DiGiSkop
Remote Monitor For The Heart

SDN
SensorDrops Networks

INNOVATION
FOR THE FUTURE CONNECT

> ENHANCED FUNCTIONALITY & AUTONOMOUS

> SMART ARCHITECTURE & EASILY INTEGRABLE

> HIGHLY PORTABLE & RAPIDLY DEPLOYABLE

#CONNECTIVITY FOR CONTINUITY

MISSION

To provide ubiquitous remote health monitoring and reduce the emergency response time. To enable easy availability of health professionals and their communication with the patients. Real-time remote monitoring of health parameters. Flexible access to analytics and services

OBJECTIVES OVER THE NEXT 4 MONTHS

Product: Make multiple prototype and use for system validation
Development: Organize health campaigns, encourage volunteers and collect data to validate the system's analytics. Testing and feasibility study of the system.

People: Acquire human resources to diversify the company with smart innovative team while solving real-life problems and penetrate the market.

Planning: The preliminary business plan is discussed in the following pages. The aim is to introduce the company and its product in the market and build a customer base.

Finance: Attract venture capital investments as per the estimations to enable company operations, carry out the production and resource expenses.

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SYSTEM

In this work, we plan to develop a digitized stethoscope DigiSkop (DS), to address a patient's preliminary examination of auscultation sounds. It records a patient's heart beats for some time (10 secs or 60 secs depending on need), analyses the recorded sounds, and generates a report that states the number of beats captured. DS has two modes of operation, namely, online and offline. In the case of online mode, DS transfers the data to a remote server over the network, which can be accessed by concerned doctors whenever needed. In case of emergencies, the DS system informs the doctor about the anomaly in the patient's vitals.

HARDWARE

DS consists of an organic light-emitting diode (OLED) display, a processing board, an auxiliary cable connected to a stethoscope diaphragm, and two buttons for mode shift. The OLED display is a 128 by 64-pixel resolution screen that supports basic fonts and photographic pictures. The processing board is capable of connecting to the network. This network connection enables the DS to send data to a remote server for further analysis. The auxiliary cable and the diaphragm enable the whole setup to record and analyze high-frequency sounds of the patient's organ's vibrations from the body surface.

SOFTWARE

The processing board operates on an open-source operating system (OS) and projects. Further, for implementing our ideas, we use the "Python compiler," which is developed under an OSI-approved open source license, making it freely usable and distributable.

SUMMARY OF KEY COMPETITIVE ADVANTAGES

- Real time audio/data collection.
- Sending data to distant doctors instantaneously.
- Remote monitoring.
- Digitization of heart beats.
- Count number of beats.
- Notification in case of any emergency.
- Energy efficient on demand monitoring.
- Mobility support.

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SMARKET: DIGISKOP (DS)

We aim to address basic societal needs through integrated IoT-based sensing, monitoring, and control solutions. With DS, we are focussing on the medicare sectors for providing IoT-based sensing and monitoring of various field-related parameters by individually addressing the specific challenges.

Cardiovascular Diseases are a cause of major concern in India as well as abroad. During preliminary clinical examination, the most common way to detect the condition of an ailing heart non-invasively is by listening to auscultation sounds. The vibrations of the organs from the body surface have a frequency of 20-20,000 Hz, which is not accurately captured by the human ear. However, due to human error, some of the sounds might not be inferred accurately, which may lead to fatal outcomes. Existing digital stethoscopes only record, filter, and send the acquired sounds to remote locations. DS, on the other hand, generates a report based on the recorded auscultation sounds at a low cost. It also sends the recorded data to the concerned doctor for reviewing later on. In case of an emergency, the doctor will get notified of the anomaly such that he can attend to the patient's needs at the earliest.

We plan to address the issues mentioned above of the society and launch DS as a product. DS will be beneficial for rural as well as urban underprivileged people who cannot get access to basic medical services. It can also serve people who have to maintain a busy schedule and cannot find coordinated time with their concerned doctors. DS also helps in reducing the patient-doctor dependency.

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SUMMARY OF MARKETING APPROACH:

PHASE I: CREATE AND INCREASE THE VISIBILITY OF THE PRODUCT IN THE MARKET

1. Organize camps in rural areas for free health checkups
2. Provide demo versions in hospitals,
   clinics, oldage homes for usages.
3. Encourage them to give feedbacks

PHASE II: START GENERATING REVENUE

1. Supply more product units to the customers built in phase I
2. Charge weekly/monthly/yearly subscription-based rentals
3. Roll out offers to keep user engagement

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COMPETITORS:

To the best of our knowledge, if not smart, there are digital stethoscopes existing in the market. Some of the leading ones in this field are:

- Eko Stethoscope
- 3M Littmann Electronic Stethoscope
- Thinklabs One Digital Stethoscope

Eko Stethoscope digitizes the analog sound waves and helps in increasing or decreasing the volume for better hearing. It also has the provision of viewing the signal on a smart phone.

