KNEO 330 EdgeGPT Server Administrator Manual

(v 0.20.9)

Mar 2025

Revision History:

Doc Version	Description	Firmware Version	Author	Date
0.20.3	Update the user interface (UI)	V0.20.3	Oscar Law	2025/01/24
0.20.6	Improve the inquiry accuracy	V0.20.6	Oscar Law	2025/02/13
0.20.8	Fix the inquiry errors	V0.20.8	Oscar Law	2025/03/05
0.20.9	Fix the database creation bugs	V0.20.9	Oscar Law	2025/03/12

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1 Introduction

The KNEO 330 is an EdgeGPT server powered by an NPU, tailored for Large Language Model (LLM) applications and offering 48 TOPS of AI computing performance. It features an all-metal body with fan-based cooling and boasts multiple peripheral interfaces for enhanced functionality. Compared to traditional GPU-based LLM inference, the KNEO 330 excels in cost-effectiveness, energy efficiency, and overall performance for Artificial Intelligence Generated Content (AIGC) applications. The system supports multiple-user access and functions like the chatbot with user-defined answers. Moreover, it is no longer limited to the text inputs for the knowledge base creation, it also supports embedded document (.pdf), video subtitle (.srt), and graphics (jpg/png) file formats. Finally, it allows the users to access the custom knowledge base through the private group.

The KNEO 330 comes with Kneron's proprietary edge chatbot software, designed primarily for answering questions and providing information. It functions similarly to an advanced offline virtual assistant. Key features and applications of this chatbot include:

1. **Q&A:** Support general inquiry for various areas: science, history, culture, technology, and more.
2. **Language Understanding:** Exhibits strong natural language processing abilities, enabling it to comprehend and respond to complex and abstract queries.
3. **Multiple Users Access:** Allow multiple users to access the machine without performance degradation.
4. **Parallel Processing:** Support multiple machines parallel processing to improve the overall performance
5. **Multiple Media Inputs:** Support additional embedded documents (docx/pdf), images (.jpg/.png), and video subtitles (.srt) inputs for the knowledge base creation
6. **Traditional Chatbot Support:** Offer the traditional Chatbot with user-defined answers using a new feature (i.e. Company QA)
7. **Rational Database:** Utilize a large language model (LLM) to assist with relational database manipulation (e.g., Company SQL) for multiple spreadsheet/sheet access.
8. **Knowledge Base Sharing:** Share the custom knowledge base through the private group (i.e. Company Organization)
9. **Text Generation:** In addition to answering questions, it can generate articles, craft stories, and produce creative content.

10. **User Interaction:** Facilitates smooth conversations with users, offering helpful responses and suggestions based on database information. It can be applied in various fields such as education, customer support, HR, corporate training, and IT support.
11. **Chatbot Assistant:** Customize the chatbot for various financial, insurance, medical, teaching, and meeting assistants.
12. **Privacy and Security:** Provide data protection for user information, data, and privacy using offline mode.

2 EdgeGPT Server

2.1 Product Overview

- KNEO 330 EdgeGPT Server

Figure 2-1 KNEO 330 EdgeGPT Server

- KNEO 330 EdgeGPT Server Interface[1]

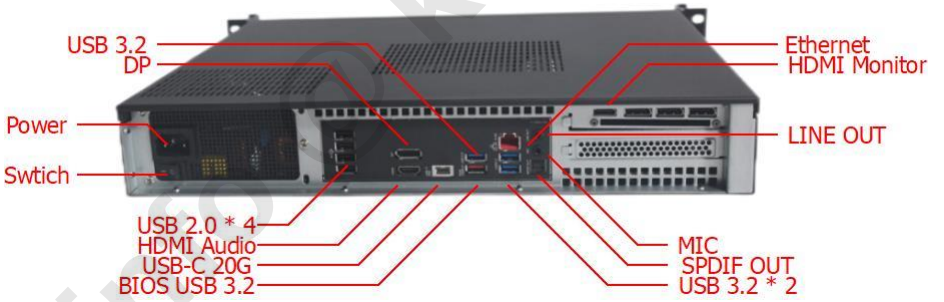


Figure 2-2 KNEO 330 EdgeGPT Server Interface

[1] Use only the top right HDMI port to connect to the monitor for display, while the other HDMI port is designated solely for audio connection only

The KNEO 330 EdgeGPT server is a standard equipment module[2] for data centers. Please consult IT professionals about installation. The KNEO 330 EdgeGPT server adopts an air-cooling system, it is recommended to leave space at the top to ensure proper airflow for cooling.

