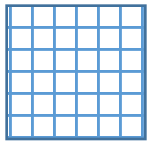
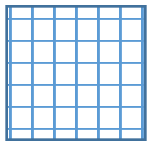
Data from the content tagging

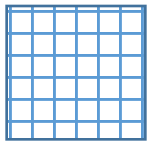
U: # users
Q: # items
K: # knowledge components
M: # adaptive modules

M
Q 

scope: boolean, shows items belonging to adaptive modules

K
K 

m_w: numeric (0-1), shows pre-requisite relations among knowledge components

K
Q 

m_tagging: integer (0 or 1), shows tagging of items with knowledge components

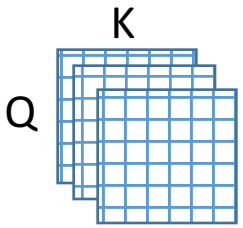
1
Q 

difficulty: numeric (0-1), shows tagging of items with difficulty levels

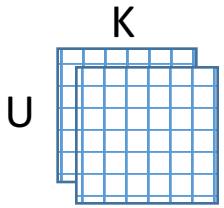
The ordering of users, items, knowledge components and adaptive modules never changes. Their indices serve as internally used IDs.

Data initialized by us

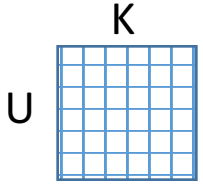
U: # users
Q: # items
K: # knowledge components
M: # adaptive modules



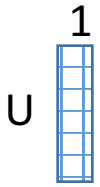
m_guess, m_slip, m_trans: numeric (≥0), odds of guessing ,slipping, knowledge transfer



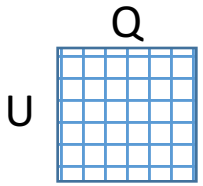
m_L_i: numeric (≥0), initial odds of mastery
m_L: current odds of mastery, in the beginning of the algorithm initialized equal to *m_L_i*



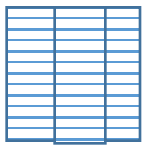
m_exposure: integer, # exposures to a KC, initialized with all 0s
m_confidence: numeric (≥0), exposure relevance to a KC, initialized with all 0s



last_seen: integer, the ID of the item last served to a user.
Initialized with -1s (or any other value not encountered among item IDs)



m_unseen: boolean, shows which items have been served to a user, initialized with all “True”

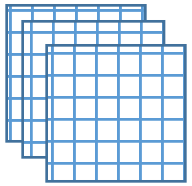


transactions: data-frame containing column [user, item, time, score], each row records a transaction.
Initialized with zero rows.

Data derived for convenience

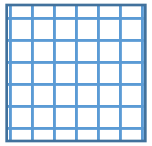
U: # users
Q: # items
K: # knowledge components
M: # adaptive modules

K

Q 

m_guess_neg_log, m_p_guess, m_slip_neg_log, m_p_slip, m_x0_mult, m_x1_0_mult, m_k: numeric

Q

K 

m_difficulty: numeric, derived from *difficulty*

Parameters

epsilon: numeric (e.g. 1e-10), a convenience cutoff
eta: numeric (e.g. 0.0), relevance threshold
M: numeric (e.g. 20.0), information threshold

r_star: numeric (e.g. 0.0), forgiveness threshold
L_star: numeric (e.g. 2.2), mastery certainty threshold (for logarithm of mastery odds)

W_r, W_c, W_d, W_p: numeric, importance weights of recommendation sub-strategies

stopOnMastery: boolean, a recommendation strategy parameter