The Debugging Decay Index: Rethinking Debugging Strategies for Code LLMs

Appendix

DDI Pseudocode

Algorithm 1 Debugging Decay Index (DDI) Calculation

Input: Debugging results CSV, threshold values θ, fresh start count ϕ
Output: DDI tuple $(E_0, \lambda, t_\theta, R^2)$
Procedure:

Data Preprocessing:
Calculate normalized effectiveness: $I_i = S_i/N_i$ for each attempt i
Where S_i = problems solved at attempt i, N_i = problems remaining at attempt i
Set $E_0 = I_0$ (initial effectiveness)
Exponential Decay Fitting:
if sufficient data points ($n \geq 3$) **then**
    Fit $E(t) = E_0 \cdot e^{-\lambda t}$ using nonlinear least squares regression
    Extract decay constant λ and calculate R^2 goodness-of-fit
else
    Set $\lambda = \text{None}$, $t_\theta = []$
end if
Intervention Point Calculation:
if $\lambda \neq \text{None}$ **then**
    for each threshold $\theta_j \in \theta$ **do**
        Calculate $t_{\theta_j} = \lceil \frac{\ln(100/(100-\theta_j))}{\lambda} \rceil$
    end for
end if
Return $(E_0, \lambda, t_\theta, R^2)$