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Design of System on Chip GPS for Chain Snatch Tracker

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Abstract – *Back -to- back chain snatching in the city put the cops on their toes. Even as chain snatchers go about their job with the catch-me-if-you-can spirit, police are working over-time to dent that spirit, but to no avail. Observing that the robberies have increased over the years, there is also a raise in chain snatching incidents. Thus chain snatching has become an urban phenomenon. Even though many cases have being lodged in the police station, but a very few cases have been solved, and many of the cases are still under investigation. In day today newspaper by default front page reads "again a chain snatcher strikes the city", a serious threat that scares the public to walk in and around city is "Chain snatching", and has become a challenge for the Police Department in capturing the culprits .Keeping this in mind I propose designing SoC GPS CHIP powered by human body , to track continuously when the chain is snatched .Highly-compact modules combine the RF and antenna can be combined with energy-harvesting transducers and power management to provide the same kind of small system that is independent of power sources. With careful attention to the power budget of the system, generating from human body can provide all the power requirements. Tapping directly into the biological processes that turn fat into energy is beyond currently available technology. However, energy might be harvested indirectly from everyday human actions or might be intentionally generated by a human. Indeed, products that operate in this mode, e.g. torches, radios, watches, have been on the market for years. At the same time, there has been a significant body of research on human generated power which can find potential applications particularly in low power biomedical applications. The related systems need to be wearable and typically consist of sensors, signal conditioning electronics and wireless transmission technology. More power allows longer operation, higher sampling rates, and wireless transmission over a longer distance, and support of additional features. Therefore powerful, low weight and compact energy storage devices and energy harvesting from the human body are crucial technologies for extended and reliable operation.*

Key Words: *Chain Snatcher, Customized Gps, Soc*

Existing Method for Solving Chain Snatching:

This is one of the crimes which are increasing as the river flows downstream. Back -to- back chain snatching in the city put the cops on their toes. Even as chain snatchers go about their job with the catch-me-if-you-can spirit, police are working over-time to dent that spirit, but to no avail. Observing that the robberies have increased over the years, there is also a raise in chain snatching incidents. Thus chain snatching has become an urban phenomenon. Even though many cases have being lodged in the police station, but a very few cases have been solved, and many of the cases are still under investigation. In day today newspaper by default front page reads "again a chain snatcher strikes the city", a serious threat that scares the public to walk in and around city is "Chain snatching", and has become a challenge for the Police Department in capturing the culprits. The statics is as shown
below.

YEAR	STOLEN VALUABLES (IN RS)	NO. OF VICTIMS
2010	50,81,000	128
2009	30,69,450	95
2008	19,85,000	-

Statistics of chain snatching

With the above discussed issue and to meet the challenge I produce a novel idea for tracking the Chain Snatcher on Real time .This paper gives the demonstration on the same.

1. Harvesting power from Human Body for Powering Soc.
2. Working of Customized GPS-SoC.

1) Technology development for GPS Powering

The heat flow carries electrons with it, thereby generating a current. Today's thermoelectric generators operate when a temperature difference of greater than 10oC exists and can provide sufficient energy to power a useful function (e.g. to feed a pulse oximeter). Digital circuits use more energy than optimised analog circuits to accomplish the same calculations and signal processing tasks, thus producing more heat. Thus, in the context of developing human powered devices, good analog electronic design is a key competence. Furthermore,

analog systems have reduced heat dissipation in the tissue surrounding them and manage the circuit noise better.

In design a highly-integrated GPS RF Antenna Module suitable for L1-band GPS systems. The device is based on the same SiRFstarIV GPS architecture as used in the design, combined with high-efficiency antenna technology, and is designed to provide an optimal radiation pattern for GPS reception. All front-end and receiver components are contained in a single package laminate base module, providing a complete GPS receiver for optimum performance. The module operates on power harvested from human body to a single 1.8 V positive supply with low power consumption and several low-power modes for further power savings, allowing it to be powered by a 3.7 V lithium battery that is supplied by the Energy harvesters.

Smart Power Harvester from Human Body (SPHH)

The module includes a 'SPHH power' mode that reduces the power and makes energy-harvesting sources viable. The device enters a duty-cycle mode to reduce the average current consumption, but retains high accuracy and Performance so that it can track weak signals. Typically, under normal conditions in full power for 100-900 ms provides a fix of location, followed by a 1-10 second interval of a low-power standby state. Once in a while (typically every 1800 seconds) the module will return to Full-power mode to update the ephemeris data.

If the signal conditions are harsh (below 30 dB-Hz) the module will automatically switch to full-power mode to improve the navigation performance. When conditions return to normal, the module will return to normal mode. This results in variable power savings but, for a fixed output rate, much more reliable performance. Applications using Mode perform similarly to applications using full power, but with significant power savings in strong-signal conditions.

For designs where the antenna has to be added separately, GPS receiver module is a self-contained high-performance GPS receiver with an on-board LNA and SAW filter. Based on the SiRFstar III chipset, it provides high sensitivity and the very-low power consumption helps maximize runtimes in energy-harvesting applications. With over 200,000 effective correlates, the receiver can acquire and track up to twenty satellites simultaneously in just seconds, even at the lowest signal levels. Housed in a compact reflow-compatible SMD package, the receiver requires programming and additional RF components (except an antenna) to form a complete GPS solution. Five GPIOs are easily configured through simple serial commands, which, along with the module's standard NMEA data output, make it easy to integrate, even by engineers without previous RF or GPS experience. The GPS core handles all of the necessary initialization, tracking, and calculations autonomously, with programming is required. The RF section is optimized for low-level signals, and requires no production tuning of any type. Technological, Miniaturization and developments in nanotechnology will play a significant role in wearable medical devices making possible the use of harvested energy sources that are not currently viable. Power management techniques combined with new fabrication and device technologies are steadily decreasing the energy needed for electronics to perform useful functions, providing an increasingly relevant niche for energy harvesting in wearable systems

Software Implementation:

Once chain snatched NMEA PROTOCOL activates programs that provide real time location of the chain, there by the precise location of the snatcher. This control signal is taken into processor by UART.Its a single line ASCII text data.

Results:

Tracking the Snatcher

- Real Time Location of the Chain Snatcher
- Route taken by the Snatcher.
- Exact location of the Snatcher can be viewed any time on real time basis
- Speed of the vehicle can be viewed as per GPS
- Plan can be generated by police to snatch the chain Snatcher as per requirement with multiple options of Locations (Perimeter), Speed (High/Low).
- Alerts can be set to predefined Mobile numbers or predefined E-mail Id's of the victim.

Conclusion

With the latest GPS and power management ICs, modules and antenna designs, it is increasingly possible to develop ultra-small form-factor devices that are self-

powered from the human body environment, allows GPS receivers to be used in many more places, opening up exciting new applications. Wearable electronic systems include any autonomous device that is powered by a battery. The battery can be augmented by energy harvesting with secondary batteries being recharged from energy harvested outside the human body. As these devices are mainly at the research stage, many improvements will be needed concerning all their parameters.

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