When the front panel ON/OFF button is activated (indicated by the blue light), it initiates the system in active mode. When the button is turned off, it initiates a soft shutdown, placing the system in standby mode without cutting off the power supply. Pressing the button wakes up the system. The back panel switch directly connects/disconnects the power supply. When the switch is off, the system is completely shut down even if the front panel ON/OFF button is pressed. It recommends the administrator turn off the ON/OFF button first followed by the back panel switch to move the system.

Product Parameters

CPU	Intel i5 10 cores 16 threads 4.6 GHz CPU
NPU	48 TOPS (INT8) equivalent
DRAM	32 Gb DDR4
Storage	2Tb SSD
Power	100-240V, 50/60Hz Avg 140W, Max 320W
Operating System	Ubuntu Linux
Size	428 x 350 x 66.6 mm (16.85 x 13.78 x 2.62 in)
Weight	7.3 kg (16.09 lb.)

Table 2-1 KNEO 330 Product Specification

2.2 Accessories List

Upon receiving the device, ensure that all accessories are included. Additional Ethernet and HDMI cables are necessary to connect the machine to the internet, and a monitor for system setup.

[2] There are multiple input/output data ports, including High-Definition Media Interface (HDMI), Universal Serial Bus (USB), Display Port (DP), LINE OUT (Audio Output), and Sony/Philips Digital Interface Output (SPDIF OUT)

- KNEO 330 EdgeGPT Server
- One AC power cord

In addition, during use, you also need the following conditions:

- Display Monitor or TV with HDMI port.
- Network 100M/1000M wired network.

2.3 Hardware Configuration

Please follow the instructions to set up the KNEO 330 EdgeGPT server:

