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## Generative Model-Based Compressive Sensing

Devices that continuously monitor cardiac activity in free living conditions are being integrated into everyday life. Cardiac sensors are an essential advancement for disease diagnostics and evaluation of post-operative progress. Also, these observations are useful for overall physical health and well-being.

With today's technology, smartphones are able to collect and analyze a wealth of data from these devices. However, proximity is vital for wearable sensors. Wireless connections can become intermittent when a smartphone is not connected to a user, resulting in monitoring interruptions at critical times. Smartwatches are wearable alternatives to smartphones because of their emergency storage and immediate communication range, and bring further opportunities for innovation.

Researchers at Arizona State University have developed Generative Model based Compressive Sensing (GenCS) for smartwatches. The GenCS system combines the strengths of two data compression techniques: compression sensing and generative model based resource efficient communication.

GenCS reduces sampling frequency of the sensor and makes it lightweight, but also condenses communication arrays from a cardiac sensor by 40 times. These reductions establish more efficient communication at a low density and improve the compression ratio 5 times the existing state of the art. The system optimizes the trade-offs between energy consumption, battery lifetime, execution time and accuracy. GenCS enables long term continuous and effective cardiac monitoring in a smartwatch.

### Potential Applications

- Health care monitoring in free living conditions
- Wearable technology

### Benefits and Advantages

- Long-term continuous monitoring – System obtains constant information from physiological monitoring devices with minimal irregularities
- High compression ratio – Reduced sampling frequency and efficient communication brings GenCS to 5 times state of the art
- Long-lasting – Condensed communication and data compression lessen power consumption, therefore improve the lifetime of the implantable sensors

For more information about the inventor(s) and their research, please see

[Dr. Sandeep Gupta's Directory Page](#)

