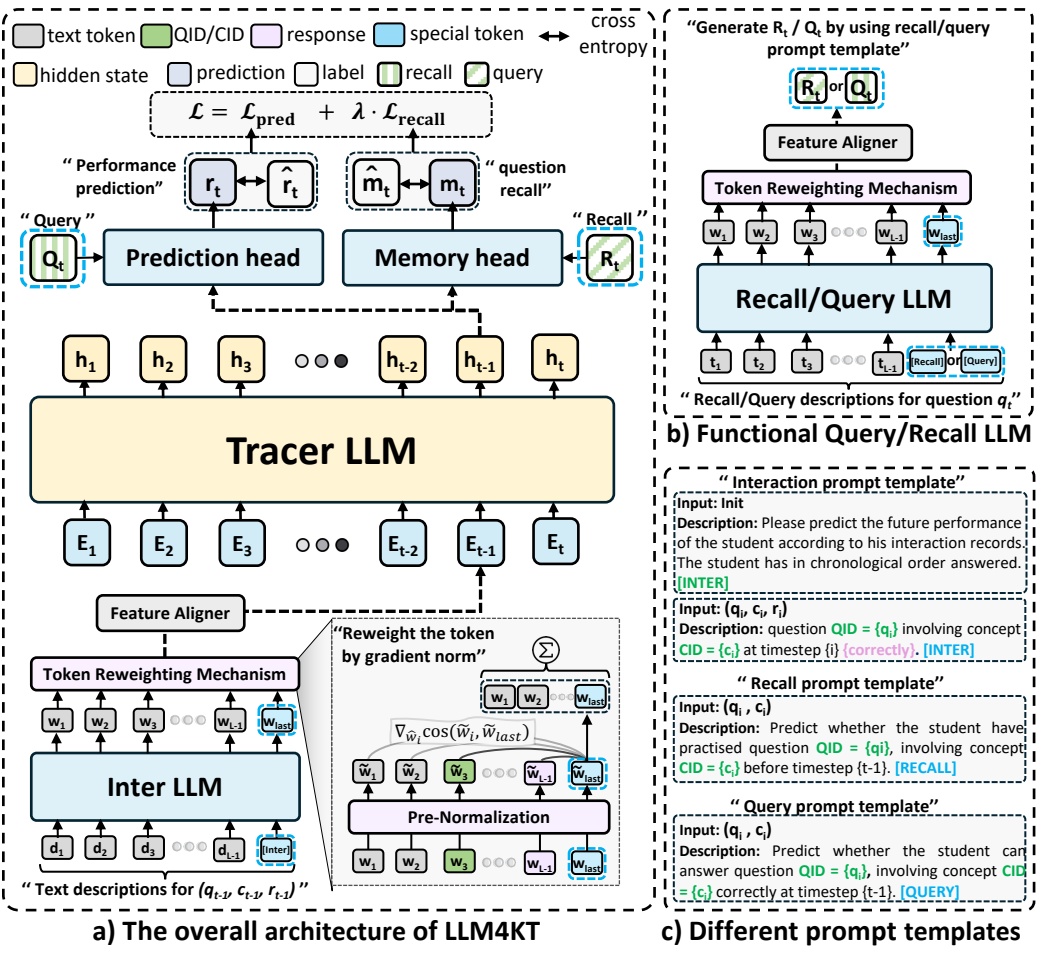
text token
QID/CID
response
special token
cross entropy
hidden state
prediction
label
recall
query
$\mathcal{L} = \mathcal{L}_{pred} + \lambda \cdot \mathcal{L}_{recall}$
" Performance prediction"
" question recall"
" Query "
" Recall "
Prediction head
Memory head
Tracer LLM
Feature Aligner
Token Reweighting Mechanism
Inter LLM
[Inter]
" Text descriptions for (q_{t-1}, c_{t-1}, r_{t-1}) "
"Reweight the token by gradient norm"
Pre-Normalization
" Generate R_t / Q_t by using recall/query prompt template"
Feature Aligner
Token Reweighting Mechanism
Recall/Query LLM
[Recall]
[Query]
" Recall/Query descriptions for question q_t"
b) Functional Query/Recall LLM
" Interaction prompt template"
Input: Init
Description: Please predict the future performance of the student according to his interaction records. The student has in chronological order answered. [INTER]
Input: (q_i, c_i, r_i)
Description: question QID = {q_i} involving concept CID = {c_i} at timestep {i} {correctly}. [INTER]
" Recall prompt template"
Input: (q_i , c_i)
Description: Predict whether the student have practised question QID = {qi}, involving concept CID = {c_i} before timestep {t-1}. [RECALL]
" Query prompt template"
Input: (q_i , c_i)
Description: Predict whether the student can answer question QID = {q_i}, involving concept CID = {c_i} correctly at timestep {t-1}. [QUERY]
a) The overall architecture of LLM4KT
c) Different prompt templates