Low Power Wearable ECG Monitoring

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Abstract: **Many devices and solutions for remote ECG monitoring have been proposed in the literature. These solutions typically have a large marginal cost per added sensorand are not seamlessly integrated with other smart home solutions. Here we propose an ECG remote monitoring system that is dedicated to non-technical users in need of long-term health monitoring in residential environments and is integrated in a broader Internet of-Things (IoT) infrastructure. Our prototype consists of a complete vertical solution with a series of advantages with respect to the state of the art, considering both prototypes with integrated front end and prototypes realized with off-the-shelf components:**

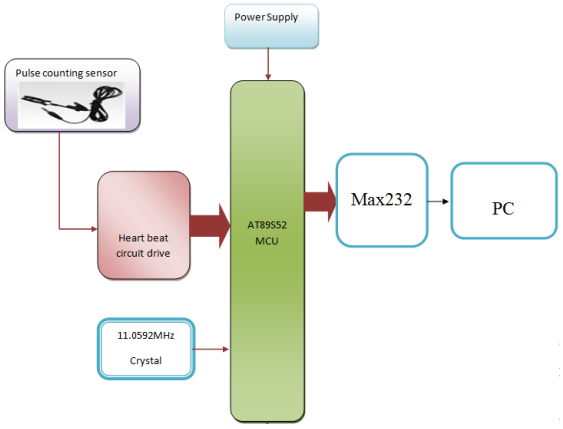
i) ECG prototype sensors with record-low energy per effective number of quantized levels.

ii) An architecture providing low marginal cost per added sensor/user.

iii) The possibility of seamless integration with other smart home systems through a single internet-of-things infrastructure.

I. EXISTING SYSTEM:

Heart beat is monitoring of a patient is done here. As the controller is directly Connected to PC. The details are visible on the PC.



In existing proposed ECG sensor nodes are based on a dedicated integrated front end, that sometimes includes a DSP, and require a second off-the-shelf chip to implement the radio link. However, power consumption mostly in such sensors is

mainly due to the radio link and therefore the optimization obtained by the use of the dedicated front-end has a limited impact on the power performance of the complete sensor. In addition, the following sections will show that a general purpose high-performance and high resolution standard ADC can outperform the noise performance of many dedicated front-end chips.

II. DISADVANTAGES:

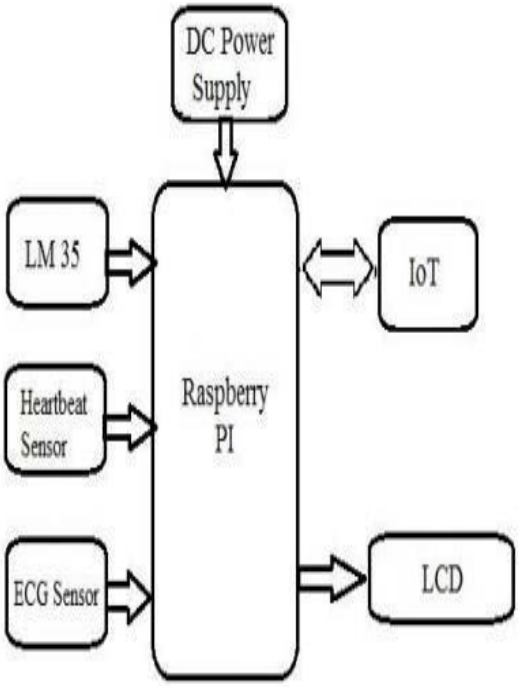
- The disadvantage of this system is it increases cost per patient.
- It may not work, if the wireless infrastructure of the system gets changed.
- No remote monitoring is possible.

III. PROPOSEM SYSTEM:

Many devices and solutions for remote ECG monitoring have been proposed in the literature. These solutions typically have a large marginal cost per added sensor and are not seamlessly integrated with other smart home solutions. Here we propose an ECG remote monitoring system that is dedicated to non-technical users in need of long-term health monitoring in residential environment. The platform has three main parts: the sensor and actuator networks, the IoT server and the user interfaces for visualization and management. Lightweight wearable ECG sensors and other ambient sensors collect data and send them in real time via a wireless protocol to a gateway connected to the home router. The architecture has been developed with the aim of enabling the integration of sensor networks based on different networks protocols. The IoT server converts the raw payload fromheterogeneous nodes into a “universal” format, containing object identifier, objecttype, measurement unit, data field, geographical position, and timestamp. Then, it makes the data available to applications and users. The wearable ECG sensor consists of a dry plastic electrodes and the electronic printed circuit board. The circuit extracts, filters, amplifies and digitizes the ECG signal, which is thenacquired by the microcontroller and wireless sent to IoT server.

IOT BOARD: Introducing a new ESP8266 Development Board with an ESP-12, a 3x AA battery holder, a voltage regulator, an RGB LED, several red LEDs, and a light sensor LDR on the ADC input all on one board. The board can be controlled by an open source Android App which is available from the AI-THINKER Website.

IV. BLOCK DIAGRAM:



V. ADVANTAGES:

- At the infrastructure level, the ECG remote monitoring system can be merged with other biomedical and ambient monitoring systems.
- Ease of operation.
- Low maintenance cost.
- No wastage of time.
- Durability.
- Accuracy.
- APPLICATIONS:
- Hospitals.
- Remote heart rate monitoring.

VI. CONCLUSION:

We have proposed a wireless wearable ECG monitoring system embedded in an IoT platform that integrates heterogeneous nodes and applications, has a long battery life, and provides a high-quality ECG signal. The system allows monitoring multiple patients on a relatively large indoor area (home, building, nursing home, etc.). Another remarkable feature of our system is a very low marginal cost per added sensor, since our architecture enables a single low-cost gateway to manage multiple sensors.

VII. FUTURE SCOPE:

. Future work will focus on monitoring additional healthrelated parameters using a broader combination of transducers, sensors, and correlation techniques, and on improving system reliability and robustness to patient movement and connectivity losses.

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