Appendix

Function Name	Input Parameters	Output	Brief Description
get_all_connected_entity_types_of_user_entity	graph: Neo4j graph object, used to execute Cypher queries; user_name: String, the ID of the user entity.	Returns a list containing all entity types directly connected to the specified user entity.	This function queries the Neo4j graph database for all entity types that are directly connected to the specified user entity via any relationship, and returns these types as a list.
get_all_connected_entity_names	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type.	Returns a list containing the names of all entities of the specified type directly connected to the user entity.	Queries the Neo4j graph database for all entity names of the specified type that are directly connected to the given user entity and returns them as a list.
get_entity_attribute_names	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type; connected_entity_name: String, the name of the connected entity.	Returns a list of all attribute names of the specified entity.	Queries the Neo4j graph database for all attribute names of the entity with the specified name and type that is directly connected to the user entity, and returns them as a list.
get_entity_attribute_value	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type; connected_entity_name: String, the name of the connected entity; attribute_name: String, the attribute name.	Returns the value of the specified attribute of the specified entity.	Queries the Neo4j graph database for the value of the specified attribute of the entity with the given name and type that is directly connected to the user entity.
set_entity_attribute_value	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type; connected_entity_name: String, the name of the connected entity; attribute_name: String, the attribute name; new_value: The new value for the attribute.	Returns the information of the setting.	Updates the value of the specified attribute for the entity with the given name and type that is directly connected to the user entity in the Neo4j graph database.
add_connected_entity	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type; relationship_type: String, the relationship type; connected_entity_name: String, the name of the connected entity; attributes: Dictionary, the attributes of the entity.	Returns the information of the adding.	Adds a new entity with the specified attributes and connects it to the user entity via the specified relationship type in the Neo4j graph database.
get_k_hop_entities	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type: String, the entity type. connected_entity_name: String, the name of the connected entity; k: Integer, the number of hops.	Returns a list of names of entities that are k hops away from the specified entity.	Queries the Neo4j graph database for all entities that are k hops away from the specified entity via the given relationship type and returns their names as a list.
get_connected_entity_relationship	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type1: String, the first entity type; connected_entity_name1: String, the name of the first connected entity; entity_type2: String, the second entity type; connected_entity_name2: String, the name of the second connected entity; relationship: String, the relationship type.	Returns a list containing details of the specified relationship between the two entities.	Queries the Neo4j graph database to check if there is a specified relationship between two entities connected to the user entity and returns the relationship details.
add_relationship_between_entities	graph: Neo4j graph object; user_name: String, the ID of the user entity; entity_type1: String, the first entity type; entity_type1: String, the first entity type; connected_entity_name1: String, the name of the first connected entity; entity_type2: String, the second entity type; connected_entity_name2: String, the name of the second connected entity; new_relationship_type: String, the new relationship type; new_attributes: Dictionary, the new relationship attributes.	Returns the information of the adding.	Adds a new relationship with specified attributes between two entities connected to the user entity in the Neo4j graph database.

Table A1. Descriptions of functions in the designed knowledge graph interaction toolkit.