SYSTEM ARCHITECTURE &PREGNANT WOMEN HEALTH MONITORING IDEAS

INTRODUCTION

MATERNAL AND CHILD DATA INTEGRATION PLATFORM REALISES THE EXCHANGE OF UNIFIED DATA AND TRANSMISSION STANDARDS. IT OFFERS COMPREHENSIVE STANDARDISED INTERFACE, WHICH NOT ONLY SATISFIES THE NEED OF VERTICAL CONNECTION BETWEEN SUBSYSTEMS IN THE SYSTEM, BUT ALSO MEETS THE NEED OF THE HORIZONTAL CONNECTION WITH THE SUPERIOR DEPARTMENTS, OTHER SYSTEMS AND HOSPITAL INFORMATION SYSTEMS.

IN THIS WAY THE PHENOMENA OF INFORMATION ISOLATED ISLAND AND DATA GAP CAN BE ERADICATED. THE MATERNAL AND CHILD DATA INTEGRATION SYSTEM INCLUDES SIX PRIMARY FUNCTIONS, WHICH ARE SINGLE SIGN-ON, UNIFIED AUTHENTICATION, DATA STANDARDS, PA- TIENT PRIMARY INDEX, DATA INTEGRATION, ENTERPRISE SERVICE BUS AND PANORAMIC HEALTH FILE.