3M Littmann Electronic Stethoscope has a display along with control buttons attached on top of the diaphragm. It can record and store the auscultation sounds. These recorded sounds can then be send to a separate device via an inbuilt Bluetooth.

Thinklabs One Digital Stethoscope is a small compact palm sized device that can record auscultation sounds with varying frequency ranges and volume. These recordings can then be sent to remote locations over the network through some other peripheral device.

SYSTHESIS

These stethoscopes are more doctor/physician-centric as they only amplify the captured auscultation sounds, replay, and store them at remote locations. Our proposed stethoscope is smart as it analyses the data and generates a report for the patients instantaneously. DS is cheap and can be made readily available for the common mass.

PATENTS AND OTHER RIGHTS

No patents have been filed yet for the system. We use off-the-self sensors available in the market. The internal codes, software and processor boards used are open source and license-free to use.

CURRENT TEAM

1. Mr. Anandarup Mukherjee: Co-Founder, Director, SDN. Currently a PhD Research Scholar and Senior research fellow at IIT Kharagpur, India.

2. Mr. Arijit Roy: Co-Founder, Director, SDN. Currently a PhD research scholar and CSIR fellow at IIT Kharagpur, India.

3. Dr. Sudip Misra: Co-Founder, Director, SDN. Currently a Professor in the Dept. of Computer Science Engineering at IIT Kharagpur, India.

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CURRENT TEAM

1. Nidhi Pathak: Product developer. Currently an MS research scholar at IIT Kharagpur, India

2. Saswati Pal: Product developer. Currently a PhD research scholar at IIT Kharagpur, India.

3. Pallav Deb: Product developer. Currently a PhD research scholar at IIT Kharagpur, India.

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CAPPENDIX 2: SYSTEM ARCHITECTURE & CURRENT TRACTION
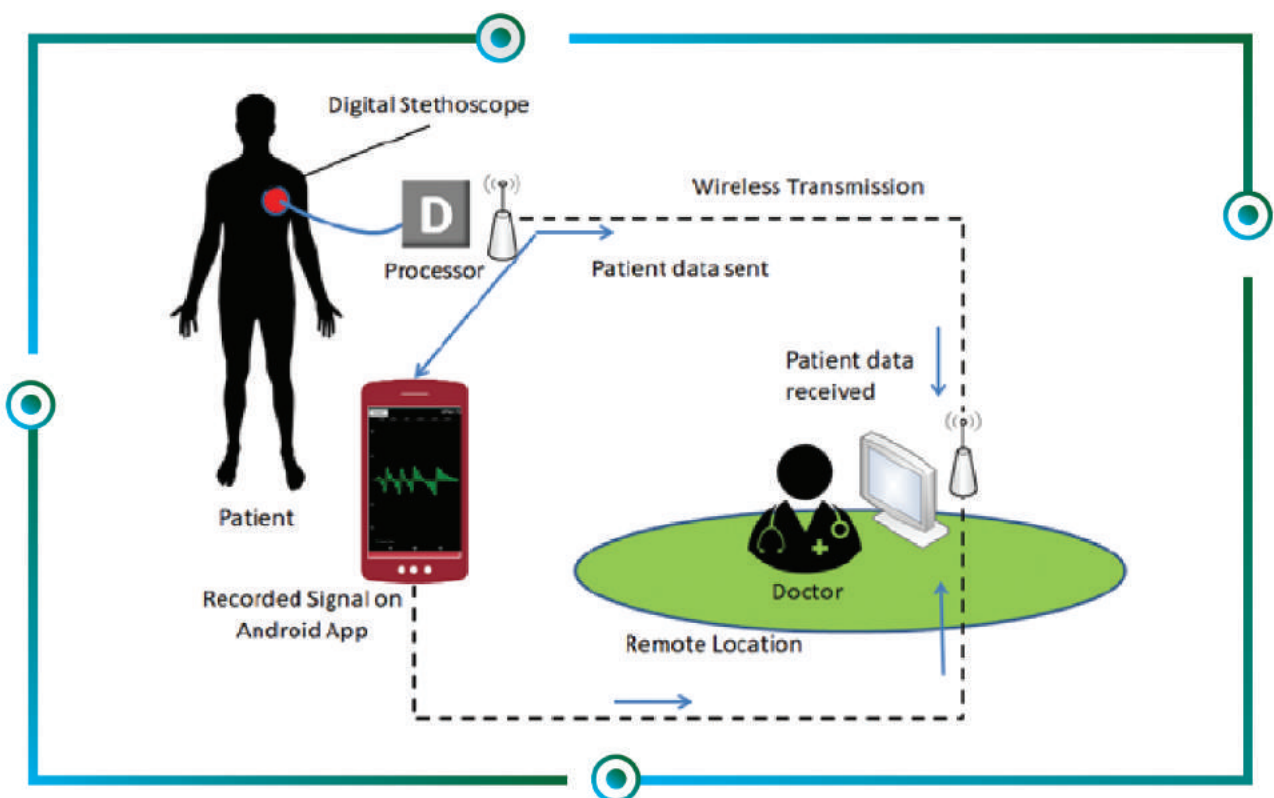
# CAPPENDIX 2: SYSTEM ARCHITECTURE & CURRENT TRACTION

