Technical Document

1. State of the Art

The health care monitoring market is emerging as trillion dollar industry worldwide, which may increase by double in the coming years. To manage this huge growth some new information technologies are required to reach the two goals, to reduce cost and maintain the quality of service at same time in health care services and medical care using IoT aims at monitoring the body's physiological state, keep record and monitor doctors and patients inside the hospital. Doctors make use of sensor networks to monitor the patient's condition using special-purpose sensor motes fixed inside the body like heart rate and monitoring blood pressure. Major challenge faced by these networks is energy efficiency, because it is near to impossible to replace the motes and real time transmission of data.

Following are the gaps identified from the literature survey carried out:

- The existing manual systems for health monitoring are not efficient in terms of time taken for immediate actions.
- Some IoT based healthcare solutions are proposed but they still lack the data consistency among the patients and the doctor.
- The available solutions are still lacking real time decisions and have a time delay factor.
- Moreover, the effectiveness of the existing protocol can be still improved in terms of high packet delivery ratio, and average latency

2. Origin of the Proposal:

The investigator visited hospital to meet his friend who was ill and was admitted in the hospital. Investigator noticed that the friend was under the monitoring of nursing staff and doctors to measure vital and physiological signs such as temperature, pulse and respiratory rates, blood pressure or oximetry. This monitoring was manual and was scheduled few times a day, so the variation in temperature or pulse between these schedules was not noticed for any inconsistency. Investigator would have appreciated the system if it had provided continuous monitoring of patients to improve the quality of care given to them. So, the investigator thought to make a real time patient monitoring system using Internet

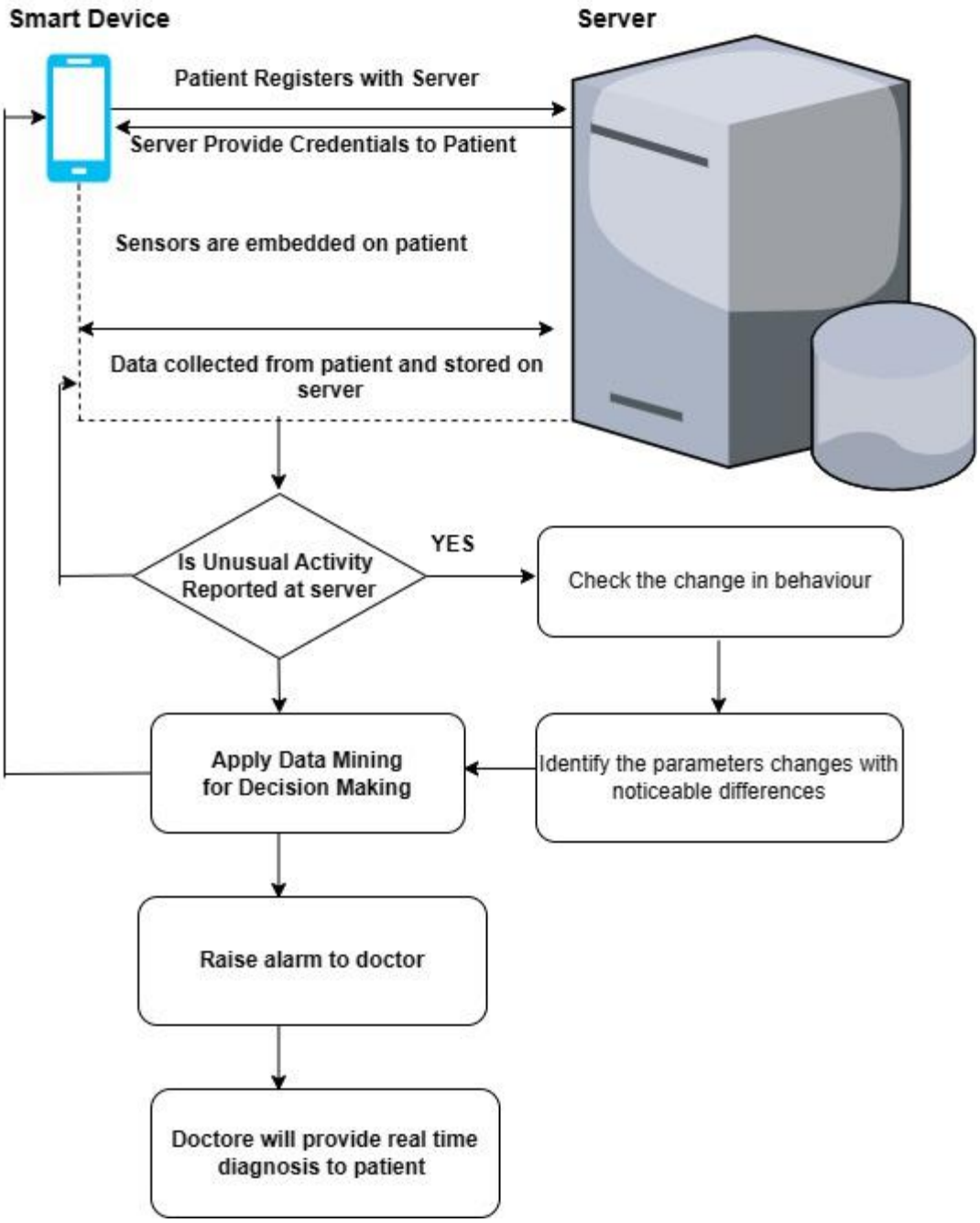
of Things that will continuously observe these physiological signs. These networks are self-organized and energy efficient without any need of physical infrastructure that will provide real time monitoring of the patients to improve the quality of care and will also reduce the workload of the nursing staff. Real time decision can be made using mining techniques by sharing the live information with the doctor.