SETUP PICTURE

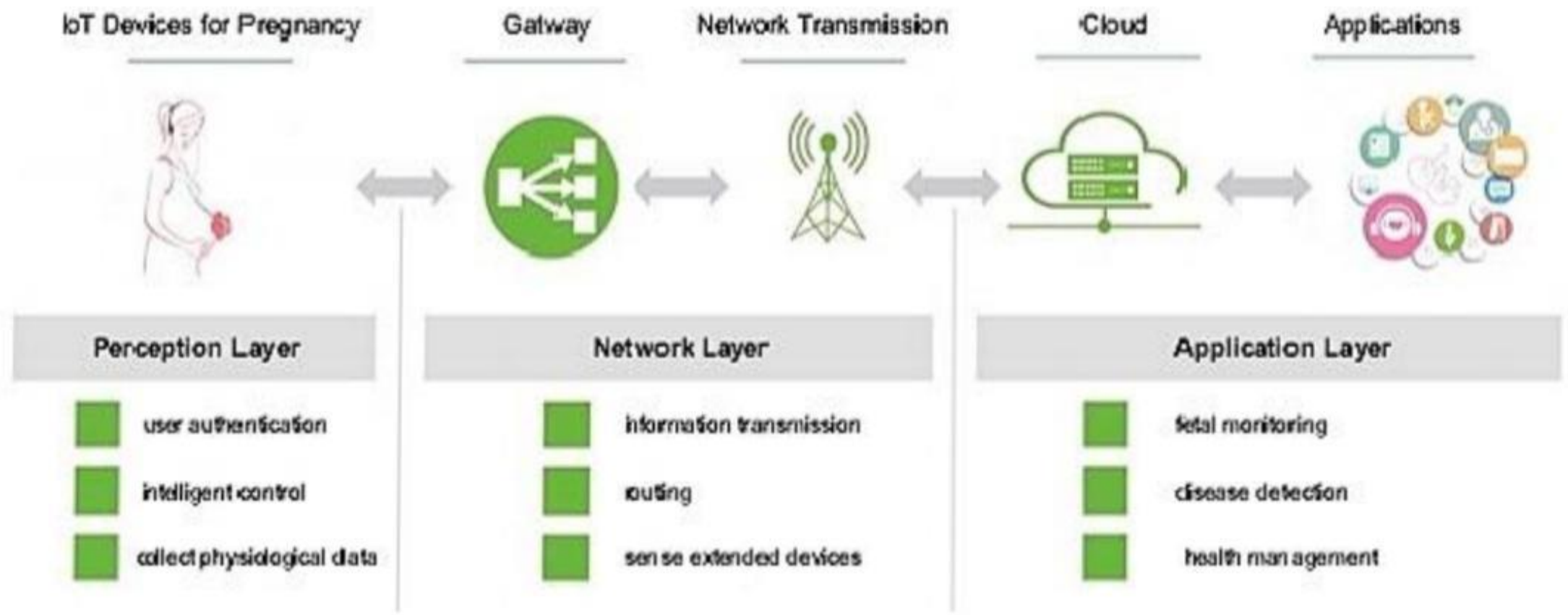


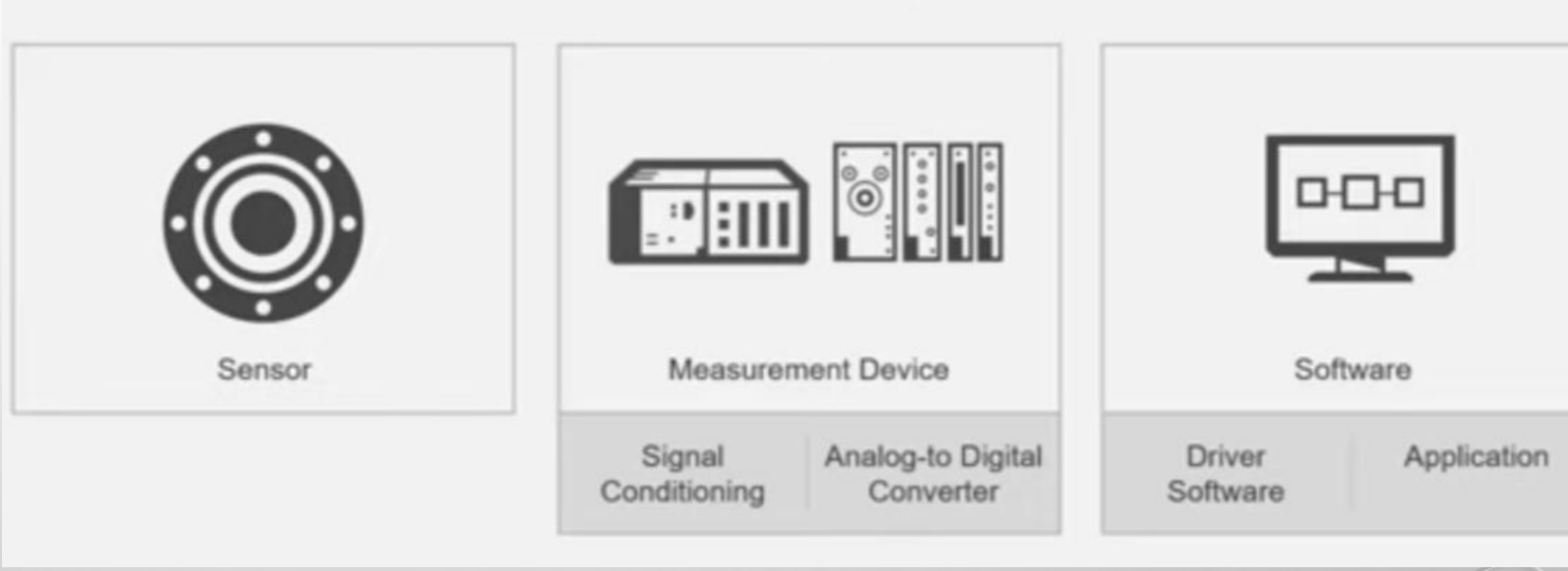
Fig. 1. Three Layers of Platform Architecture.

