154)

자료: 서울시

The JoongAng

Construction companies of the second group, including LH and SH,
focusing on the first new town verification index
Product mass-production after system release through partnership
with first-tier construction companies Data-Seoul City

1st New Town and Shindong Planning Area, Large number of households with 2069 single-person households
Application of platform to many areas where many patients with apnea live and many knowledge workers live

Traction/Sales Strategy and Vision



21.5 Creative Self-Assignment (ICT) and Technology Innovation Challenge Selection, totaling 50 million

[Business model]



- 5,000 won per month. 50,000 won per year
Target 251 service singers
- Inquiries about re-purchase status (94% desired)
 - Source: Kangwon National University Graduate School of Medicine

[to single-person households and military units]



- Smart Home Services Other than Vulnerable Single-Person Households
 - From knowledge workers to manual workers
 - Expanded to military units and outlying areas

'22. 6

[Domestic households with more than one person, 7.3 million as of 22 years.]



- The vulnerable are in their mid-30s and older...
 - Expansion of houses, villas, officetels, etc. centered on Bundang and reconstruction areas

'22. 9 (Ver2 released)

'22. 12 (Ver3 released)

Personnel expense
(Additional Employment)

- 3 million won for two full-time development workers X Participation rate 100% X 120 days = 12,000,000 won
- 2 million won per person x 100% participation rate X 7 months = 14 million won
- Development permanent employment KRW 1.8 million per person X 100% participation rate X 5 months = 9 million won
- Data collection personnel: 1 doctor, 1 master, 10 days of every month, total 20 days of employment = 5,000,000 won
- 40 day employment for 3 academic students = 5,400,000 won (4,540,000 won, 91.1%)

Prototyping costs
Marketing expenses

- Outsourcing = 3,400,000 won (6.8%) including UX design and functionality (payment)
- Production of promotional videos, distribution of online promotional materials such as SNS, etc. = 1,000,000 won (calculated from the project)

Shorten time to build finished products
Can be promoted
Through promotions of good quality
Securing DB

Funding needs and performance-generating strategies



Traction, "Expected revenue from November, 22"

(Estimation of occurrence of households in demand for charging centered on the demonstration complex per minute. Data are from Bundang-gu Office and Bundang Jesaeng Hospital)

지원금



시장진입



판매예상



1. SIS Sungkyunkwan University's application for laboratory start-up support is not scheduled
 - Support projects for start-up-focused universities and additional initial start-up packages (100 million won) will be carried out.
 - **Discussion on the direction of attracting investment in Hanwha Life Insurance and Naver D2 startup (22.5)**
 - First round of discussion on Mega Zone Cloud and attracting investment ('22.5)

1. Discussion Meeting on Reconstruction of Bundang Demonstration Complex
 - Meetings focusing on the construction companies of Hanshin, Hanyang, Woosung, etc
 - Identification of apnea patients and health check-ups at affiliated complexes
 - Discount coupon provided (centred by Bundang Jesaeng Hospital)
 - **Spreading the service around educational institutions in the complex**
2. Expanded around primary new towns such as Pyeongchon and Ilsan
3. Partnerships with large hospitals, SNS, and press releases
 - Seeking Partnership with Big Broadcasters and YouTubers

1. Of the 51,495 people excluding Samsung apartments in the Bundang demonstration complex, 42,225 were aged 35 or older (82%)
2. Among them, apnea patients, 30% 13,512 in total (the largest number in the country)
 - The overwhelming majority of knowledge workers are employed, and one in three people visit the emergency room at dawn with apnea

: Jeong Ju-min (33, working for major media company A) visited the hospital for five years due to apnea symptoms

: Han Sang-joon (43, working for a large company B) has been using a paid apnea tracking app for three years





The Team

Completion of projects linked to KAIST laboratories, startups, and local emergency medical centers



Ko Namwook (Team leader)

- Artificial Intelligence, Server/BackEnd & Development, Business research and planning
- Sound detection Technology and Classification Tech
- Representative of Sungkyunkwan University's outstanding preliminary start-up package ('21) : Artificial Intelligence & Smart Home-Based Speech Recognition

