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RESEARCH ARTICLE

PERSONAL HEALTH-CARE SYSTEM.

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Abstract

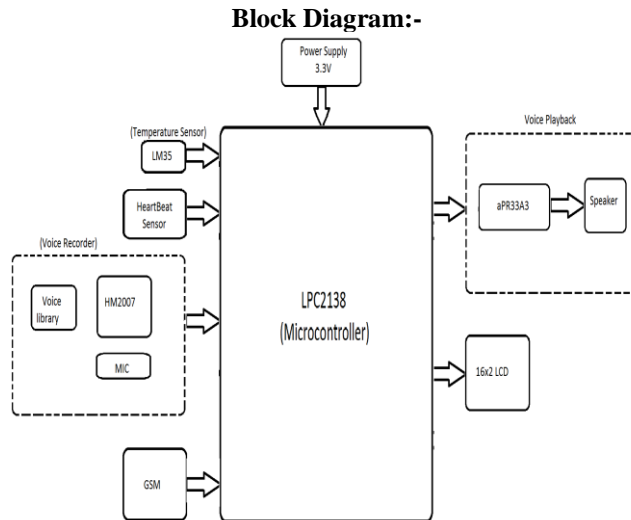
This document gives an overview about how “Personal Healthcare System” can extend a professional advice on what you might find useful to treat your illness. Following proper instructions and the medicine prescribed by the system may temporarily or permanently cure you. You may also consult your doctor if the illness persists or becomes more severe. “Personal Healthcare System” offers professional and free health advice at any time – you don’t need an appointment. From coughs and colds to aches and pains, it can give you expert help on everyday illnesses. Since there is no restriction for gender, you can talk in confidence. It may suggest you to visit your GP (General Practitioner) for more serious symptoms

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Introduction:-

The use of computers in health care evolved through a process driven by need. Over the last 30 years, health care has seen few real visionaries who have developed systems to aid in the clinical process. Only in the past five years has the emphasis shifted from applying computer technology to hospital administration, to applying technology to the clinical process. The use of computers in health care began to emerge in the early 1970s (through the use of shared systems) after Medicare reimbursement legislation was enacted, but it wasn’t until the late 1970s, when minicomputers began to become available, that computers began to be widely used in health care. Health care automation was quite limited for the first 10 years because of the insufficient file capacities of most systems.

The remote entry by patients of blood pressure, temperature, pulse, respiration, and conformance with treatment plans is already being accomplished through some home health systems. Innovation in clinical care would be sharply reduced were it not for the way the health care industry has flocked to the Internet. Probably no other technology since personal computers has gained such attention. Five years ago, the primary use of the Internet was for messages and promotional purposes. Today, the Internet has become an integral part of many vendors’ systems. Most important, from the perspective of clinical care, is the access to a myriad of disease and medical databases through the Internet. Such access provides medical data to even the most remote parts of the world. In fact, best-treatment plans that were developed in advanced countries can be made available to physicians in even the least-advanced countries over the Internet.



Robots in Medical History:-

Robots serving various tasks and purposes in the medical/health and social care sectors beyond the traditional scope of surgical and rehabilitation robots are poised to become one of the most important technological innovations of the 21st century. Traditional medical robots have focused mainly on highly specialized platforms for surgery or rehabilitation and low levels of autonomy, relying on tele-operation and/or the presence of qualified staff to enable and ensure appropriate conditions and use. A novel approach along these traditional lines is the magnetic microbots for vascular network intervention. A recent trend has been to move away from costly, task-specific platforms supporting well-defined medical, commonly surgical tasks, towards cheaper more generic platforms. These robots can commonly support a number of different and —softer human-robot interaction (HRI) tasks and have been used to improve the medical conditions of patients.