DATA ACQUISITION:-

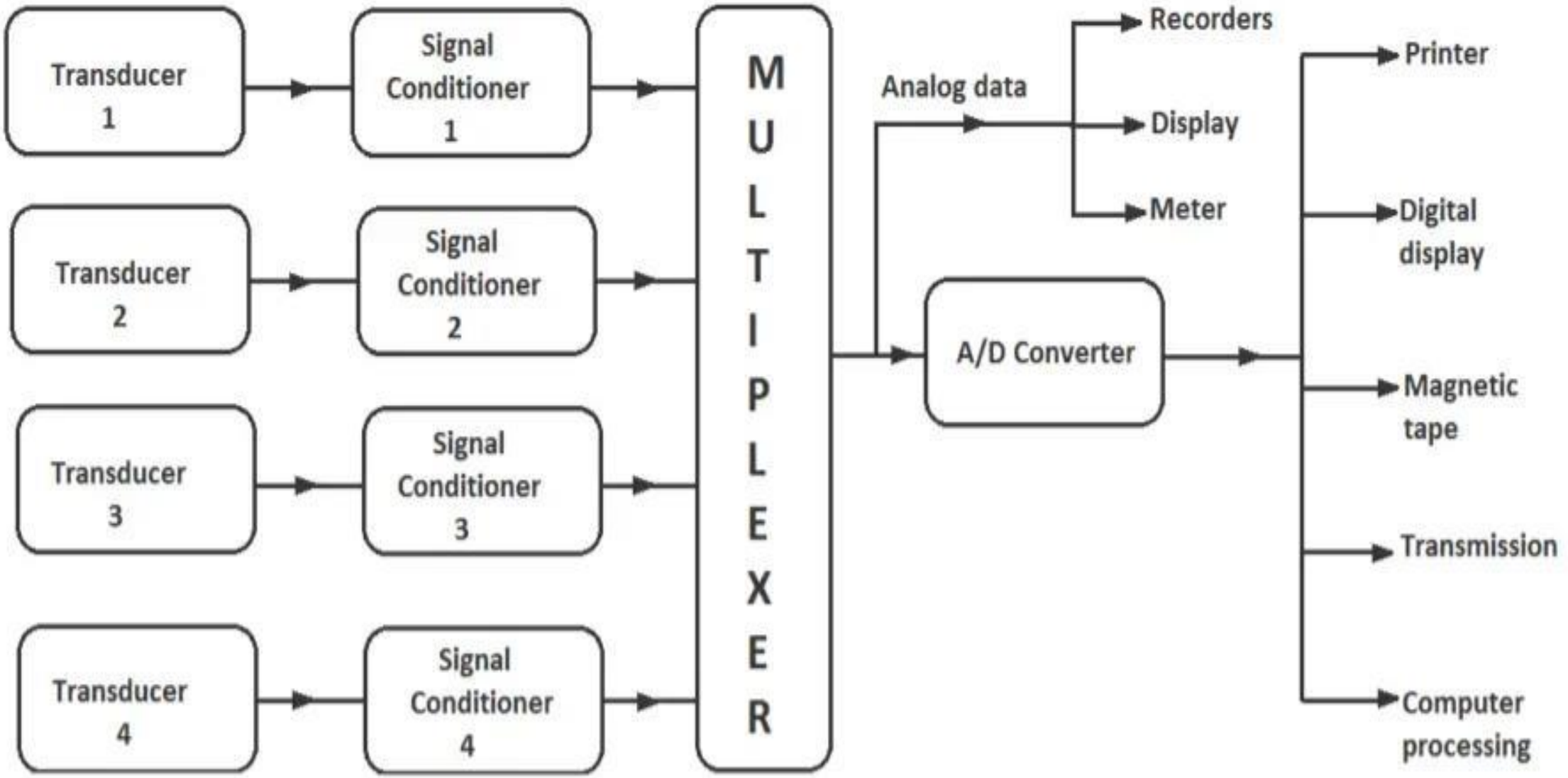
IT IS A INFORMATION SYSTEM THAT COLLECTS STORES AND DISTRIBUTES THE INFORMATION.