3. Research Plan

The proposed research plan is divided into following steps:

1) Patient is first registered with the server.
2) Once the patient is registered, data collection related to different health parameters of patients is conducted using sensors.
3) Data collected will be related to health of patients. The data is collected and shared to central server on real time basis.
4) If there is any unusual activity identified, like high blood pressure than normal range, hig temperature than normal range, server starts working on data mining.
5) Data mining techniques are used to make real time decisions whether the situation of patient is under control or not.
6) In case of emergency, it will be reported as an alarm to doctor.
7) This will eventually lead to right diagnosis at right time for the patients.

The complete methodology using flow graph is represented below:



4. Key publications of the Investigator during the last 5 years

- "Performance Analysis of Data Mining Techniques in IoT". In 4th International Conference on Computing Sciences (ICCS), 2018.
- "Current research on congestion control schemes in VANET: a practical interpretation", International Journal of Recent Technology Engineering, 2019.
- "A lightweight IoT-based security framework for inventory automation using wireless sensor network". International Journal of Communication Systems, 2020.
- "Hybrid logical security framework for privacy preservation in the green internet of things". Sustainability, 2020.
- "LLSFIoT: Lightweight Logical Security Framework for Internet of Things". Wireless Communications and Mobile Computing, 2021.

- "Gene expression-assisted cancer prediction techniques". Journal of Healthcare Engineering, 2021.
- "Ensemble Classification Approach for Sarcasm Detection". Behavioural Neurology, 2021.
- "Design and evaluation of a hybrid technique for detecting sunflower leaf disease using deep learning approach". Journal of Food Quality, 2022.
- "Intrusion Detection Systems in Cloud Computing Paradigm: Analysis and Overview". Complexity, 2022.
- "Seed: secure and energy efficient data-collection method for IoT network". Multimedia Tools and Applications, 2022.
- "Predicting Trends and Research Patterns of Smart Cities: A Semi-Automatic Review Using Latent Dirichlet Allocation (LDA)". IEEE Access
- "Digital society social interactions and trust analysis model". PeerJ Computer Science

5. Bibliography

- Dr. Isha Batra received her B.Tech. Degree from Kurukshetra University, Kurukshetra in 2008, M.E. Degree from PEC University of Technology, Chandigarh in 2010 and Ph.D. degree from Lovely Professional University in 2019. She has more than 11 years of teaching experience and published more than 35 papers in journals and conference proceedings. Her research interests include wireless networks, Network Security, Artificial Intelligence, IOT and cloud computing.
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6. Equipment available with the Institute/ Group/ Department/Other Institutes for the project

Equipment available	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI & his group	Simulator	Latest version	-
PI's department	NA	NA	-
Other Institute(s) in the region	NA	NA	-