- Connect the power cable to the 100-240V 50/60Hz power cord.
- Connect the device and monitor with the HDMI cable.
- Plug the network cable into the Ethernet port and connect it to the network.
- Once powered on, the device will automatically start, and the default terminal is initialized. The administrator first logs in to the system with user ID: aiuser with password: aiuser, then types the command: ifconfig to display the server IP address shown in inet entry (i.e. 10.200.210.237) for web access

```
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 6.8.0-40-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

45 updates can be applied immediately.
7 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Fri Sep 13 14:23:45 2024 from 10.200.211.96
aiuser@kneron330:~$ ifconfig
eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.200.210.237  netmask 255.255.255.0  broadcast 192.168.200.255
        inet6 fe80::2979:5613:2a22:d58  prefixlen 64  scopeid 0x20<link>
```

```
        ether 10:7c:61:74:cd:d0  txqueuelen 1000  (Ethernet)
        RX packets 9407575  bytes 698190452 (698.1 MB)
        RX errors 0  dropped 606829  overruns 0  frame 0
        TX packets 191990  bytes 117483916 (117.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 211475  bytes 86707283 (86.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 211475  bytes 86707283 (86.7 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

2.4 WEBUI Interface

2.4.1 Session Initialization

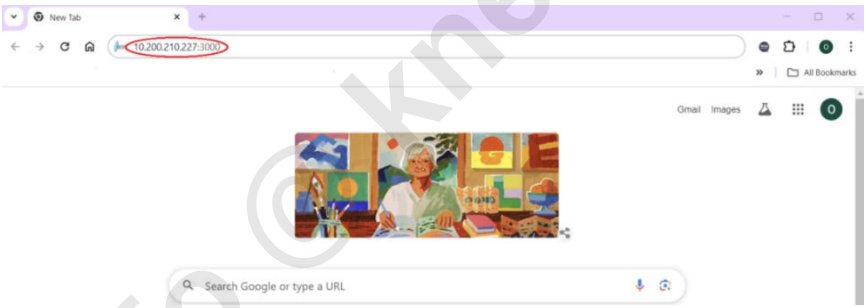


Figure 2-3 Browser Access

The administrator initiates web access using the WEBUI interface. For intranet access, it must employ the prefix: Hypertext Transfer Protocol Secure (i.e. HTTPS)[3], then enter the IP address (e.g., 10.200.210.237) followed by port 3000 in the browser, resulting in the web address (https://10.200.210.237:3000). For internet access, it enters the domain name (e.g., <domain.com>) with port 3000,

[3] HTTPS is the secure requirement to access the KNEO 330 EdgeGPT server

resulting in the web address (https://<domain.com>:3000). The administrator must enter the IP address: (i.e. https://10.200.210.237:3000) to log in to the system.

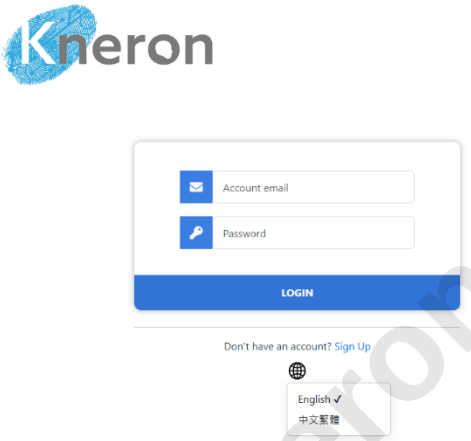


Figure 2-4 WEBUI Login Page (English)