DATA ACQUISITION CONSIST OF:-

- TRANSDUCER/SENSOR
- SIGNAL CONDITIONING
- MULTIPLEXING
- DATA CONVERSION
- DATA PROCESSING



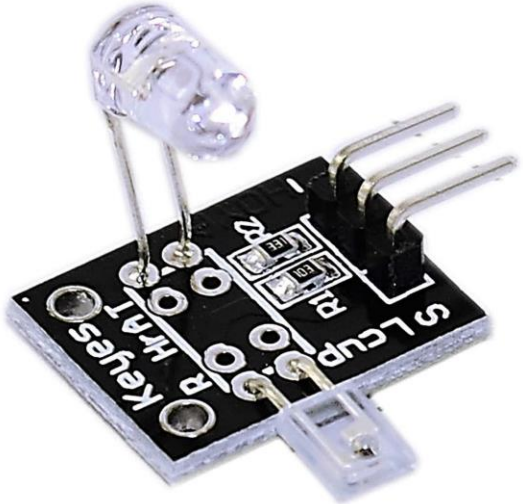
DATA ACQUISITION BLOCK DIAGRAM

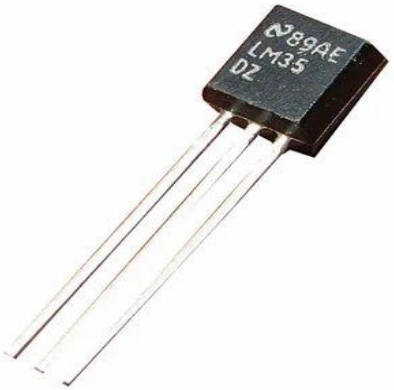


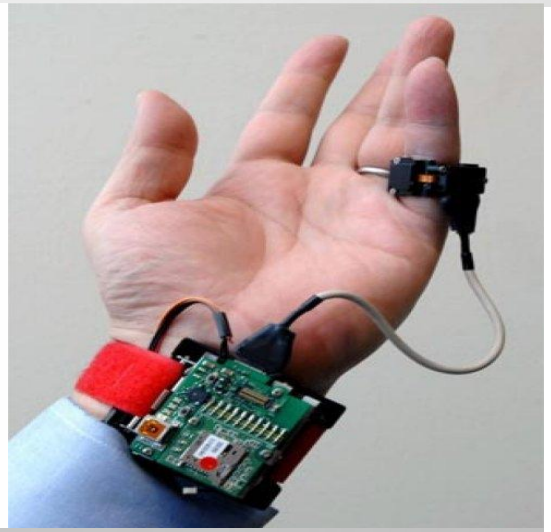
Generalised Data Acquisition System

SENSORS

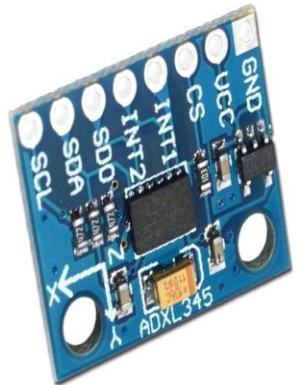
- HEARTBEAT SENSOR
- TEMPERATURE SENSOR
- BLOOD PRESSURE SENSOR
- ACCELEROMETER (ADXL345)







ADXL345 3-Axis Accelerometer Sensor



HEARTBEAT SENSOR:-

DURING PREGNANCY, THE AMOUNT OF BLOOD PRESSURE BECOMES HIGH BY THE INCREASE IN HEART BEAT BY 30-50%. HEART RATE INCREASE AT HIGH SPEED FROM NORMAL RATE OF 70BPM TO 80 BPM TO 90 BPM. SO WE MONITOR THE HEART RATE.

TEMPERATURE SENSOR:-

THIS TEMPERATURE SENSOR CAN BE COMMUNICATE WITH THE HELP OF ONE WIRE FOR TWO WAY COMMUNICATION TO THE MICROCONTROLLER. THE ACCURACY RATE IS ABOUT THE RANGE FROM -55° C TO +125° C. NORMALLY IN HUMAN BODY TEMPERATURE VARIES. BY THIS WE USE THIS SENSOR TO MONITOR THE TEMPERATURE OF THE MOTHER.

BLOOD PRESSURE SENSOR:-

BLOOD PRESSURE MAY RAPIDLY INCREASED OR DECREASED DURING PREGNANCY. THIS MAY CAUSE SOME RISK FACTORS FOR THE FETUS HEALTH. THERE IS COMPLICATION IN PREGNANCY DUE TO THIS BLOOD PRESSURE VARIED.

ACCELEROMETER SENSOR:-

THE ACCELEROMETER (ADXL335) SENSOR CAN ACCELERATE FROM ONE, TWO OR THREE CAN BE MEASURED ON

ORTHOGONAL AXIS. THIS SENSOR IS PLACED ON THE ABDOMINAL REGION OF THE MOTHER. PRESSURE BY KICK OF BABY CAN BE DETECTED BY THIS SENSOR IS TAKEN AS AN INPUT OF THREE AXIS X,Y,AND Z IN ANALOG FORM. THEN IT CONVERT DIGITAL BY USING ADC IN ARDUINO UNO

