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SHRI RAMDEOBABA COLLEGE OF ENGINEERING & MANAGEMENT NAGPUR MAHARASHTRA

**Name of the students in the Team :**

* Huzefa Essaji
* Chandrakant Mohadikar
* Vivek Kaushik
* Parth Bhalerao

**Topic Name of Idea :**

Development of Point of Care Device for measurement and analysis of vital parameters.

**Briefly explain your idea (not more than 100 words) :**

**Technical –**

* The Point of Care Device is centred around a dedicated micro processor which will be able to acquire the Analog signals , convert them into Digital data and through use of the algorithm and AI process the same to give digital outputs as per the medical templates required. Since the microprocessor and other components are mass produced the reliability and repeatability in the devices is assured.

**Clinical –**

* The Point of care Device will be able to deliver clinical outcome at minimum cost as compared to standard medical test procedures. Also it will be very safe and simple to use by the patients , thereby increasing the adaptability and usability by the patients. This is a non invasive type of device which will not cause any pain or discomfort to the patient and hence more acceptable. Once the proof of concept is established on a limited set of human beings, this will lay the ground for a clinical trail on a larger set of human beings. This will also be a requirement by the regulatory body.

**Please explain how your idea is unique / new or inventive. If it is an improvement over existing solution, please provide reference / details of the existing solution and improvements over it :**

* Availability of key human parameters located remotely, to a trained medical professional can result in early diagnosis and prognosis of a patient leading to better healthcare and thereby reducing patient load in the Government hospitals. However the testing of these key parameters require sophisticated equipments and trained manpower which require heavy investment. As a result these are not available in remote locations, consequently the poor and needy patients have to spend money to come to the city hospitals for further treatment.
* Also due to the lockdowns and the epidemic, even urban citizens faced a crisis in connecting with their Doctors for medical advice and treatment. Here a point of care device which can measure basic but vital parameters of human body can be very well utilized to diagnose and provide line of treatment by the Doctors and Trained Medical Professionals
* Uniqueness: Even though telemedicine is being practiced on a large scale in India, still there is no method to measure the basic vital human parameters unless a sophisticated hi-tech medical equipment is put to use. There is also challenge of availability of trained manpower to handle such devices.

Many companies in the Telemedicine vertical, provide only software based tele-consultation with the panel of expert Doctors. Other companies have complex point of care devices with multiple sensors for multiple parameters thus requiring a trained manpower to handle the entire kit. Also the entire setup becomes quite complicated and time consuming, negating the purpose of telemedicine.

Here our POC will be very simple, easy to use and very economic as compared to market competitors.

**Please explain the impact of the problem your idea is addressing and what is the impact of this on society and environment :**

*Using the point of care devices will bring value to the following chain of users :*

* **Patients :** With onslaught of Covid , patients are increasingly being used to virtual consulting with their Doctors. This has developed a sense of convenience to receive routine care to be sought as per their schedule , at their door step , using the Point of Care Diagnostic Device.

Digital Health Option using this point of care device will provide an end to the expenses on the travel and logistics for the patients to get basic healthcare, thus reducing the pollution and load on the roads/rails.

Availability of Digital records provides the patients an alternative, or a choice of taking a 2nd opinion from any other Specialist Doctor just by showing the test reports available.

Preventive Diagnosis can lead to better planning and treatment of the patients before advent of any major ailment.

* **Doctors :** With this POC Device at the patient door step , the Doctors can easily evaluate the medical conditions of the Patients. Any routine corrective measure can be addressed on the spot. Thus he can immediately provide relief to his patient situated remotely as well as increase his number of consultation done daily without any additional efforts .
* **The Health Department GOI :** With the launch of the ambitious NDHM, it is pertinent to on-board the citizens for the Digital Health Card. Using this POC, not only can the citizens be registered but also their basic vital parameters can be recorded for future use.

Based on the digital medical data available , deficiency or any particular ailment in a specific region can be identified and corrective measures easily taken

Using the POC Device, the cost of offering medical health services to the Indian citizens can be significantly lowered as common diseases, non-serious ailments can be easily addressed virtually by the Senior Consultants from Government Hospitals

So, based on the Test results delivered virtually by the POC Device to the Senior Doctors , instant decision can be taken whether to shift the patient to tertiary or main Government Hospital for immediate treatment. Thus quality of healthcare delivery services improves a lot , leading to reduced mortality and satisfied citizens in the upcountry.

**Please explain how your solution is partially or completely solving the problem. Discuss if any technology limitation or bottlenecks to implement the solution :**

Development of hardware including bio sensors to analyse and interpret the human data available, using transducers and other components as needed. Development of a software solution including an interface which will be able to collate the data and display the output in the required international formats/ approved data charts.

Development of a UI whereby the Doctors can examine the Patients remotely using this device and perform their diagnosis and later prescribe probable remedy, medicines etc.

**Whether your idea - proof of concept (POC) can be implemented in  8 Weeks ? Please provide the list of tools required for the POC from the below available resources (*For more details of resources:***[***https://community.arm.com/designing-and-modelling-of-iot-ai-ml-systems/p/the-inventors-challenge-----***](https://community.arm.com/designing-and-modelling-of-iot-ai-ml-systems/p/the-inventors-challenge-----)***> Shipment of prototyping kits from STMicroelectronics------->Details of Development kits*)**

**Please provide the link to access your supporting document.(For more details,** [**https://www.wikihow.com/Make-a-Google-Doc-Public**](https://www.wikihow.com/Make-a-Google-Doc-Public)**). The supporting document needs to be a single document in pdf format in the following order for idea  
  
1. Idea Introduction   
2. Block Diagram   
3. Hardware details   
4. Process flow chart   
5. Any other additonal details   
6. Approx Bill of Material (BOM) (Optional)   
7. Authorization Letter from institute (Format can be downloaded from** [**https://community.arm.com/designing-and-modelling-of-iot-ai-ml-systems/p/the-inventors-challenge**](https://community.arm.com/designing-and-modelling-of-iot-ai-ml-systems/p/the-inventors-challenge)**----> Idea Submission)**

**Authorization letter for participation in “The Inventors Challenge 2022”**

**To whom so ever it may concern**

Subject: Authorization of Participants for “The Inventors Challenge 2022” jointly organized by All India Council for Technical Education (AICTE), Arm Education and ST Microelectronics.

I hereby certify/authorize that the below listed faculty and students are enrolled in our institution Shri Ramdeobaba College of Engineering and Management Nagpur Maharashtra.

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| --- | --- | --- | --- |
| Name of the Faculty | Designation | E-mail | Department |
| 1. Dr Deepak Khushlani | Associate Professor | khushalanidg@rknec.edu | E&C |

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***Name of the idea:***

Development of Point of Care Device for measurement and analysis of vital parameters.

***Abstract of the Idea:***

HoD EC Name : Dr. Dipak .J. Dahigaonkar

HoD EC Signature:

Institute Seal

Date: