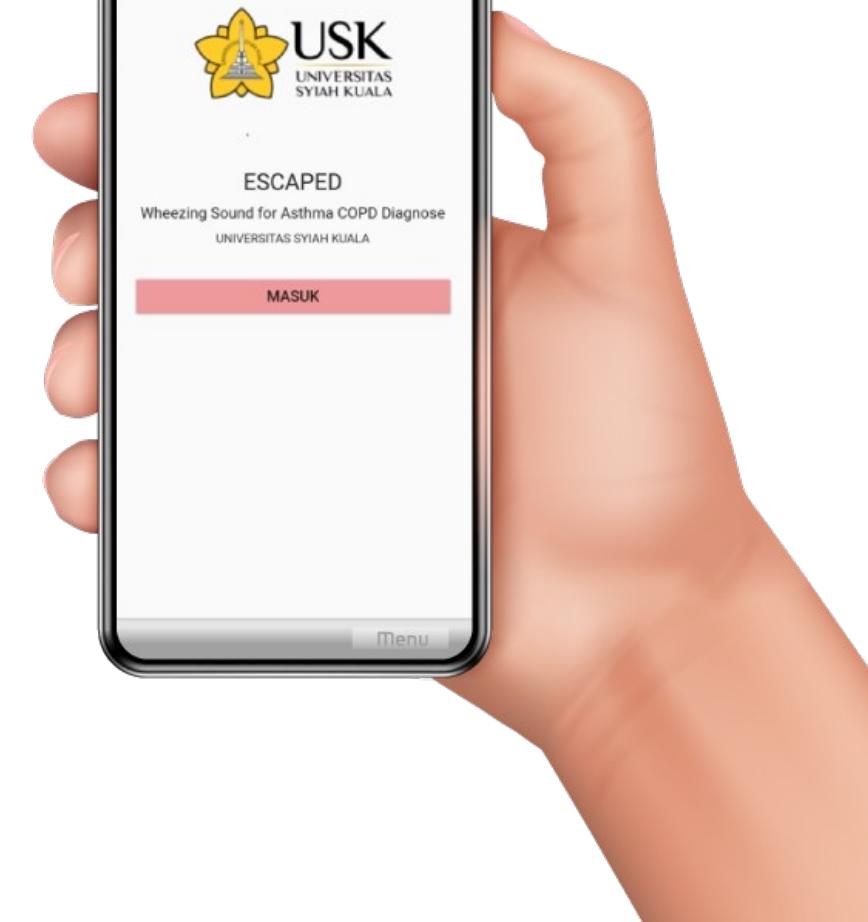


**IBU PERTIWI SEDANG PANDEMI
MESKIPUN BEGITU MAHASISWA TETAP HARUS BERKREASI
JANGAN TAKUT PENYAKIT MENGI
KARENA SEKARANG SUDAH ABANG BUATKAN ESCAPED APLIKASI**

PKM - KC **ESCAPED**

Alat Detektor Wheezing untuk Mengetahui
Kelainan Obstruksi Saluran Pernapasan





OUR TEAM



Adinda Zahra AR
PENDIDIKAN DOKTER



Fawzi Linggo
TEKNIK ELEKTRO



Dr. dr. Budi Yanti, Sp.P (K)
DOSEN PEMBIMBING



Khalilullah
PENDIDIKAN DOKTER
KETUA KELOMPOK



M. Yusuf Kardawi
TEKNIK KOMPUTER



Delia Putri Sanur
PENDIDIKAN DOKTER

POKOK BAHASAN



A person wearing a red hooded sweatshirt and a red belt, standing in a dark, rocky landscape.

LATAR BELAKANG



Latar Belakang



Obstruksi saluran napas merupakan Penyebab utama kematian di dunia.



65 JUTA orang menderita PPOK
3 JUTA orang meninggal karena PPOK

(Forum of International Respiratory Society, 2017)



Terdapat 383.000 kematian akibat asma

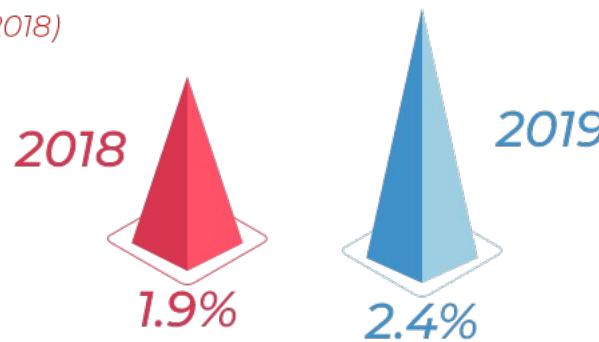
(World Health Organization, 2015)

Terdapat 235 juta jumlah pasien asma

(World Health Organization, 2020)

4.5% Penduduk Indonesia menderita asma

Jumlah kumulatif kasus asma sekitar 11.179.032 penderita
(KEMENKES RI, 2018)