Wearable Biosensors for Personalized Medicine

Commercial health monitors can mainly track
physical activities and vital signs

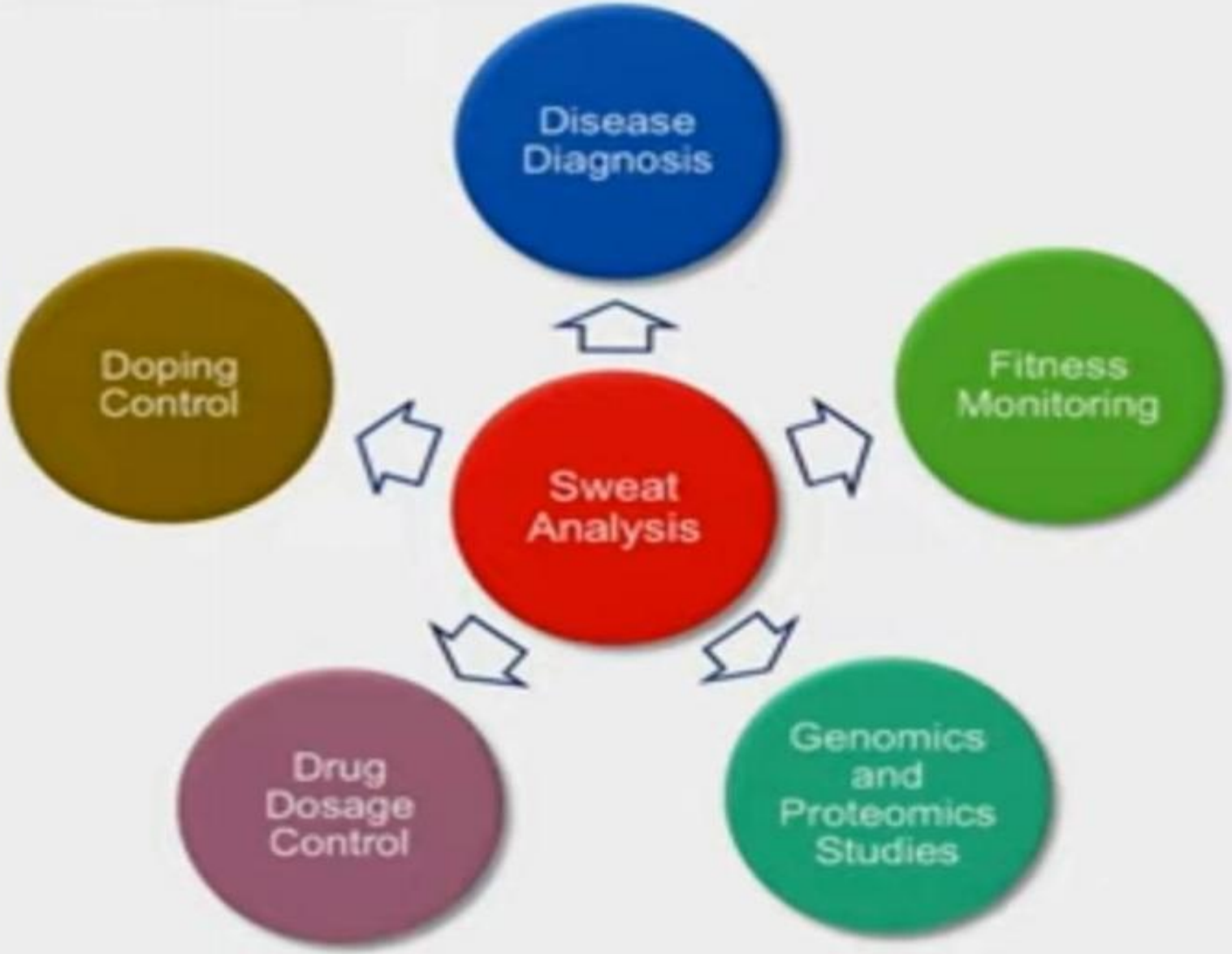
Challenges and opportunities: physiological monitoring at molecular levels

