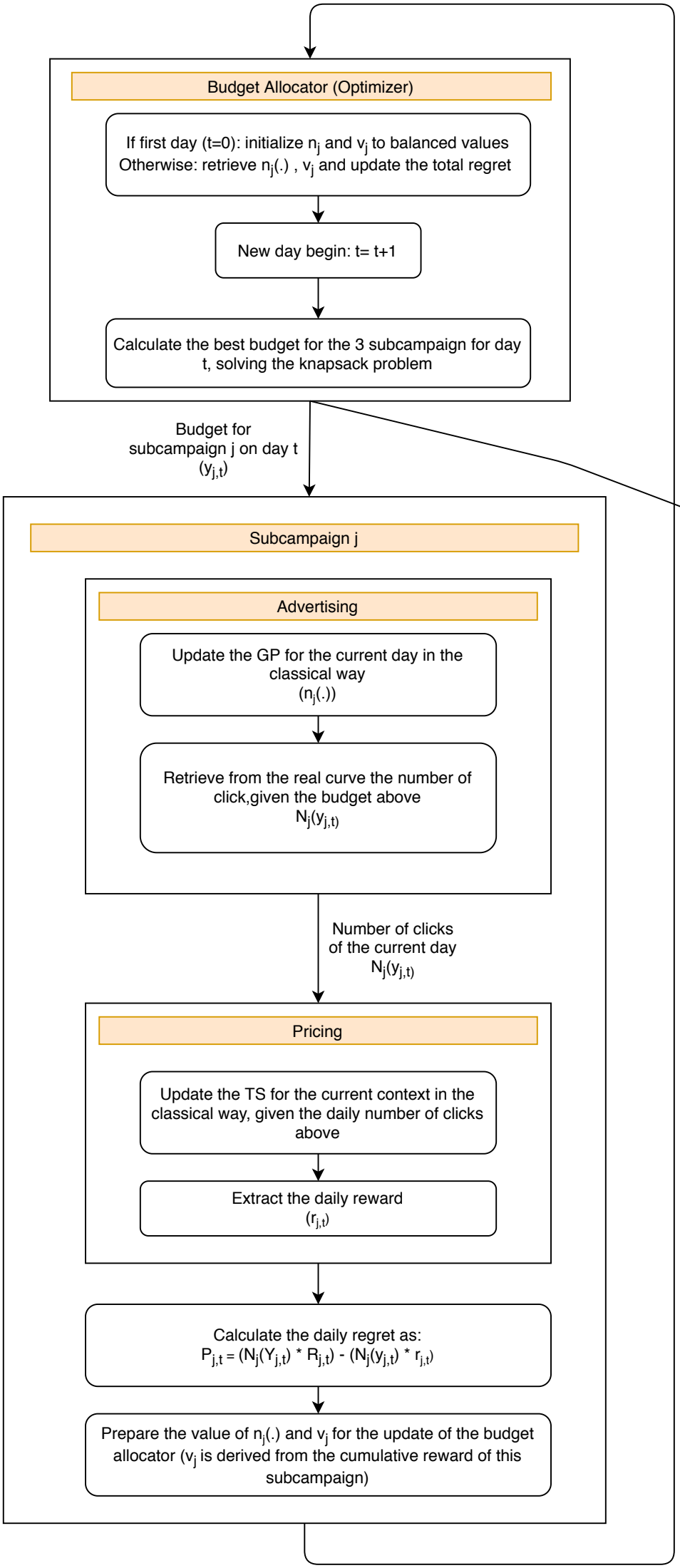

Legend:

t = current day

$N_j(.)$ = Real distribution function for advertising

$n_j(.)$ = Learned (from GP) distribution function for advertising

$Y_{j,t}$ = Real best budget allocation

$y_{j,t}$ = Learned best budget allocation for the budget allocator

$R_{j,t}$ = Best daily reward

$r_{j,t}$ = Learned daily reward

v_j = Value per click

New Knapsack problem to solve:

$$\max_{y_{j,t}} \sum_{j=1}^{N} v_j \; n_j(y_{j,t})$$

$$\text{s.t.} \sum_{j=1}^{N} y_{j,t} \leq \overline{y}_t$$