UVM Innovations
The University of Vermont Office of Technology Transfer

Information Technology

Case # 256

# Algorithm Improves Sampling of Continuous Data Streams

*Competitive Advantages*

- ☑ Optimizes memory usage in sensor-based devices.
- ☑ Increases accuracy of sampled data.
- ☑ Applicable to wide variety of industries, including healthcare, government, and transportation.
- ☑ Adds value without increasing manufacturing costs.

Many sensor-based electronic devices collect samples of streaming data and store them in limited memory. Ideally, the sampled data accurately reflects the distribution of values in the entire stream.

## Benefits of Adaptive Sampling

Often data storage capacity is shared among applications, such as a GPS device that can play MP3 files simultaneously. If it can adapt to changing demands for storage, when MP3 playback ends the memory available for GPS will increase, allowing more sampling of data and more accurate determination of geographic coordinates.

In other devices, multiple data sources may compete for storage, such as hospital equipment that monitors several patients simultaneously. When monitoring is no longer needed for one patient, more data samples could be collected from the remaining patients.

## Ensuring Sample Uniformity

Until now, it has not been possible to ensure uniform sampling of continuous data if the sample size adapts to available storage space. The algorithm presented here corrects this deficiency by ensuring uniformity when the sample size changes.

If storage decreases, the algorithm randomly evicts data to maintain a uniform sample. If storage increases, the algorithm finds the minimum amount of data that should be drawn from the data stream to fill the storage, as well asas the amount to randomly evict. In each case, uniformity is maintained because every possible value has an equal probability of being included in or rejected from the stored sample data with a required confidence level.

## Commercialization

Industries that make use of sensor-based devices, such as heathcare, government, weather services, and transportation, would benefit from improved data sampling accuracy.

Hardware manufacturers and software developers specializing in each of these fields could easily gain a competitive advantage and marketing opportunities by incorporating the algorithm into their products.

## Patent/Licensing Status

Patent pending. Exclusive rights available.

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Data stream query article
www.cs.uvm.edu/tr/Papers/CS-07-02.pdf


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