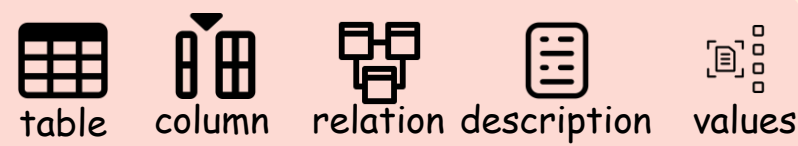


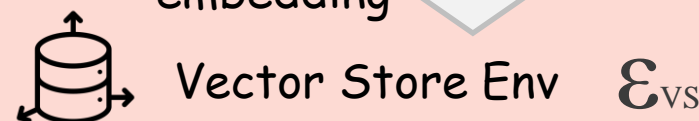
## Environment



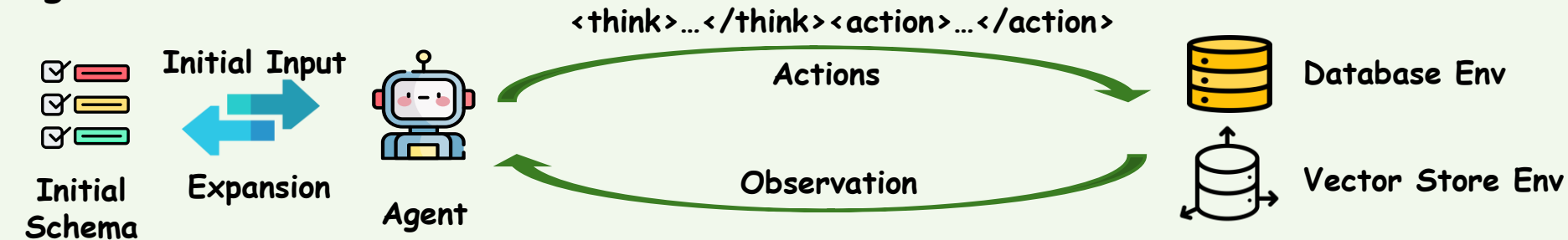
### Column Documents

Table:frpm, Column: rtype, values: .....  
 Table:frpm, Column: IRC, values: .....  
 Table:schools, Column: city, values: .....  
 .....

embedding



## Agent-Environment Interaction



## Initial Schema Construction

Question: Please list the phone numbers of the direct charter-funded schools that are opened after 2000/1/1.

Retrieve

Table: frpm, Column: school name, values: .....  
 Table: frpm, Column: school code, values: .....  
 Table: schools, Column: phone, values: .....  
 .....(top n)

Initial Schema (M-Schema)

[SCHEMA]  
 #Table: frpm[  
 (id, Primary key, INT, Description .....)  
 (school name, TEXT, Description: .....)  
 ]  
 #Table: schools[  
 (id, INT, Description: .....)  
 ]  
 [FOREIGN KEYS]  
 frpm.id = schools.id

## Action Space

W/ Feedback

Explore Schema

Retrieve Schema

Verify Schema

W/O Feedback

Add Schema

Stop Action

## Agentic Schema Linking Process

Instruction Prompt + Question + Complete Table List + Initial Schema

$\langle \text{think} \rangle$  The initial schema is missing a column indicating the **school opening date**. I'll inspect the `schools` table to check if such a column exists .....  $\langle / \text{think} \rangle$   
 $\langle \text{action} \rangle$  @explore\_schema(SELECT \* FROM pragma\_table\_info('schools') WHERE name LIKE 'open%')  $\langle / \text{action} \rangle$

SQL execution results:

cid	name	type	notnull	dflt_value	pk
20	OpenDate	DATE	0	None	0



$\langle \text{think} \rangle$  I have identified `OpenDate` in the `schools` table. I will add it to the schema. It seems sufficiently complete to attempt drafting a SQL query to verify .....  $\langle / \text{think} \rangle$   
 $\langle \text{action} \rangle$  @add\_schema(schools.OpenDate)  $\langle / \text{action} \rangle$   
 $\langle \text{action} \rangle$  @verify\_schema(SELECT s.`Phone` ..... LIMIT 5)  $\langle / \text{action} \rangle$

Add schools.OpenDate to initial schema

SQL Execution results : No data find.



$\langle \text{think} \rangle$  The draft SQL query returned no results. I will further investigate the schema for potential issues .....  $\langle / \text{think} \rangle$

$\langle \text{think} \rangle$  It appears that there is still a column missing, specifically one that identifies the **type of charter funding**. I will attempt to retrieve a column in the `frpm` table that records charter funding type .....  $\langle / \text{think} \rangle$   
 $\langle \text{action} \rangle$  @retrieve\_schema(The column representing the meaning of **charter funding type** in the frpm table)  $\langle / \text{action} \rangle$



Retrieval results: #Table: frpm[  
 (charter funding type , INT, .....)  
 ] (top m)

$\langle \text{think} \rangle$  Now I will add frpm.Charter Funding Type. There are enough schemas to address the question. Let's verify if we can draft a SQL query to answer the question ...  $\langle / \text{think} \rangle$   
 $\langle \text{action} \rangle$  @add\_schema(frpm.Charter Funding Type)  $\langle / \text{action} \rangle$   
 $\langle \text{action} \rangle$  @verify\_schema(SELECT s.`Phone` FROM ` ..... LIMIT 5)  $\langle / \text{action} \rangle$

Add frpm.Charter Funding Type to initial schema

SQL execution successful!



$\langle \text{think} \rangle$  The SQL draft query execute successfully, all schema has been obtained!  
 $\langle / \text{think} \rangle$   $\langle \text{action} \rangle$  @stop\_action  $\langle / \text{action} \rangle$

Terminate the process