Algorithm 1 QTS algorithm

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Input: Data Stream $DS$; $QTS$ height $h$; Sliding Window $w$; Sliding Window size $i$; Summarized Sliding Window $sw$; Summarized Sliding Window size $j$; Sliding Window Recent Data size $RD$; Sliding Window Old Data size $OD$; Reference Window $rw$; Multiplicative Threshold $\alpha$; Multiplicative Threshold $\beta$;
$flag\_initial \leftarrow true$;                         ▷ Flag indicates beginning of Data Stream
$n\_samples \leftarrow 0$;                               ▷ Number of processed samples
$flag\_dv\_change \leftarrow false$;                     ▷ Derivative change drift detection flag
$cont\_drift \leftarrow 0$;                              ▷ Auxiliary counter
$flag\_ocup\_change \leftarrow false$;                   ▷ Occupancy change drift detection flag
$cont\_ocup\_drift \leftarrow 0$;                        ▷ Auxiliary counter
for each $x_t$ in $DS$ do                                ▷ Streaming loop
    $n\_samples \leftarrow n\_samples + 1$;
    $w_i \leftarrow x_t$;                                ▷ Sliding window of the last $i$ samples of $x_t$
    $QTS_h \leftarrow \emptyset$;                        ▷ Set a empty $QTS$ with height $h$
    $sw_j \leftarrow QTS_h(w_i)$;                        ▷ Sliding window of the last $j$ number of data in $QTS_h$
    if $flag\_initial = true$ and $n\_samples > i + j$ then   ▷ Set initial Reference Window
        $rw \leftarrow sw_j$;
        $flag\_initial \leftarrow false$;
    if $abs(mean(derivative(sw_{RD})) - mean(derivative(sw_{OD}))) > \alpha \times std\_deviation(derivative(sw_{OD}))$ then   ▷ Drift condition
        Return $x_t$
        $flag\_dv\_change \leftarrow true$;
    if $flag\_dv\_change = true$ then
        if $cont\_drift < (i + j)$ then                  ▷ Wait for the new concept re-occupancy of Sliding Windows
            $cont\_drift \leftarrow cont\_drift + 1$
        else
            $cont\_drift \leftarrow 0$;
            $flag\_dv\_change \leftarrow false$;
            $rw \leftarrow sw_j$;                        ▷ Set a new Reference Window
    if $(abs(mean(rw) - exp\_mean(sw_j)) > \beta \times std\_deviation(rw))$ and $(flag\_dv\_change = false)$ and $(flag\_ocup\_change = false)$ then   ▷ Drift condition
        Return $x_t$
        $flag\_ocup\_change \leftarrow true$
    if $flag\_ocup\_change = true$ then
        if $cont\_ocup\_drift < (j)$ then                ▷ Wait for the new concept re-occupancy of Sliding Window
            $cont\_ocup\_drift \leftarrow cont\_ocup\_drift + 1$
        else
            $cont\_ocup\_drift \leftarrow 0$;
            $flag\_ocup\_change \leftarrow false$;
            $rw \leftarrow sw_j$;                        ▷ Set a new Reference Window
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