THESE ARE THE SOME WEARABLE DEVICES FOR PREGNANT WOMEN

Wearable Biosensors for Personalized Medicine

Commercial health monitors can mainly track

The Current Healthcare Applications of Sweat Test

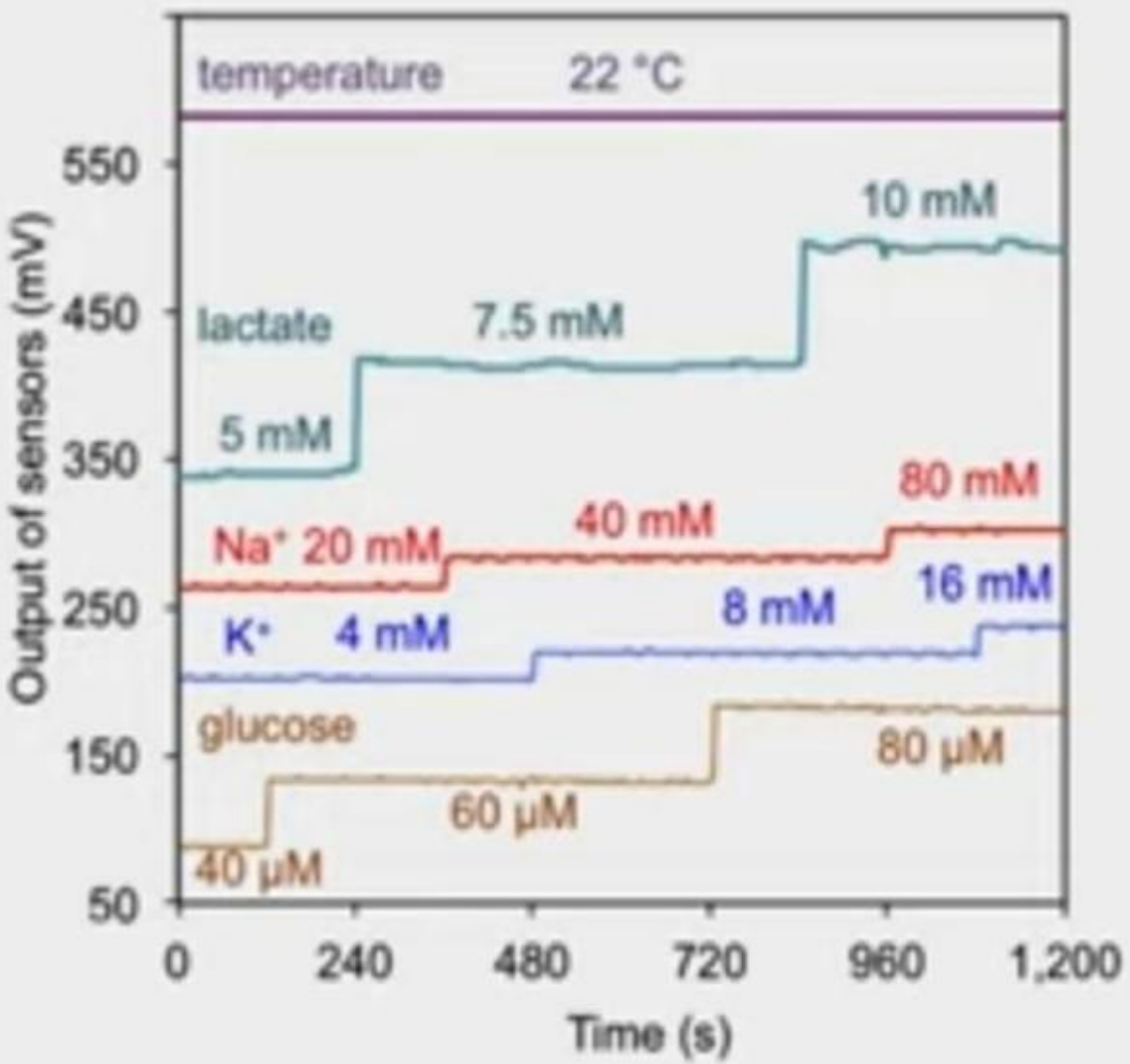


Fully Integrated Wearable Sensors for Perspiration Analysis

- **Real time in situ monitoring**:
