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# HeWi Bridge: COMPACT HETEROGENOUS WIRELESS NETWORK BRIDGE FOR HEALTHCARE APPLICATIONS

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## PROBLEM STATEMENT

Heterogeneous wireless environments bring about new integration challenges that are not an issue in homogenous networks, due to the various technologies having their specific characteristics.

The challenges of using Wireless Sensor Networks (WSNs) is the short range of the sensor nodes which increases the complexity of transporting data to a central server.

## PRODUCT DESCRIPTION

A Single Board Computer (SBC) is used to develop a prototype for the wireless network bridge. The novelty of this product is that it integrates two different wireless technologies the IEEE 802.15.4/Zigbee (WSN) and the IEEE 802.11x (Wi-Fi) into one compact bridge. Reducing the network complexity and power source is the main contribution of this product.

Figure 1 shows an example of independent living space incorporating a WSN coexisting with the existing installed infrastructure. The more common existing infrastructure is the WLAN or the Wireless Mesh Network (WMN) which is universally used for local access. The WMN and wired Ethernet are normally used as the uplink for connecting to the Internet or to the central server for augmenting data collection and real-time response.

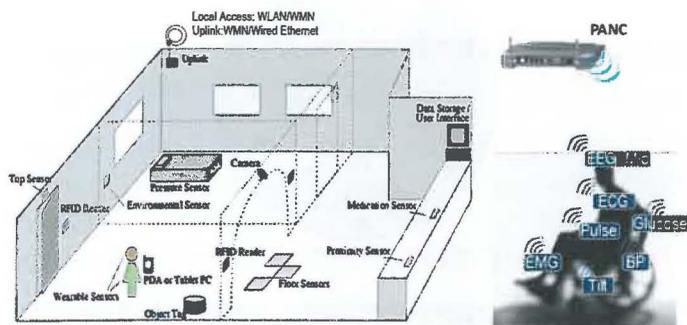


Figure 1 : Independent Living Space

## PROCESS DESCRIPTION

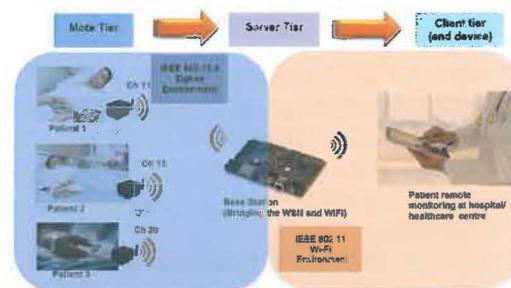
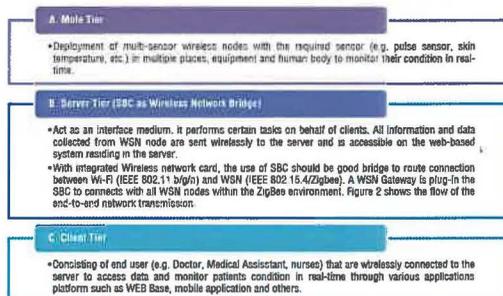


Figure 2 : Assisted living with wireless monitoring

## COMMERCIAL POTENTIAL

- Realization of Internet of things (IoT)
- This work is part of a current development work between ICoE Healthcare with CREST/AMMI and other industries (e.g. KPJ, UM, USM, UNIMAP and others) in the healthcare ecosystem on a sustainable ecosystem in IoT or embedded solutions for healthcare.
- Promotes independent living in but not limited to healthcare industry
- Real-time monitoring
- Reduce wired data transmission

## NOVELTY

- Heterogeneous wireless bridge
- Reduce power consumption and network complexity

## ACKNOWLEDGEMENT

RAGS 9018-00024 HSense: Indoor Wireless Propagation and Characterization Study for Enabling Intelligent Green Building- RM 56,000.



## PUBLICATIONS

1. Hassan, M.N., Kamarudin, L.M., Zakaria, A., Ahmad, R.B. Integration and deployment of IEEE 802.15.4 wireless sensor networks with a wireless mesh backhaul network (2013) *Advances in Environmental Biology*, 7 (SPEC. ISSUE 12), pp. 3775-3782.
2. MN. Hassan, L.M. Kamarudin, and A. Zakaria, "Mitigating Interference in a Heterogeneous Wireless Network using Channel Selection," *Journal of Applied Sciences Research*, 2013.