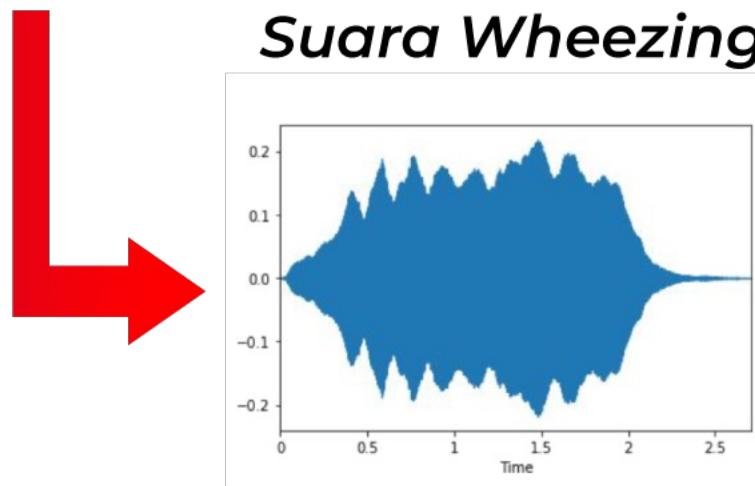
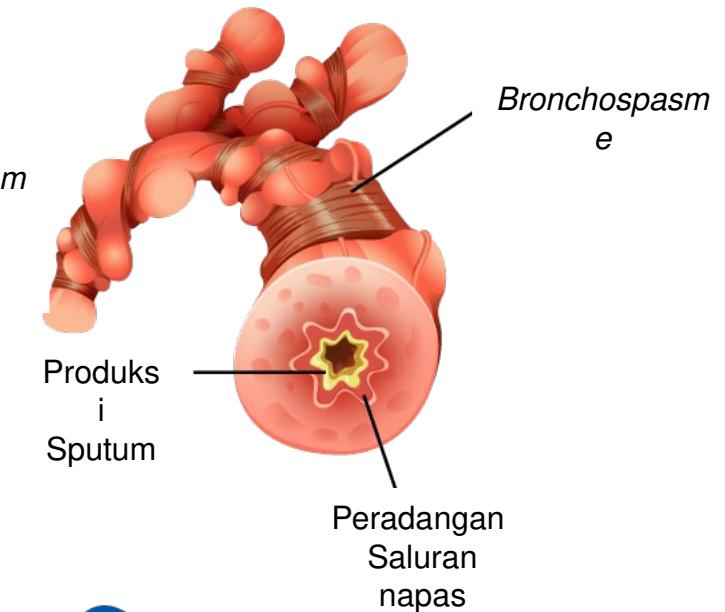
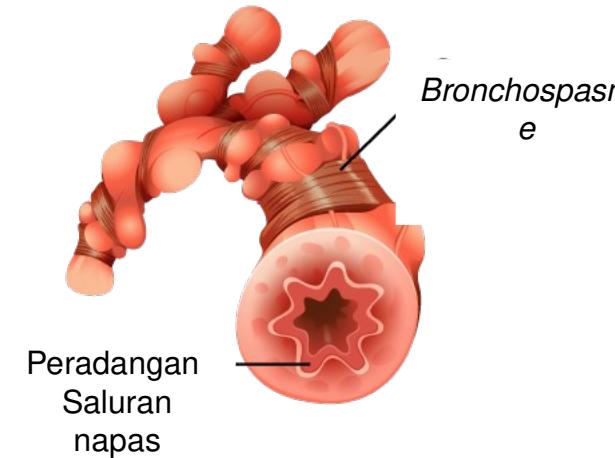
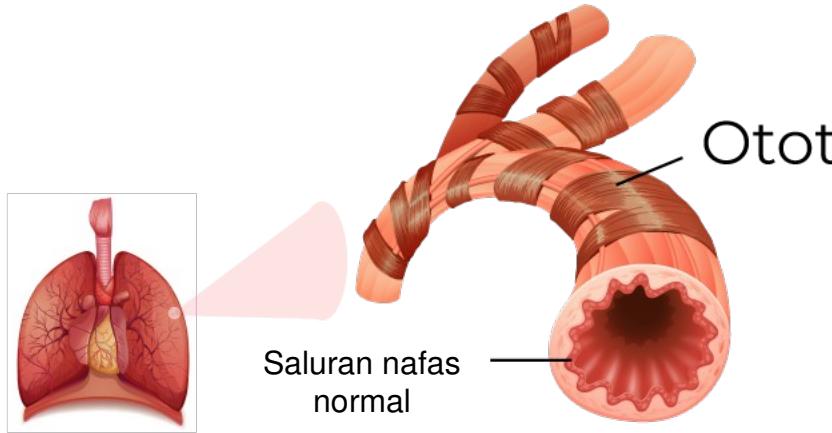


Prevalensi asma di Indonesia meningkat 0,5%

(KEMENKES RI, 2019)



Latar Belakang



Mendeteksi suara wheezing



Latar Belakang



Penggunaan stetoskop dalam diagnosis memiliki beberapa kelemahan seperti Hasil yang subjektif dan bergantung pada kepekaan pendengaran si pemeriksa



Ini disebabkan frekuensi wheezing berada pada rentang frekuensi suara pernapasan normal

Frekuensi pernapasan normal : 100 - 1000 Hz

Frekuensi wheezing : 250 - 800 Hz

Sehingga diperlukan perangkat mudah yang membantu menentukan suara wheezing



ESCAPED

Wheezing Sound for Asthma COPD Diagnose



Artificial
Intelligence

A medical professional wearing a white coat and a surgical mask is shown from the side and back. They are holding a stethoscope around their neck with one hand and a clipboard with the other. The background is a dark, out-of-focus image of a patient's face.

METODE PELAKSANAAN

METODE PELAKSANAAN





STUDI LITERATUR

File Edit Tools Help

CASE REPORT

Obstruksi Saluran Napas pada Non Small Carcinoma: Sebuah Laporan Kasus

Borries Foresto¹, Eric D Tenda², Cleopas M Rumende³

¹Departemen Ilmu Penyakit Dalam FKUI/RSCM
²Divisi Respirologi dan Perawatan Penyakit Kritis, Departemen Ilmu Penyakit Dalam FKUI/RSCM
³Divisi Alegi dan Imunologi, Departemen Ilmu Penyakit Dalam FKUI/RSCM

Global Health Metrics

Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019

GBD 2019 Diseases and Injuries Collaborators*

Lancet 2020; 396: 1204-22
his online publication has been corrected. The corrected version

Summary
Background In an era of shifting global agendas and expanded emphasis on non-communicable diseases and injuries along with communicable diseases, sound evidence on trends by cause at the national level is essential. The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) provides a systematic scientific assessment of published, heard during both inspiration and expiration. The more clearly heard than vesicular sounds during expiration. The sounds are high-pitched (higher than vesicular sounds), loud and tubular.

Tracheal sounds
These can be heard over the trachea, above the sternum, in the suprasternal notch and fall in a frequency range of 100-4,000 Hz [5, 9]. They are generated by turbulent airflow passing through the pharynx and glottis. These sounds are not filtered by the chest wall and thus provide more information.

Mouth sounds
Mouth sounds are described as falling in a frequency range of 200-2,000 Hz. They represent turbulent airflow below the glottis [5]. In the case of a healthy person, there should be no sound coming from the mouth during respiration.