  - Metabolites (glucose, lactate)
  - Electrolytes (Na^+,K^+)
  - Skin temperature.
- **On site signal conditioning, processing, wireless transmission.**
- **Real time sensor reading calibration.**
- **Data display on cell phone.**
- **Data aggregation on cloud server.**

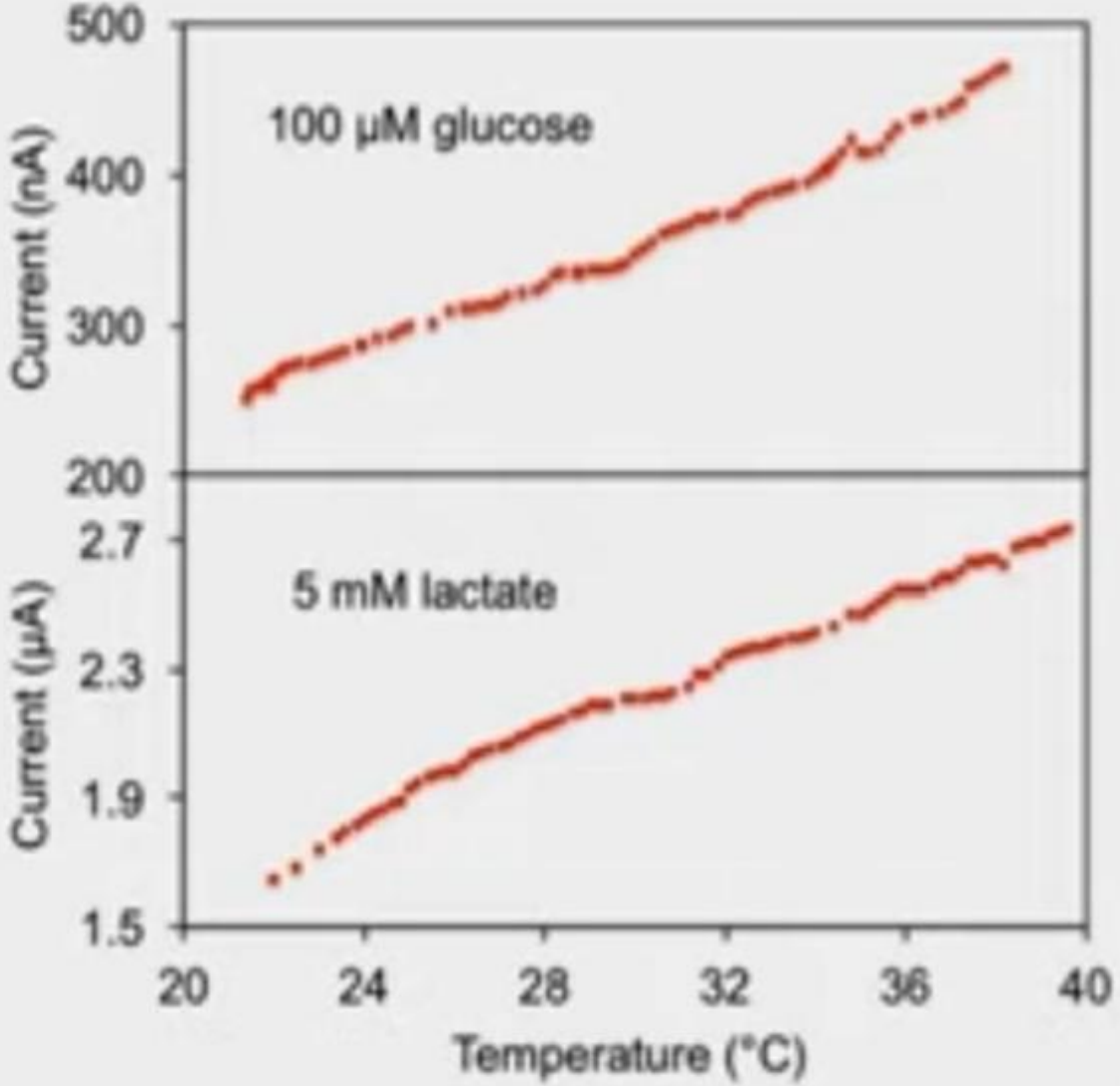
Gao et al. Nature, 2016, 529, 509.