FACTSHEET

ADDRESSING THE NEEDS OF THE SOCIETY USING WIRELESSLY NETWORKED INNOVATIONS IN COMPUTING.

SALIENT FEATURES

- REAL TIME AUDIO/DATA COLLECTION.

- SENDING DATA TO DISTANT DOCTORS INSTANTANEOUSLY.

- REMOTE MONITORING.

- DIGITIZATION OF HEART BEATS.

- COUNT NUMBER OF BEATS.

- NOTIFICATION IN CASE OF ANY EMERGENCY.

- ENERGY EFFICIENT ON DEMAND MONITORING.

- MOBILITY SUPPORT.

- ANDROID APP

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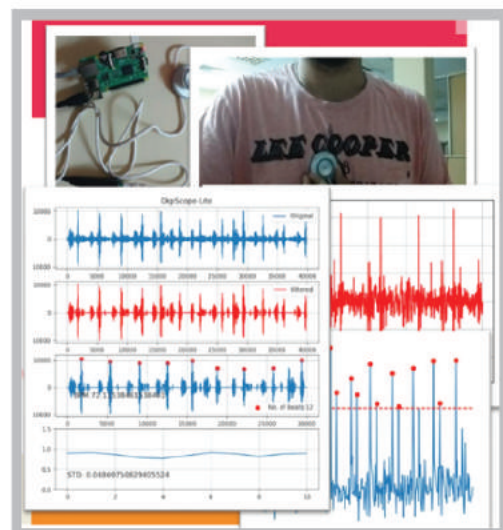
SENSORDROPS NETWORKS PVT. LTD.

We plan to address basic societal needs by means of integrated IoT-based sensing, monitoring, and control solutions. Initially we are focusing on the medicare and the power sectors for providing IoT-based sensing and monitoring of various field-related parameters by individually addressing the challenges specific to both of these domains. As both of these domains are clearly gaining momentum not only in India but world-over, in terms of the use of connected and automated solutions, we have identified multiple challenges and opportunities in which our company can step-in to provide economical and sustainable solutions for specific challenges, which are yet to be addressed in these technological realms.

STRIVING FOR SOCEITALLY IMPACTFUL SOLUTIONS FROM OUR RESEARCH

DigiScope-Lite is a robust and easily integrable smart intelligent solution. DigiScope-Lite enables real time data collection of patients and sending it to the concerned doctors instantaneously. It also counts the number of beats and notifies of any vital information.company can step-in to provide economical and sustainable solutions for specific challenges, which are yet to be addressed in these technological realms.

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WHY DIGISCOPE-LITE?

- PORTABLE & DIGITAL.

- ENABLES VISUALIZATION OF HEART SOUNDS.

- ENABLES REMOTE VISUALIZATION OF PATIENT FROM ANYWHERE IN THE WORLD.

- CHEAPER THAN AVAILABLE SOLUTIONS

DigiScope-Lite entails the patient to be equipped with the digitized stethoscope that is backed by a device having some form of cellular connection (A processor Board in our case and the concerned doctor needs to have the receiver and a screen attached to it. DigiScope-Lite records the patient's heart beat for 10 seconds and then sends it to the doctor where the data is displayed and any important information is notified automatically

SYSTEM REQUIREMENTS

- Stethoscope
- Processor Board
- Wireless Connection
- Remote monitor System

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