Abnormal respiratory sounds
Abnormal breath sounds include the absence or reduced intensity of sounds where they should be heard or, by contrast, the presence of sounds where there should be none, as well as the presence of adventitious



PERANCANGAN HARDWARE



**Jetson Nano Developer
kit**

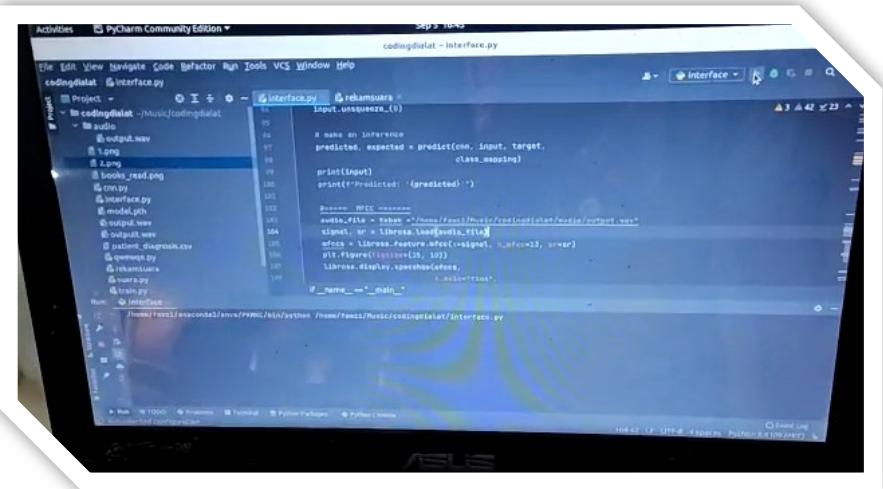


**Stetoskop elektronik
*head Littmann***





PERANCANGAN SOFTWARE & APLIKASI ANDROID



Sistem
Operasi



Bahasa
Pemrograman



Teks Editor



Audio Processing
(Pengolahan dan Visualisasi)



Deep Learning
(Klasifikasi dan Prediksi Audio)