Advisory, voice-based artificial intelligence and medical institutions

- Professor Lee Soo-young of KAIST Electronics and Electrical Engineering (negative therapy)
- Kim Tae-soo, CEO of Neosapiens (voice detection and discrimination)
- Dr. Kim Ji-hoon, Graduate School of Medicine, Kangwon National University (Emergency Medical Center))



Lee Seungmin

- HW modeling, FrontEnd Development
- Smart device development and application development
- 22-year preliminary start-up package (IT-based)



Ko Eunseo

- AI and FrontEnd Development
- application of artificial intelligence
- Models and application development
- Artificial Intelligence Deep Learning Development Part



Huh Hanwool

- HW modeling, security
- Smart device development and server interworking
- Certificate of 3D printer operator



Son Seokgyu

- Arduino, Server/BackEnd Development
- Device Server Integration and DB Management
- Smart Watch and IT-linked device specialist



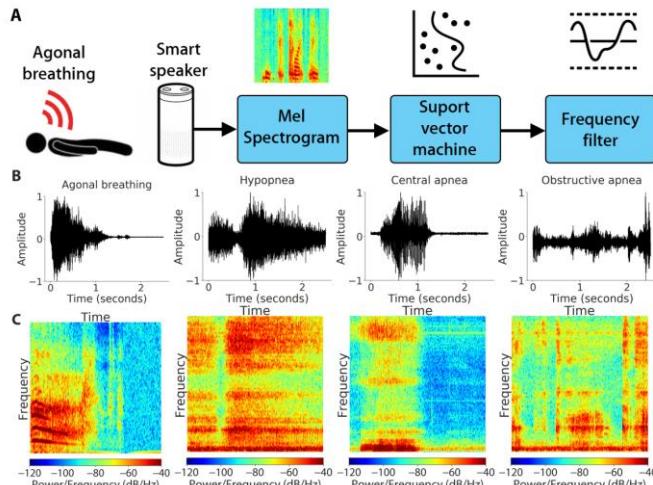
Sound of Music, no Sound of Breath
A team that makes innovation with smart noise



Proven papers and competitors identify feasible technologies 'Contactless Cardiac Arrest Detection Using Smart Devices' (Thesis)

AI model based on actual hyperventilation sound and cardiac arrest detection

Utilization of location-based automatic operation capabilities



AI Model Experiments with Smart Speaker and Smartphone

98.7% of detection performance is confirmed when 3m or more
Check the performance of 90% or more even if there is noise or noise.

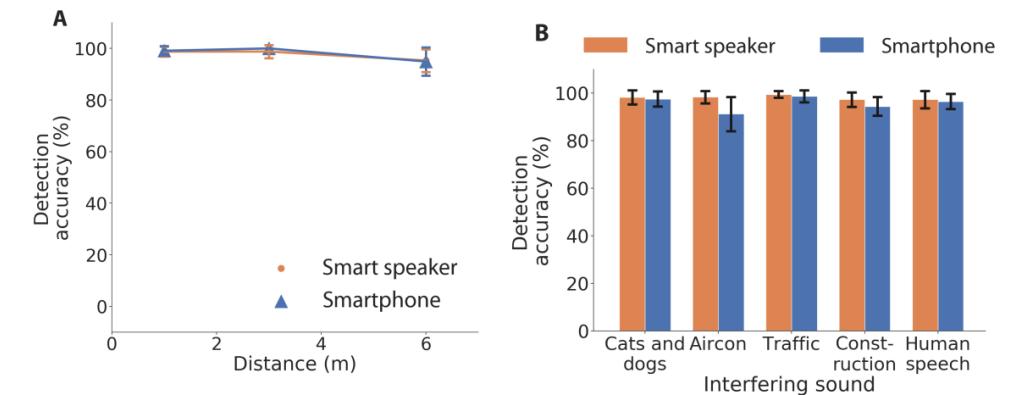


Figure 2: (A) of the smart speaker, smartphone according to the distance. detection performance, (B) detection results in noisy and noisy environments