The WEBUI interface is set to English by default, it can click the icon to switch to Traditional Chinese. The administrator can log in to the system using the username: admin@useradmin.com[4] with the password: admin123.

[4] KNEO 330 system administrator login domain is different from KNEO 300 one.

Figure 2-5 WEBUI Login Page (Chinese)

Figure 2-6 WEBUI Session (English)

The menu in the top-left corner displays the chat history and includes a toggle button to switch it on or off. The username is shown at the bottom-left corner,

along with a button for logging out. In the top-right corner, the administrator can find the Free Chat and Knowledge Base modes toggle button. The administrator clicks the setting button in the top-right corner menu button to open the Settings Menu and switches the language between English and Chinese using the language button. The software release is indicated in the version display.

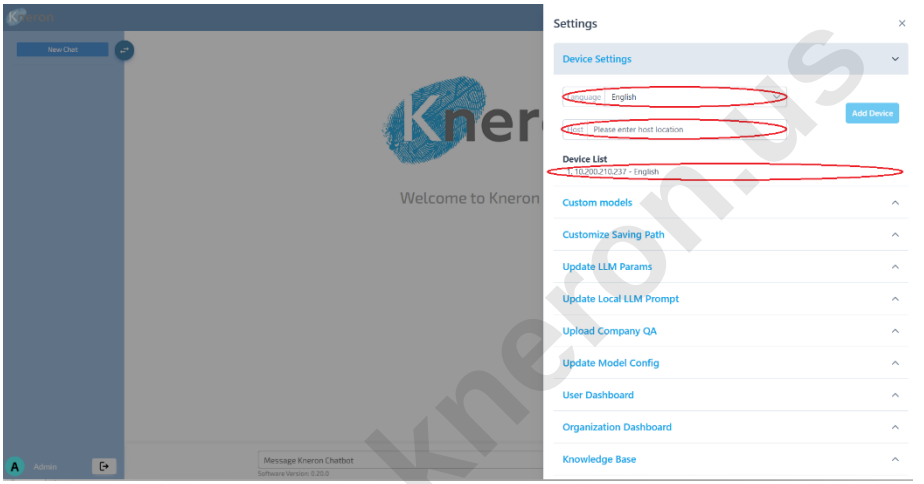


Figure 2-7 WEBUI Setting Menu

In the setting menu, the administrator first sets the language to English in the Language box, enters the device IP address (e.g., 10.200.210.237) in the Host field, and clicks the ADD DEVICE button. It takes a few minutes for the KNEO 330 to initialize the system.

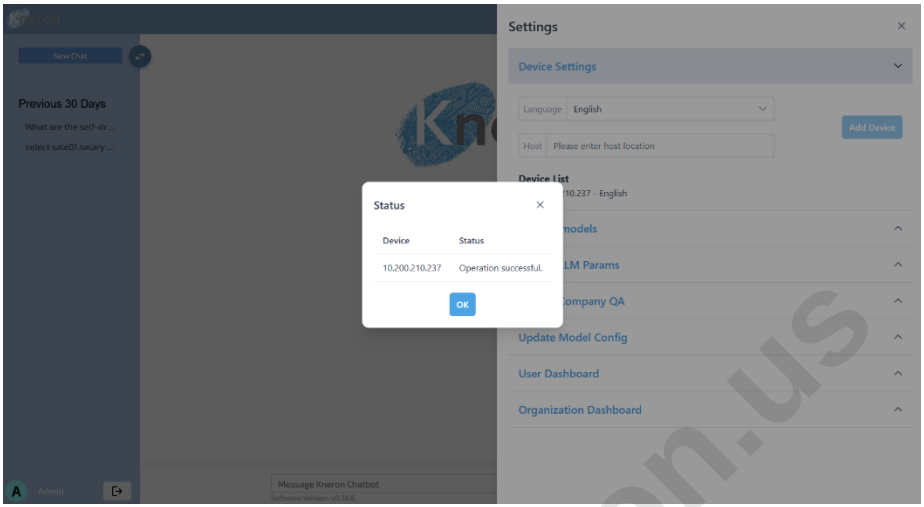


Figure 2-8 WEBUI Device Menu

Once initialization is completed, the device IP address appears in the Device List dialog box. The machine is linked with the system, it is no longer required to initialize the machine in the future. The device IP address will be shown in the Device List dialog box during the next login. The administrator can follow the same steps to add additional machines for inquiries, the additional machine needs to follow the same language model as the Host. It is strongly recommended to run only one machine during an inquiry session.

2.4.2 Knowledge Base Path

The knowledge base is stored in the default directory <default directory>. This directory is divided into two subdirectories: EN (for English) and ZN (for Chinese), which store the language-specific knowledge base based on the system language setting. All databases will be stored in the EN subdirectory <saving path> if the language is set to English. The default directory refers to the public/database for the public database and is defined as <username>/database for the regular user. The database is stored in the device with the default directory: <default directory>/content/EN/<saving path>. For the external device (i.e. USB driver and

