
Algorithm 2: Implementation of bandit algorithms with missing data and imputation

Input: trial size n ; probabilities of success p_k ; probabilities of missingness p_k^m .

Initialization: The initial prior $x_{k,0} = (s_{k,0}, f_{k,0})$.

while $t < n$ **do**

 Decision for allocation based on the current state

$x_{k,t} = (s_{k,0} + S_{k,t}, f_{k,0} + F_{k,t})$;

if *observed* ($p_k^m < u, u \sim U_{[0,1]}$) **then**

if *failure* ($p_k < u, u \sim U_{[0,1]}$) **then**

$F_{k,t} += 1$;

$S_{k,t} += 0$;

else

$S_{k,t} += 1$;

$F_{k,t} += 0$;

end

else

 Imputation based on $\hat{p}_{k,t}$;

if *failed* ($\hat{p}_{k,t} < u, u \sim U_{[0,1]}$) **then**

$F_{k,t}^{\text{imp}} += 1$;

$S_{k,t}^{\text{imp}} += 0$;

else

$S_{k,t}^{\text{imp}} += 1$;

$F_{k,t}^{\text{imp}} += 0$;

end

end

 Update $x_{k,t}$ with $(S_{k,t} + S_{k,t}^{\text{imp}}, F_{k,t} + F_{k,t}^{\text{imp}})$ for the next allocation

end

Output: $(S_{k,n} + S_{k,n}^{\text{imp}}, F_{k,n} + F_{k,n}^{\text{imp}})$
