



AerobON Breathe on with AerobON

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Abstract—In this era, a smartphone is all you need to save a life. We have developed a product that promises to bridge the gap between health and technology, making life simpler. AerobON is a practical add-on to the medical asthma kit. It is a two-tier system -- a mobile application (Android, Windows & IOS platform) and a device (Microcontroller, Bluetooth & battery). When in sync, features like find device, panic button, peak flow meter, puff counter, etc. are available. It's a one-of-a-kind-product design that aims to minimize the risk of asthma.

Keywords—Asthma, apps, microcontroller, smartphone, cloud server

I. INTRODUCTION

WHO (World Health Organization) estimates 300 million individuals have asthma worldwide including millions in India; a figure that could rise to 400 million by 2025. It is third major cause of emergency room visits. 90% of these deaths occur because of

- a. Delay in obtaining help
- b. Poor adherence to asthma medication
- c. Non-availability of inhaler at the time of need

The present methodology of treatment for asthma patients is through simple inhalers. Also there are certain smartphone applications like MY ASTHMA available in markets which are creating awareness among the people regarding asthma. But till today there is no combination of hardware and software technologies available for asthma patient about severity of their asthma, track their symptoms and progress, and motivating them to follow proper medication schedule which is the biggest issue among asthma patients.

II. CONSTRUCTION

Device + Blueterm = AerobON



Fig. 1 AerobON Device

A. Device

Arduino BT is a microcontroller board based on ATmega 328 & Bluetooth module. It has 14 digital input or output pin. It supports wireless serial connection.

B. Software Platform

Blueterm is an Android terminal emulator app. It connects Arduino BT and the mobile. It is a two way communication based on zero's & one's. Also we can use BLEND and some more software for graphic designing. The backend data storage is running on Cloud which stores all the smartphone data and updates automatically whenever user is connected to Wi-Fi or by his mobile data.

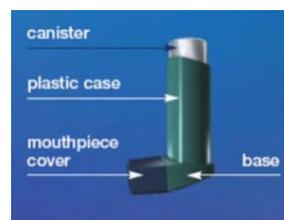


Fig. 2 Structure of inhaler



Fig. 3 Software platform

III. FEATURES

A. Medication reminder

With a medication reminder built-in the app, a patient can never forget to take his/her medication. The medicine schedule can be easily be modified through the Patient Details tab in the App.

B. Out of range alarm

The device is connected with the Smartphone application via dual mode BLE (Bluetooth low energy). As soon as the device goes out of the Bluetooth range, both the Phone as well as the device give out an alarm so that the patient immediately knows that he has forgotten his Inhaler. This

feature comes as a USP of the product, as many people forget their inhalers because of their busy work schedule.



C. Find device button

The "Find Device" button is used in cases when the patient is unable to find his Inhaler. Clicking on the Find Device Button in the Smartphone application triggers a loud alarm in the AerobON Device so that the patient can find his inhaler in time.

D. Puff counter

The puff counter in the Smartphone application automatically provides live updates of the number of puffs left in the medicine cartridge. Also the patient can set the

threshold level for the number of puffs below which the App gives an alert to the patient to replace the cartridge. This is essential because if the patient runs out of medicine in case of an attack, it may even lead to the patient's death.

E. Usage statistics

The device uploads puffs usage data (usage time and location) to the server after regular intervals. This data can help Government Organizations and other agencies working to prevent the respiratory diseases to get valuable clues about environmental exposures that may cause attacks. Thus, these areas can be focused on and the environmental problems can be tackled to help prevent future ailments.

F. Expiry date alerts

The Expiry Date Alert provides the user with a notification that his medicine cartridge has expired. This feature helps prevent the cases when a patient accidentally ingests an expired dosage which may increase the problem. So with our application the Expiry Date of the Medicine can be entered into the Patient Details Tab when a new cartridge is loaded in the app and such types of incidences can be avoided.

G. Deep breathing exercises

The app consist of deep breathing exercise session timed from 5 minutes to 60 minutes, it's easy to use by just follow voice instructions and these exercise will ensure your anxiety reducing, stress relieving, hypertension management, and daily use of this app can help manage high blood pressure ultimately all these factors will help patient to achieve controlled asthma. This feature is especially useful for people who are more susceptible to panicking in case of an Asthma attack.

H. Panic button

"PANIC BUTTON" feature is present in both the device and the Application. The phone application sends an alert to the telephony server which generates automated call and text message to the nearby hospital as well as to the patient's predefined relatives and family members. The "Panic Button" in the hardware device is essential because during an attack the patient is not able to easily operate the Smartphone.

I. Share your health

With the patient history being monitored on the timely basis, the past history is made portable as it is saved in the

Azure supported backend database. If the patients change their doctors or if doctors need timely reports, this facility can be made useful. Also, this feature reduces paper work..

IV. ARCHITECTURE



Fig. 4 Architecture

V. CONCLUSION

In a world where technology has rooted its seed deep within the society, AerobON may not be the only solution but an innovation especially for the asthmatics to lead a normal and healthy life.

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