



Ettaceo Corporation - Capability Statement

Company Profile

Ettaceo develops solutions to meet the challenges in efficient utilization of sensor data arising from the growth of sensor networks. The centerpiece of the technology is a scalable sensor data recording system that is capable of replicating multiple streams of the sensory data with a high degree of accuracy in relative timings.

Technology Summary

A time coherent multi-stream database (MSDB) records a large number of sensory data streams along with associated timing information for the purpose of review, analysis, and simulation. MSDB is designed with the goal of being able to replay multiple streams of data simultaneously and to keep precisely the relative timing among the data segments of the streams as they were produced. As a result, replaying the streams facilitates a reproduction of the evolution process of the target environment in a time-faithful manner.

Retaining sensor data for delayed processing is necessary not only in the case of inadequate real-time computing resources, but also for parameter extraction algorithms to run the datasets multiple rounds in order to understand and acquire useful information to an optimal extent, as in the case of data-mining and machine learning. With the ability to preserve aggregated sensor data streams chronically in their totality, MSDB extends data analytical toolset to include explicit time domain analysis and repeatable realistic simulation.

Unlike the traditional databases, MSDB treats stream data items as type-agnostic and mutually independent except the natural chronicle order of arrival. This is the key to achieve the scalability and performance needed to handle the sheer data volume a large sensor network may produce. Compared to the traditional media recorders, such as DVRs, MSDB trumps in three critical aspects: synchronous multi-stream retrieval, fine timing resolution, and type-agnostic stream handling. Thanks to its small code footprint, MSDB fits well to run on platforms from embedded system-on-chip to cloud-based server clusters, with expected performance scaling linearly to the platform's input/output capacity.

Key Applications

MSDB plays back captured sensor data to replicate a target system's evolution, with choices of speed, perspective, and focus of attention. It serves to gain insights into the system behaviors, as conceived valuable in force training, machine learning, and sensor system development, instrumentation, and validation.

A prominent application of MSDB is to record video streams from a set of cameras along with their orientation, zoom, and location information for after action reviews. The force training facility under the cameras' coverage is calibrated into a 3D model so that the videos can be geometrically projected onto it. As the trainer navigates through the 3D model, the recorded videos from the visible cameras are played back onto the 3D scene, synchronized to the navigation time. This enables the trainer to evaluate the trainee's performance with complete space-time sensibility. The same setup applies to free space robotic training.

In addition to assisting the investigation of a target system externally, the recorded sensor data streams can also be replayed to simulate external, continuous sensor input to a target system, creating a human-controllable environment for system instrumentation and validation. This is particularly applicable to those neural-net training processes where the training datasets are produced in a real and dynamic environment in which they are not verbatim repeatable, as in the case of autonomous driving.

System Datasheet (preliminary)

Maximum database size: up to 1 exabyte on EXT4
Maximum number of streams: up to 16 million
Max data unit size: up to 4 gigabytes
Data unit time resolution: up to 4 microseconds

Company Information

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