Robots have been applied in multiple ways to assist the logistics of health and social care. Non-tactile HRI has also been studied extensively in the health and social care domain. Verbal and gesture-based interaction provides opportunities for robots to support patients in two main ways. First, a robot can act as a conduit for socializing, enabling friends or family to engage with the user remotely, or for (remote) communication with a health professional, allowing professionals to reach a larger number of patients. Second, a robot can present itself as an autonomous entity, providing play scenarios that can reduce the effect of disabilities, or improving wellbeing through entertainment and companionship. The increasing numbers of people with long-term illness and an ageing population are putting an unsustainable demand on the already resource-constrained hospitals and healthcare/social care systems in developed countries. Tele-healthcare, home care and self-care have long been encouraged and pushed as strategic policies and directions in these countries, as the way forward for mitigating the increasing demands and burdens on conventional health/care and social care services. The goal is to shift part of the care burden from hospitals/clinics and healthcare professionals to patients and their informal care-givers, and to help individuals take responsibility of, and better manage, their own health.

Components Required:-

A) Hardware	B) Software
<ul style="list-style-type: none"> • LPC2138(Micro-controller) • HM2007p • LM35 • Heart-Beat Sensor • MAX232 • GSM • LCD (16x2) • aPR33A3(Voice Processor) 	<ul style="list-style-type: none"> • Orcad Capture • Express PCB • μVision IDE

Table I:- Components Used for Personal Health-care System**C) Working Principle:**

LM35 (temperature sensor) and heartbeat sensor are used to monitor physical parameters. Two modes of input are provided viz., voice and text modes. HM2007p is the voice processor used for learning and storing real-time voice inputs. APR33a3 is a voice playback used to give voice output while the LCD displays the same. GSM module receives inputs and reverts the remedy through SMS. LPC2138 is a 32-bit microcontroller which is responsible for all controlling actions.

LPC2138 has 32-bit timers, single or dual 10-bit 8-channel ADC(s), 10-bit DAC, PWM channels and 47 GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers particularly suitable for industrial control and medical systems.

Advantages and Disadvantages:-**Advantages:-**

1. System has a low operating cost with one-time investment and the time of purchase. Its costing would make it affordable to every strata of the society.
2. Information regarding patients' ailments and treatment methods, and even emergency services can be received anywhere and anytime, regardless of the location. This makes it useful in remote areas lacking medical facilities for diagnosis and immediate treatment procedures.
3. A system that can be remotely accessed by user, even if the user isn't in the vicinity of the system. This makes it advantageous in any type of setting (domestic, industrial etc.).
4. No need of consulting a doctor for minor ailments which can be cured easily with the intake of proper medication.
5. Prognosis on par with professionals and first-aid for all kinds of problems provided.
6. The system can minimize medical errors which can occur due to human error or negligence and ensures safety of the user.

Disadvantages:-

1. Cannot provide treatment methods for major ailments that are life threatening or for which professional assistance is mandatory.
2. Flexibility of medication is restricted due to pre-fed database and hence cannot provide treatments to ailments that are not available in database.
3. Database has to be updated regularly to keep the system in touch with the updates and progress in medicine.

Application:-

1. A personal healthcare unit to provide a complete first-aid solution to user
2. Provides prognosis based on the input given by user
3. Healthcare companion to provide better treatment procedure based on user's medical history
4. Professional advice on par with that of doctors
5. Used in domestic and industrial medical systems for immediate first aid solutions.
6. Can be used as a helper at various critical stages in case of emergencies like stroke etc.

Future scope:-

- The system can be further modified to append an expansion to store the medical history of one or more patients. The database can furthermore be updated to include new treatment methods for existing ailments by doctors.
- The system can comprise of e-nursing and care-bots in addition to treatments.
- The system can be directly affiliated to medical institutions in case of requirement of professional help.
- The system can be made to directly contact nearest hospital in case of extreme emergencies.

Conclusion:-

The aim of this system is to provide professional medical advice for minor ailments and diseases for which a patient would not require to go to a doctor for its treatment. This would be beneficial in remote areas where medical help is sparse and not well facilitated for medical institutions. It would provide first-aid measures for proper treatment of injuries and minor accidents. Also in case of emergencies, the system can provide proper treatment method instead of waiting for emergency services for a solution.

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