PERANCANGAN SOFTWARE & APLIKASI ANDROID



Sistem
Operasi



Bahasa
Pemrograman



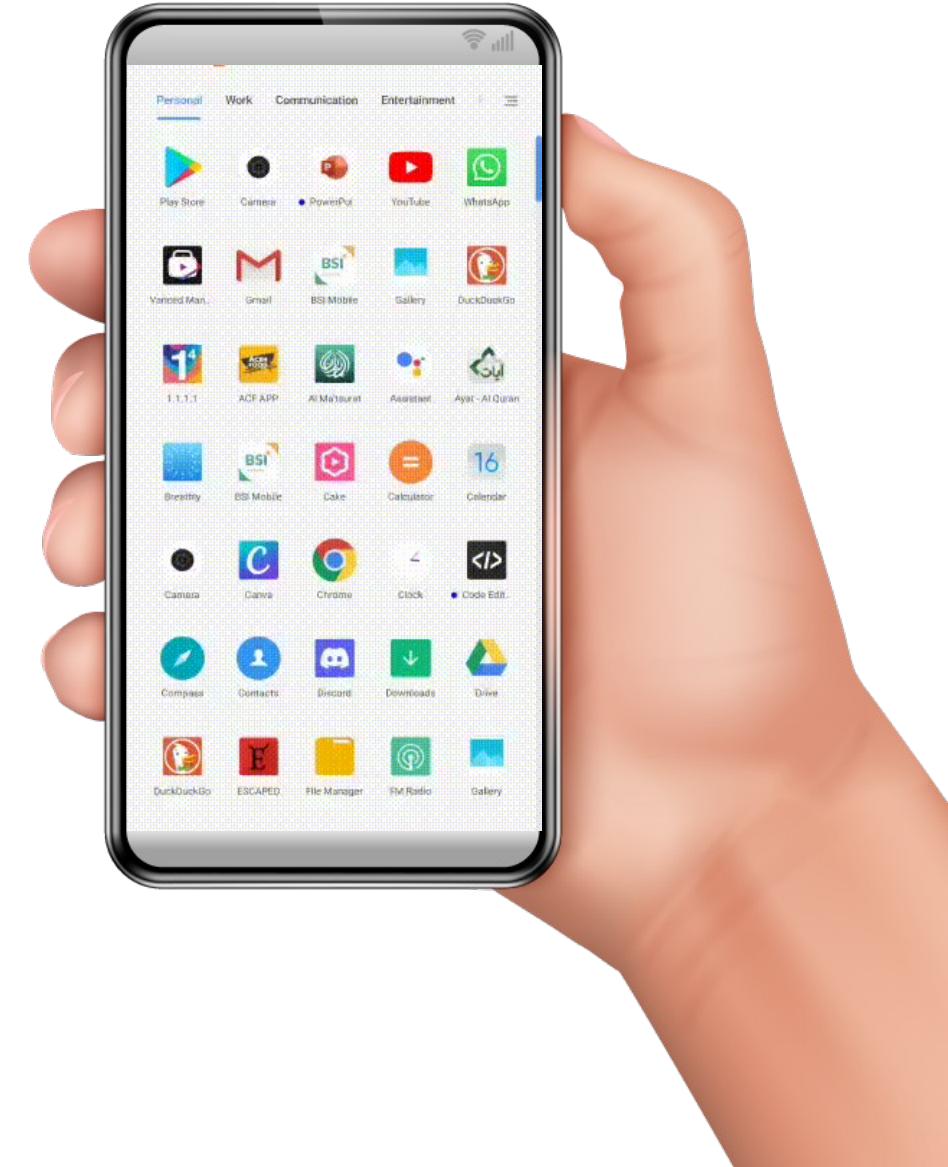
Teks Editor

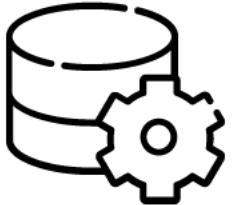


Mobile App
Framework

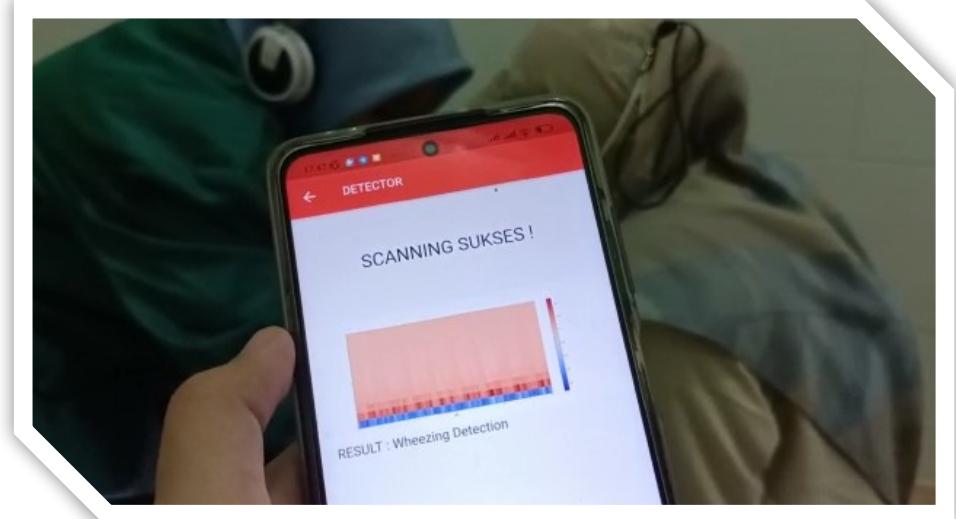
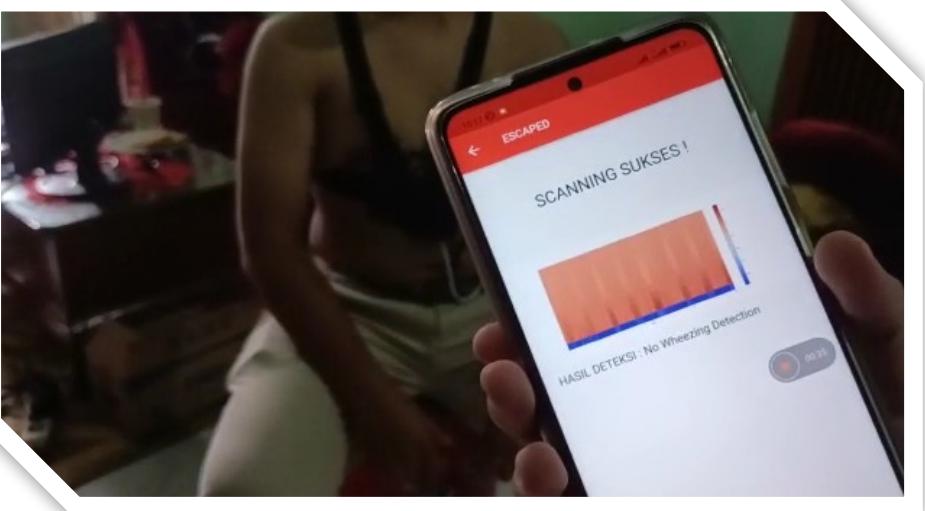


Storage and Realtime
Database





PENGUJIAN ESCAPED



Pengujian Terhadap Orang Normal

Pengujian Terhadap Penderita Asma/PPOK

Semua anggota kelompok sudah melakukan **vaksinasi** dan sebelum pengujian alat telah dilakukan **tes antigen** yang hasilnya **negatif**. Juga mematuhi protokol kesehatan.

A medical professional in a white coat and stethoscope is examining a patient's lungs with a stethoscope. The patient is lying down, and the doctor is focused on the examination. The background is a warm, reddish-orange color.

CARA KERJA ESCAPED

CARA KERJA ESCAPED

Tahapan Persiapan Program





CARA KERJA ESCAPED





CARA KERJA ESCAPED



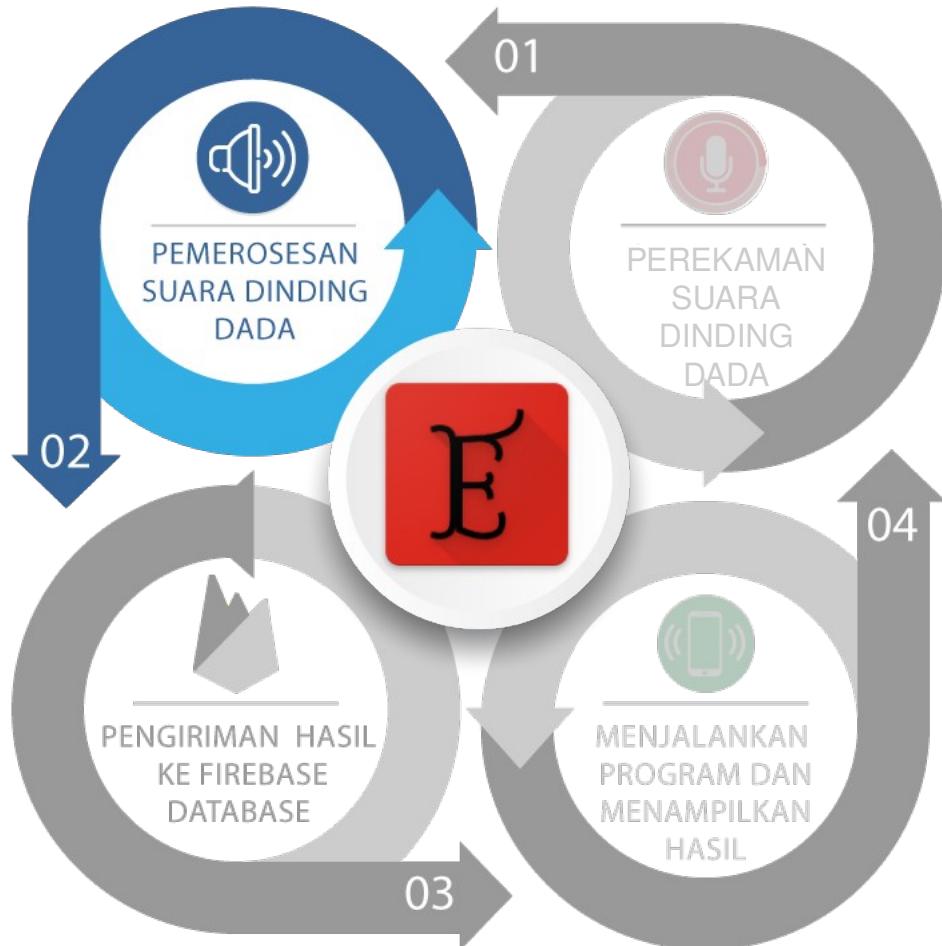
01

Perekaman Suara Dinding Dada

Suara direkam selama 20 detik



CARA KERJA ESCAPED

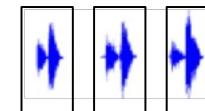


02

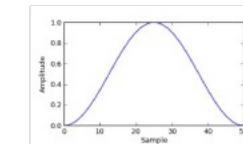
Pemerrosesan Suara Dinding Dada

Pemerrosesan Suara Dinding dada meliputi :

