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Next Generation: IOT Chipset

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Abstract: Over the years, the healthcare sector in India has achieved capability, maturity and global recognition, positioning the country as a preferred destination for advanced healthcare services. Both the health & technology sectors have grown and are increasingly becoming a hotbed of innovation in developing new products and services for healthcare delivery in India.Wireless connectivity is a key component, or can even be considered the key component, of the Internet of Things. Embedded systems in the Medical, Building Automation, Smart Grid, Transportation, Industrial, and other markets are more often built with wireless connectivity than without, with the connectivity called Machine-to-Machine or M2M communication. The Internet of Things (IoT) need not necessarily be comprised of devices and equipment designed afresh to be M2M capable, but would have a host of legacy equipment, sensors, and other devices into the M2M concept.

I. INTRODUCTION

In a computer system, a chipset is a set of electronic components in an integrated circuit that manages the data flow between the processor, memory and peripherals. It is usually found on the motherboard. Chipsets are usually designed to work with a specific family of microprocessors. Because it controls communications between the processor andexternal devices, the chipset plays a crucial role in determining system performance



An integrated circuit or monolithic integrated circuit (also referred to as an IC, a chip, or a microchip) is a set of electronic circuits on one small plate ("chip") ofsemiconductor material, normally silicon. This can be made much smaller than adiscrete circuit made from independent components. ICs can be made very compact, having up to several billion transistors and other electronic components in an area the size of a fingernail. The width of each conducting line in a circuit can be made smaller and smaller as the technology advances; in 2008 it dropped below 100nanometer, and now it is tens of nanometers.



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A system on a chip or system on chip (SoC or SOC) is an integrated circuit (IC) that integrates all components of a computer or other electronic system into a single chip. It may contain digital, analog, mixed-signal, and often radio-frequency functions—all on a single chip substrate. SoCs are very common in the mobile electronics market because of their low power consumption. A typical application is in the area of embedded systems.

II. OBJECTIVE

The main objective is to design the concept and develop the prototype of a *Self-sustaining IOT chipset for next generation healthcare*.

The specific objectives are:

(a) Design and development of a low power, robust, secure and smart indigenous internet enabled chipset for personalized healthcare.

(b) Design an efficient Microscale hybrid environmental energy harvesting unit interface (solar, thermal, RF & vibration etc among the state-of-the art or novel methodologies) on IOT for healthcare chipset for self-sustainability

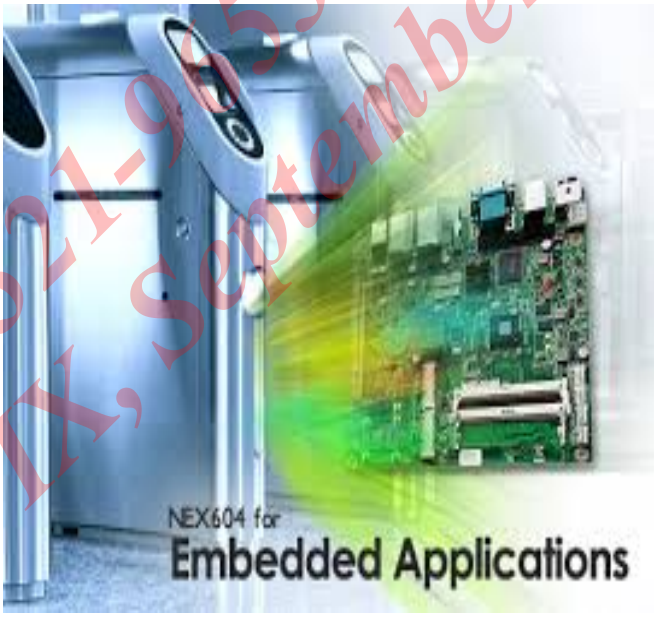
(c) Design an efficient Power aware architecture for the proposed chip-set with suitable power-management modules.

(d) Design of cost-effective Nano-micro biomedical sensor to be embedded on-chip or integrated off-chip.

(e) Development of the Chipless RFID integrated together with the proposed prototype solution.

(f) Produce Intellectual Property Rights (IPR) as a part of technology translated to product. (g) Encourage Start-ups and entrepreneurship from the outcome of this project.

To support the preventive and personalized healthcare, it is necessary to develop an IoT connect intelligent medical devices (wearable and environmental) that helps to provide communication and interaction between patients and remote specialists [1]-[3] through the wireless and CMOS technology. Once medical information collected via sensors and linked in cloud, next major challenges is source of energy for the IoT chipset. Since it is not feasible to connect the "IoT enabled medical devices" to the grid, ubiquity is thus one of the keywords implying that the objects will be able to provide themselves the energy they need to operate [4]. Therefore, there is a pressing need of design to develop a self powered cost-effective, affordable, proactive healthcare solution including diagnosis, prognosis and therapy with the help of IoT: Convergence of Communication, Signal Processing, VLSI and Internet.

