Database Systems : Stream Analytics

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Abstract

Question 1 and 2 for the task 1 in the Database course

1 How to compute the size of the sub-window

We want to compute the size of the sub-windowW_1 that guarantees a maximum absolute error of $\epsilon * W$ for a window size W.

We saw in the course that with the jumping window structure, the error is introduced only in the oldest sub-window. This error is bounded by the size of the sub-window. However, one could tighten the bound With a simple schema (due to a minimization), and reduce it to half the size of the sub-window. Thus the size of the sub-window W_1 that guarantees a maximum absolute error of $\epsilon * W$ for a window size W is given by :

$$\frac{W_1}{2} \leq \epsilon * W$$

.

$$W_1 \leq 2 * \epsilon * W$$

Such that W_1 divides W.

2 Compute the maximum memory required for the structure

The maximum memory required for the structure is :

$$4 * 255 * (\epsilon + 1)W - 4 * 255$$

since the largest size that the new coming subwindow can reach is :

$$\epsilon * W - 1$$

References

[1] Database Course : EPFL.