1. Framing

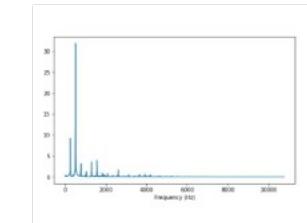


2. Windowing



$$w(k) = 0.5 \cdot (1 - \cos(\frac{2\pi k}{K-1})), k = 1 \dots K$$

3. Fourier Transform





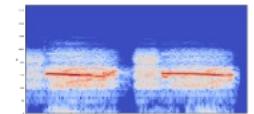
CARA KERJA ESCAPED



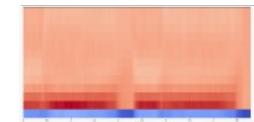
Pemerosesan Suara Dinding Dada

Pemerosesan Suara Dinding dada meliputi :

4. Extracting Spectrograms



5. Mel-Frequency Cepstral Coefficients (MFCC)

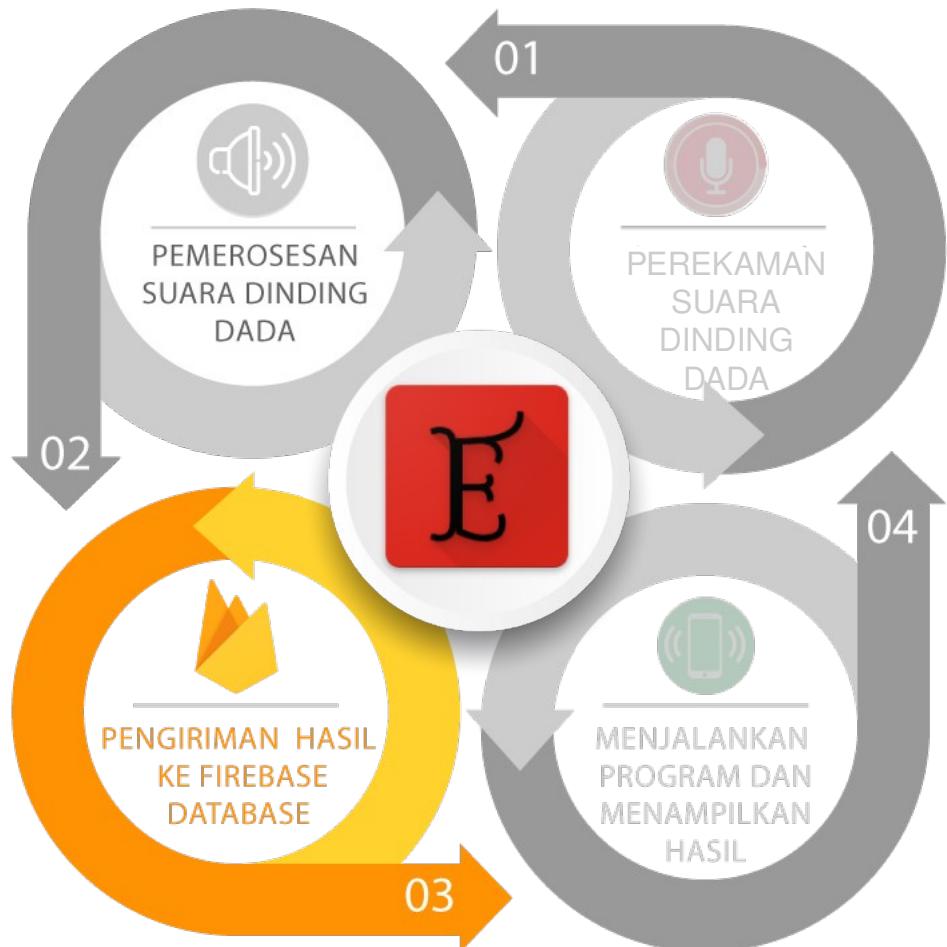


Deteksi Wheezing Melalui MFCC





CARA KERJA ESCAPED

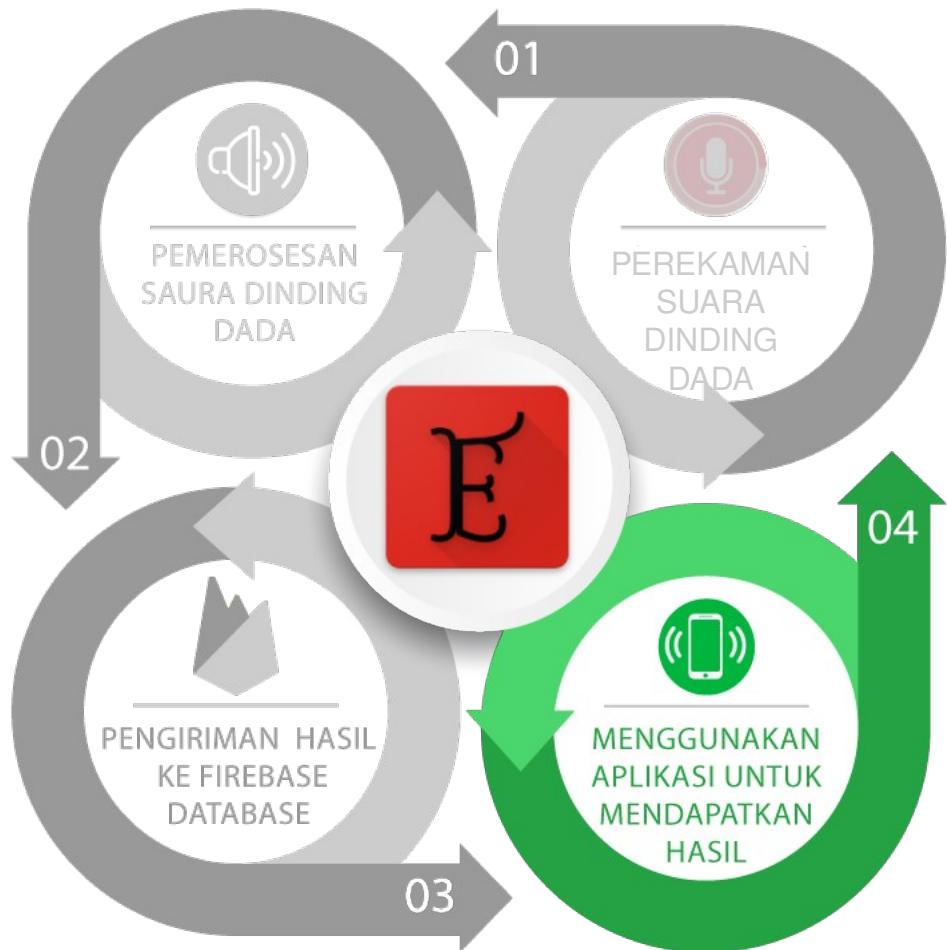


Firebase Sebagai Real time database :

Hasil Deteksi berupa suara dinding dada pasien, dalam bentuk MFCC yang di simpan dalam storage firebase, juga berupa string yang menyatakan pasien terdeteksi Wheezing atau tidak terdeteksi Wheezing.

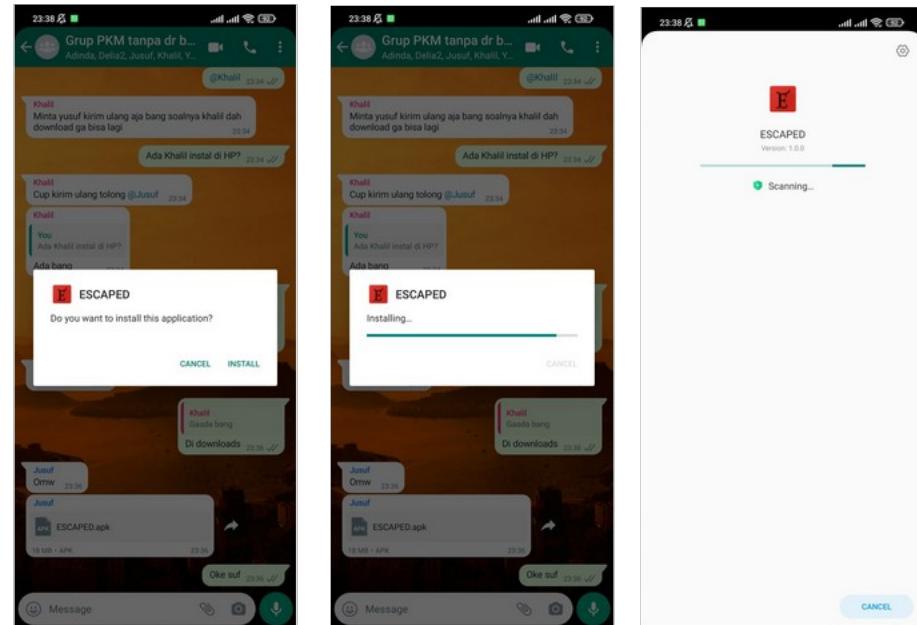


CARA KERJA ESCAPED



Menggunakan aplikasi untuk mendapatkan hasil

Langkah persiapan : melakukan instalasi aplikasi ESCAPED berbasis android





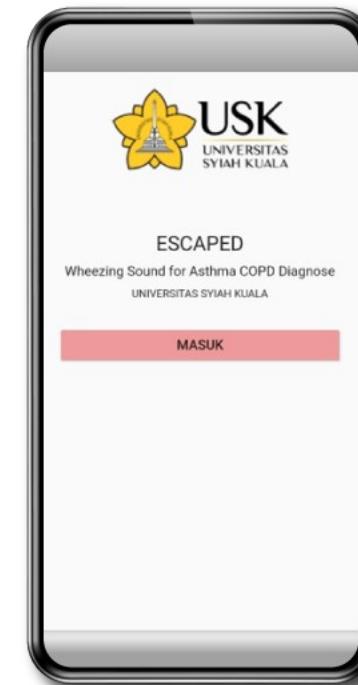