Interference Study



The chemical sensors have good selectivity.

Temperature dependence

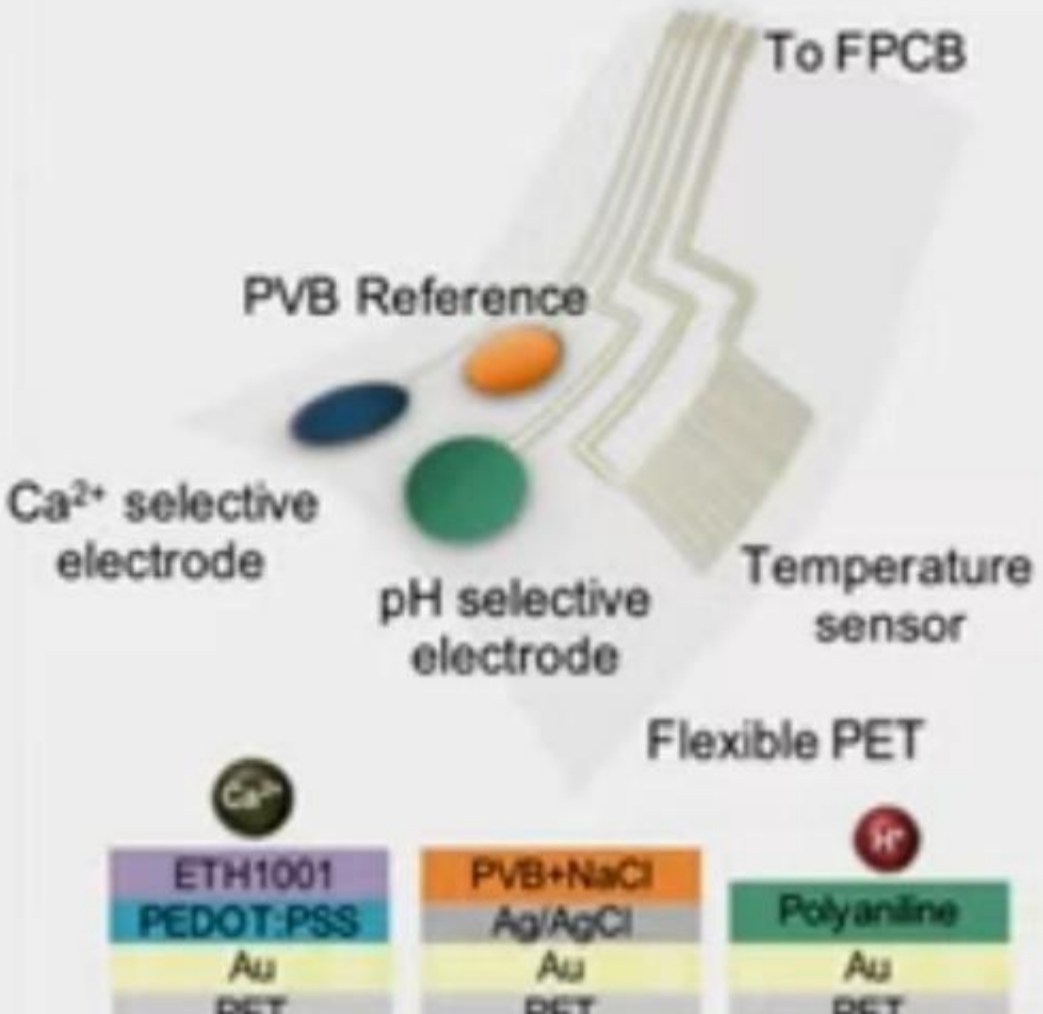


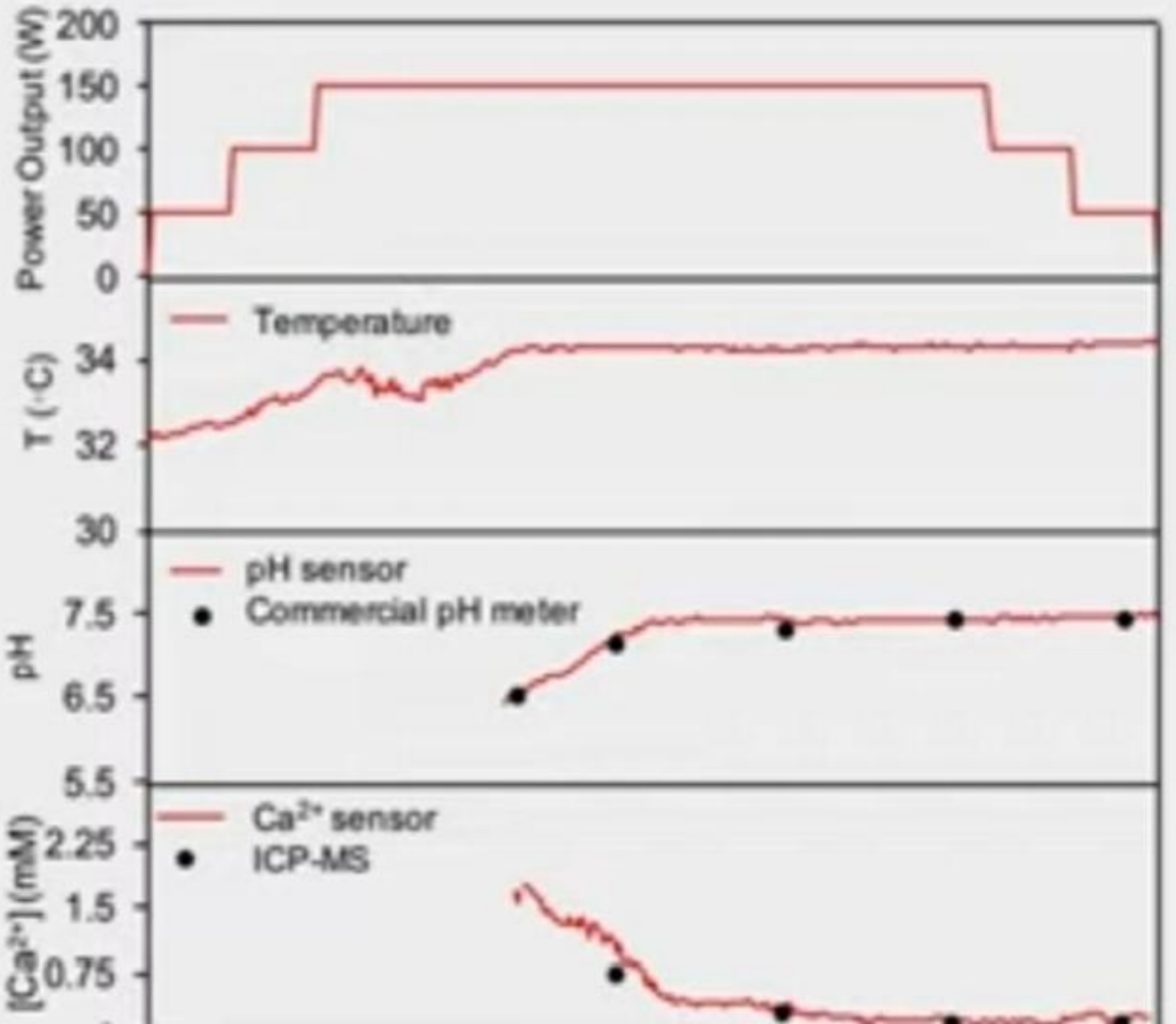
Real time temperature compensation is necessary.

Wearable Sensors for Ca^{2+} and pH Monitoring

Kidney function monitoring

Ca^{2+} level in body fluids is dependent on pH





CONCLUSION

The sensing layer mainly be applied to realise the collection of various physiological information, automatic identification and intelligent control. Obstetrical high-risk pregnancy monitoring and early warning for the IoT-based Platform for Smart Maternal Healthcare Services

The network layer mainly supports the information transmission, routing and control of terminals and sensing extension devices, which provides communication support between pregnant women and devices for home monitoring.