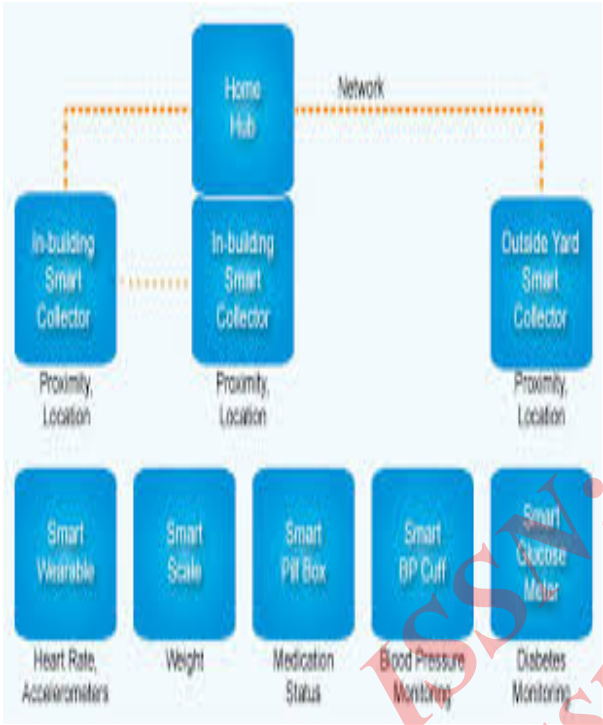


III. TECHNIQUE DEVELOPMENT & CHALLENGES

The main objective is to design the concept and develop the prototype of a *Self-sustaining IOT chipset for next generation healthcare*. The specific objectives are: (a) Design and development of a low power, robust, secure and smart indigenous internet enabled chipset for personalized healthcare. (b) Design an efficient Microscale hybrid environmental energy harvesting unit interface (solar, thermal, RF & vibration etc among the state-of-the art or novel methodologies) on IOT for healthcare chipset for self-sustainability (c) Design an efficient Power aware architecture for the proposed chip-set with suitable power-management

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Justification

Through the design and development of a *Self-sustaining IOT chipset* will lead to the technology innovation and improvement of the healthcare delivery and clinical diagnosis across the world including developing countries like India and others.

Details of the estimated fund required

Head	*Year 1*	*Year 2*	*Year 3*
Capital Equipment	10	10	10
Consumable	5	35	40
Manpower	20	20	20
Travel	5	10	10
Contigencies	5	5	5
Subtotal	45	80	85
Overheads(20% on subtotal)	9	16	17
Total	54	96	102

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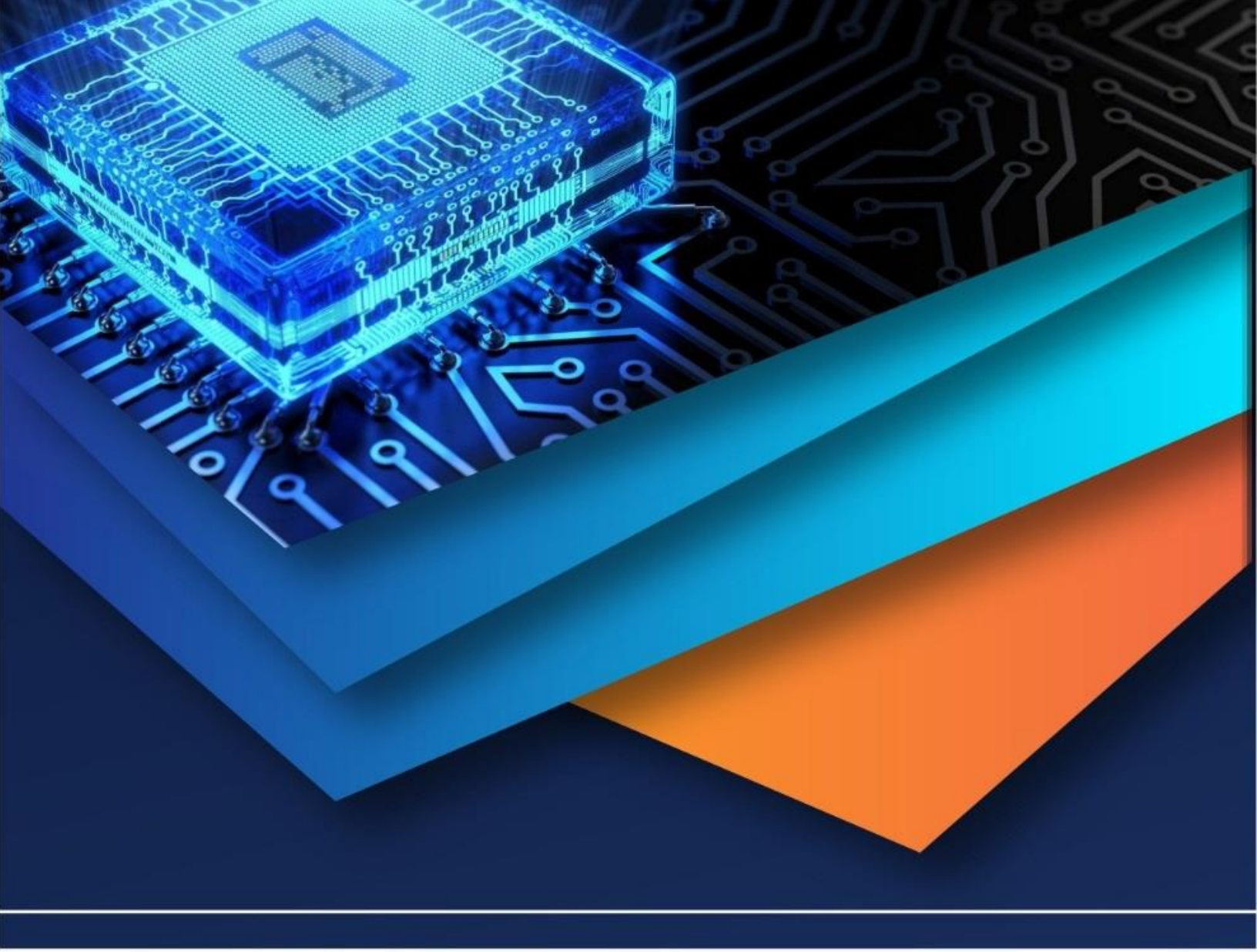
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