CARA KERJA ESCAPED



Menggunakan aplikasi untuk mendapatkan hasil

Berikut tampilan aplikasi ESCAPED

1. Tampilan Awal



CARA KERJA ESCAPED



04

Menggunakan aplikasi untuk mendapatkan hasil

Berikut tampilan aplikasi ESCAPED

2. Halaman Utama





CARA KERJA ESCAPED



Menggunakan aplikasi untuk mendapatkan hasil

Berikut tampilan aplikasi ESCAPED

3. Halaman Rekam Suara



Saat menekan tombol “**Rekam Suara**” pada halaman utama, maka Aplikasi akan mengirimkan perintah untuk merekam suara pada alat dan ini akan menunggu selama 20 detik. selanjutnya akan muncul perintah “**sukses**” dan dilanjutkan untuk melihat hasil dengan menekan tombol “**Lihat Hasil**”



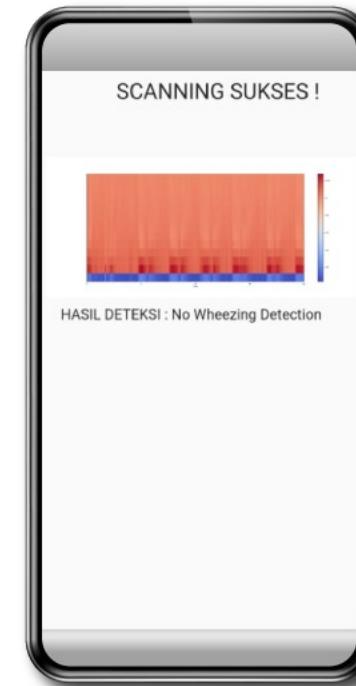
CARA KERJA ESCAPED



Menggunakan aplikasi untuk mendapatkan hasil

Berikut tampilan aplikasi ESCAPED

4. Halaman Hasil





KEUNGGULAN ESCAPED

KEUNGGULAN ESCAPED



1. *internet of things* (IoT)
2. Menentukan suara wheezing secara akurat
3. Portabel
4. Menghasilkan tampilan visualisasi suara
5. Efisiensi penggunaan yang tinggi

