

Concurrent programming

Write a short note on the benefit of having concurrency in modeling the problem.

In this problem, there are 8 sensors that produces raw data continuously after which they are converted to integers in pre-processing stage. In the data fusion stage, the various sensory inputs (in the form of integers) are fused in three ways: averaged, multiplied and added. Now this problem can be handled sequentially or concurrently.

The benefit of using concurrency is to assign independent task to separate threads. The result is better performance. Here generation of raw data by each sensor is independent of other sensor. So the raw data from each sensors can be generated independently. Also the preprocessing of numbers,i.e. Converting binary strings to integer from each sensor is an independent task for each thread.

If however we program it sequentially, only after each sensor have generated a raw string the computation will take place. Also order is important in such case. However in real world, this is not what happens. The sensors generate data independently and the order in which they generate these strings is completely random. In such a situation, concurrency comes as a RESCUE!!

Propose a concurrent solution for the problem.

The concurrent solution which we have implemented in our program is as follows:

- a) For each sensor a separate thread is created which stores the preprocessed data in its own separate queue.
 - b) These thread generate raw data and preprocess them after certain time(1000 ms).
 - c) Concurrently, a thread is run which gets the first number from the queue if not empty otherwise waits until the number is generated and then performs sum, multiply and average on these numbers and check for threshold values.
-