KEUNGGULAN ESCAPED



Article

Design of Wearable Breathing Sound Monitoring System for Real-Time Wheeze Detection

Shih-Hong Li ^{1,5}, Bor-Shing Lin ², Chen-Han Tsai ³, Cheng-Ta Yang ^{4,5} and Bor-Shyh Lin ^{3,*}

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² Department of Computer Science and Information Engineering, National Taipei University, New Taipei City 23741, Taiwan; bslin@mail.ntpu.edu.tw

³ Institute of Imaging and Biomedical Photonics, National Chiao Tung University, Tainan 71150, Taiwan; melon0511@hotmail.com

⁴ Department of Thoracic Medicine, Chang Gung Memorial Hospital at Taoyuan, Taoyuan 33378, Taiwan; yang1946@cgmh.org.tw

⁵ Department of Respiratory Therapy, College of Medicine, Chang Gung University, Taoyuan 33302, Taiwan
Correspondence: borshylin@mail.nctu.edu.tw; Tel.: +886-6-303-2121 (ext. 57835)

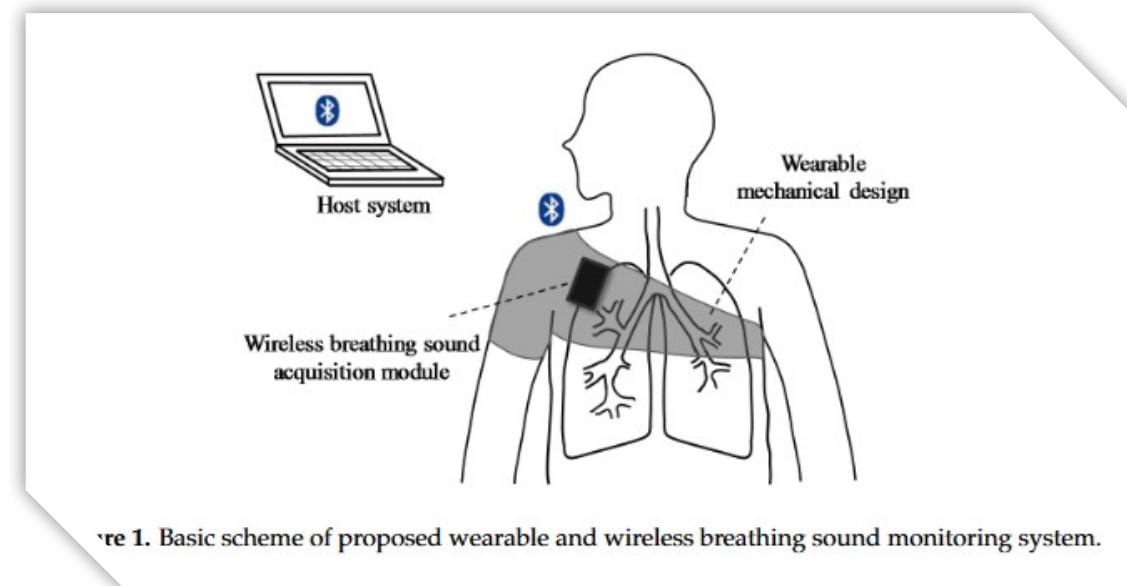
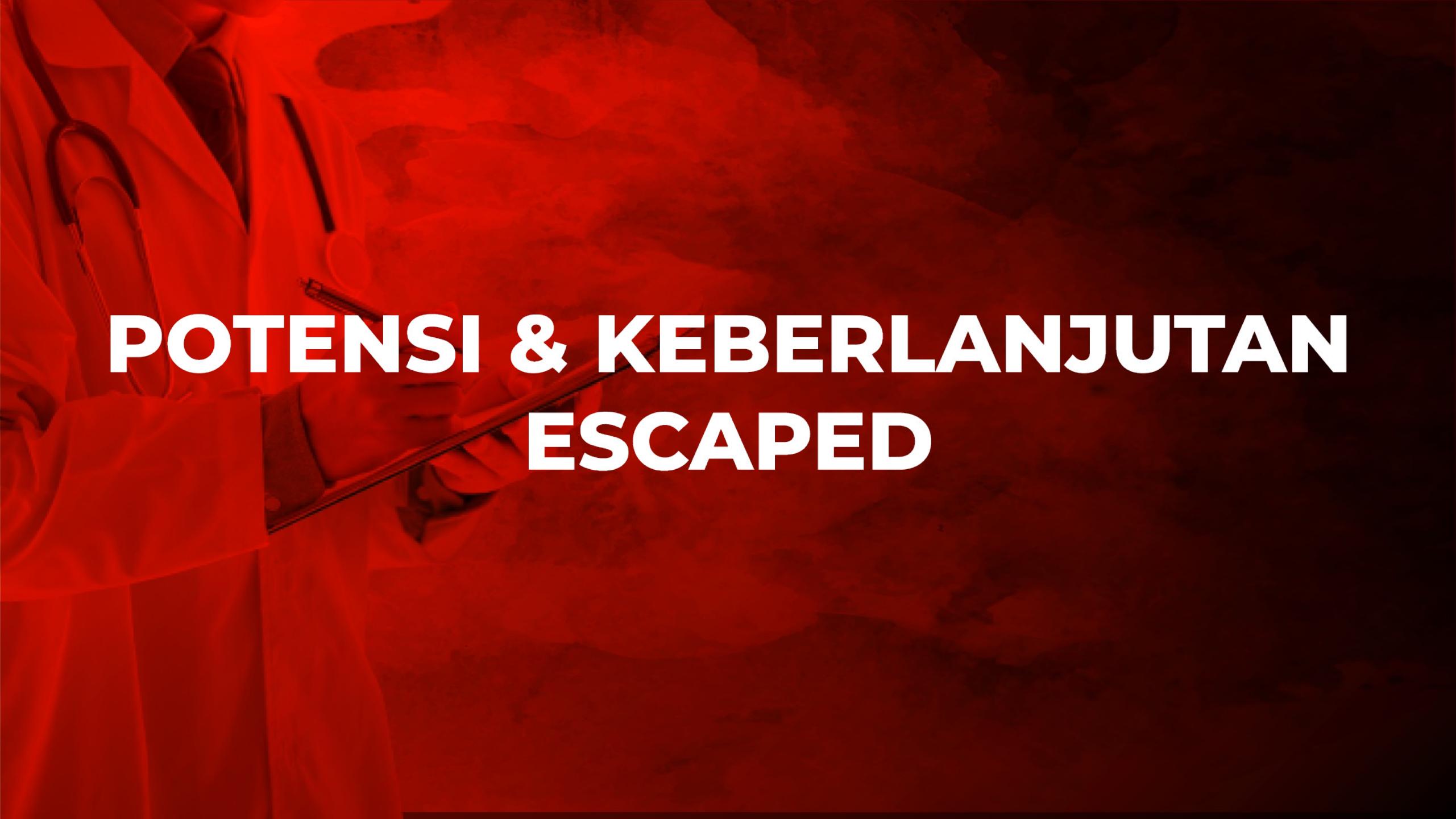


Figure 1. Basic scheme of proposed wearable and wireless breathing sound monitoring system.

Penelitian sebelumnya masih menggunakan sistem Bluetooth untuk mengirimkan sinyal suara, juga belum dapat mendeteksi langsung suara wheezing.

(Li, S. H., et al 2017)

A person wearing a red suit jacket and a white shirt with a dark tie is shown from the waist up. They are holding a pair of dark-rimmed glasses in their right hand, which is extended towards the camera. The background is a solid red color.

**POTENSI & KEBERLANJUTAN
ESCAPED**

POTENSI & KEBERLANJUTAN **ESCAPED**



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Program Studi Kebidanan
Fakultas Kedokteran, Universitas Sebelas Maret
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Telp/Fax: (0271) 662622

LETTER OF ACCEPTANCE (LoA)

Nomor: 68/PLACENTUM/IX/2021

Menyatakan bahwa artikel dengan judul :

**DESAIN DETEKTOR SUARA WHEEZING YANG TERINTEGRASI SECARA
REAL TIME DENGAN GADGET**

Nama Penulis : **Budi Yanti^{1*}, Fawzi Linggo², Khalilullah³, Delia Putri Sanur⁴, Adinda Zahra AR⁵, Muhammad Yusuf K⁶**

Institusi Asal : ^{1,3,4,5}Fakultas Kedokteran, Universitas Syiah Kuala, Indonesia
²Fakultas Teknik Elektro, Universitas Syiah Kuala, Indonesia
⁶Fakultas Teknik Komputer, Universitas Syiah Kuala, Indonesia



HAK CIPTA DAN KOMERSIAL

**PUBLIKASI JURNAL
ILMIAH**

POTENSI & KEBERLANJUTAN ESCAPED

The screenshot shows a news article on the Portalsatu website. The title is "Escaped: Detektor Suara Napas untuk Memeriksa Pasien PPOK dan Asma". It features a "MEET OUR TEAM" section with three team members: Dr. dr. Budi Yanti, Sp.P (K), Ketua Khalilah Pendidikan Dokter, and Anggota 1 Della Putri Sanur Pendidikan Dokter. Below the article are several other news snippets.

The screenshot shows a news article on the Serambinews.com website. The title is "Mahasiswa USK Ciptakan Alat Detektor untuk Menentukan Suara Napas Penderita Penyakit Paru dan Asma". It includes a "MEET OUR TEAM" section with the same three team members as the previous article. To the right, there is an advertisement for "Shampo Dari Bahan Alami - BPOM" featuring a bottle of shampoo and some ingredients.

Publikasi di Beberapa Media

The screenshot shows a news article on the DETaK website. The title is "Tim PKM-KC USK Ciptakan Alat Detektor ESCAPED untuk Pasien PPOK dan Asma". It includes a "MEET OUR TEAM" section with the same three team members. At the bottom, there is a logo for Universitas Syiah Kuala (USK).

The screenshot shows a news article on the USK website. The title is "MAHASISWA USK CIPTAKAN ALAT DETEKTOR PENYAKIT PARU OBSTRUKSI KRONIS". It includes a "MEET OUR TEAM" section with the same three team members. On the right side, there is a sidebar titled "BERITA LAINNYA" listing various other news items.

POTENSI & KEBERLANJUTAN **ESCAPED**



Tahun
2021
Pembuatan
Alat, Uji Alat

Tahun
2022
Pengujian
Alat kepada
Pasien

Tahun
2023
Produksi Alat,
Rancangan &
pembuatan
Start Up





KESIMPULAN



KESIMPULAN



ESCAPED (*Wheezing Sound for Asthma COPD Diagnose*) merupakan sebuah alat detektor wheezing. Alat ini sudah terintegrasi dengan gadget, berbasis IoT dan dapat langsung menunjukkan hasil wheezing atau tidak. ESCAPED juga dapat membantu penegakan diagnosis pada penyakit obstruksi saluran napas seperti PPOK/asma

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- [2]
[Assessing national capacity for the prevention and control of noncommunicable diseases: report of the 2019 global survey.](#) Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO
- [3]
[Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019](#). *Lancet*. 2020;396(10258):1204-22.
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PERAN TIM

Dr. dr. Budi Yanti, Sp.P (K)

Sebagai motivator dan supervisor dalam proses perancangan, perakitan dan pengujian alat serta pembuatan artikel ilmiah dan hak paten



Khalilullah

- Pencarian Literatur terkait Asma / PPOK
- Perancangan Desain Alat
- Pendeklegasian tugas
- Koordinator Anggota

Adinda Zahra AR

- Pencarian Literatur terkait *Wheezing*
- Pengumpulan Data Suara Pernapasan
- Melakukan pengelompokan Suara
- Animator



M. Yusuf Kardawi

- Perancangan aplikasi ESCAPED
- pengembangan aplikasi ESCAPED
- Desain UI/UX
- Desain poster

Fawzi Linggo

- Perancangan & Pengembangan Algoritma *Deep Learning*
- Perancangan & Pengembangan Algoritma Pengolahan Suara
- Integrasi database



Delia Putri Sanur

- Pencarian Literatur terkait *Audio Processing*
- Pengujian alat pada Pasien
- Membuat Laporan, artikel dan pengajuan Hak Paten





TERIMAKASIH