NAS storage)[5], the <default directory> is replaced with the machine data path (i.e. USB driver: /dev/sdb1 and NAS storage: /mnt/kds/data_feed), the absolute path becomes /dev/sdb1/content/EN/ or /mnt/kds/data_feed /content/EN.

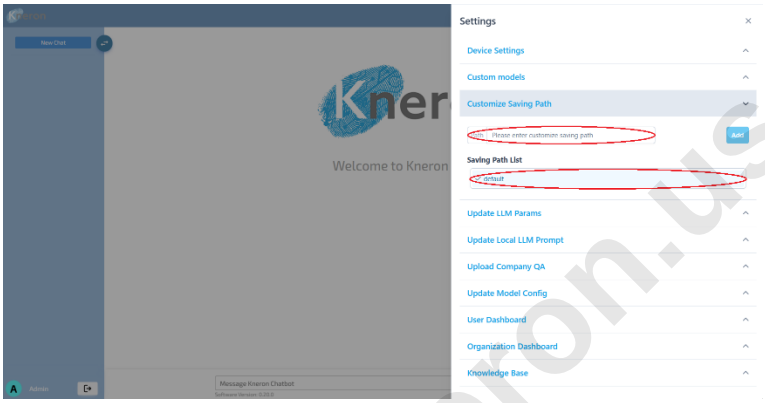


Figure 2-9 Knowledge Base Data Path

The administrator can set the custom knowledge base path using the Path box with the Add button, which adds the path to the Saving Path List. The administrator can select different data paths using the check mark symbol ⊘ and remove the path using the garbage 🗑 symbol. It is useful to save the database to the other directory or mounted devices.

2.4.3 Free Chat Mode

The KNEO 330 offers two chat modes: Free Chat and Knowledge Base modes, which allow the user to switch between these modes using the buttons: Free Chat and Knowledge Base Q&A. Free Chat mode is the default mode which is used for general inquiries. The Knowledge Base mode allows the user to retrieve the correct answer directly from the custom database.

[5] Please refer to Section 4.2.1 for detail external device setup

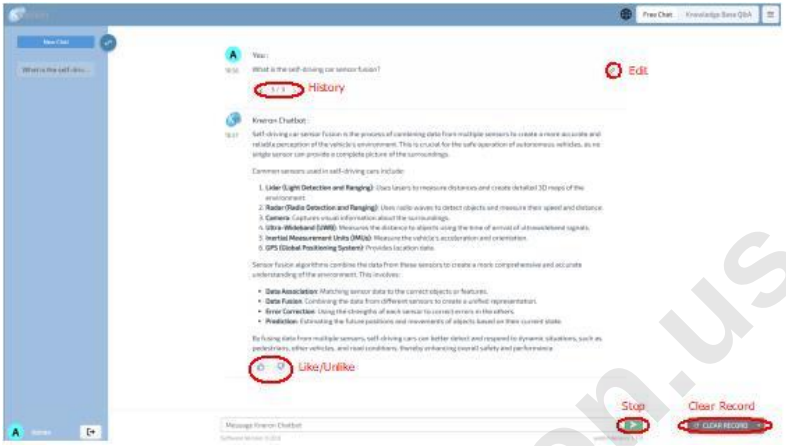


Figure 2-10 Free Chat Mode

For the default Free Chat mode, the user enters the inquiry into the Message Kneron Chatbot box and presses the green arrow key, the response appears in the Dialogue Box. The chat history is shown under the New Chat section. The user edits the prompt using the edit icon and iterates the history with the history icon (< n/n >) where n indicates the times of modification, The user can stop the chat using the red stop button or clear the inquiry using the CLEAR RECORD button. The like/unlike icon is used for system statistical analysis.

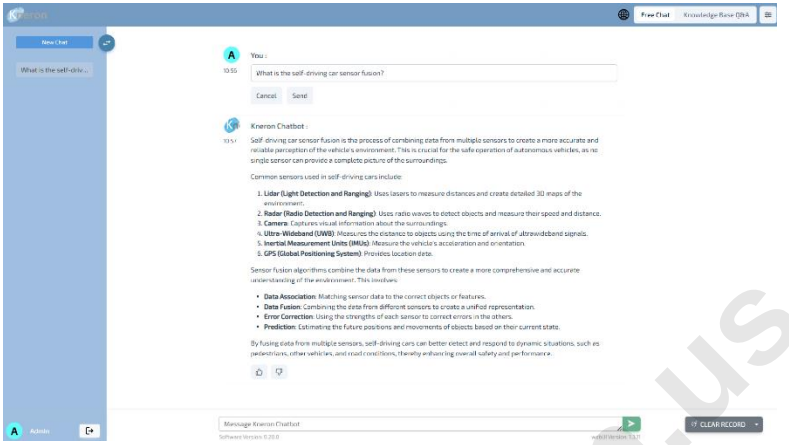


Figure 2-11 Prompt Edit

By clicking the edit icon, the administrator opens a window where the prompt can be modified. The Send button evaluates the prompt, and the Cancel button dismisses the inquiry.

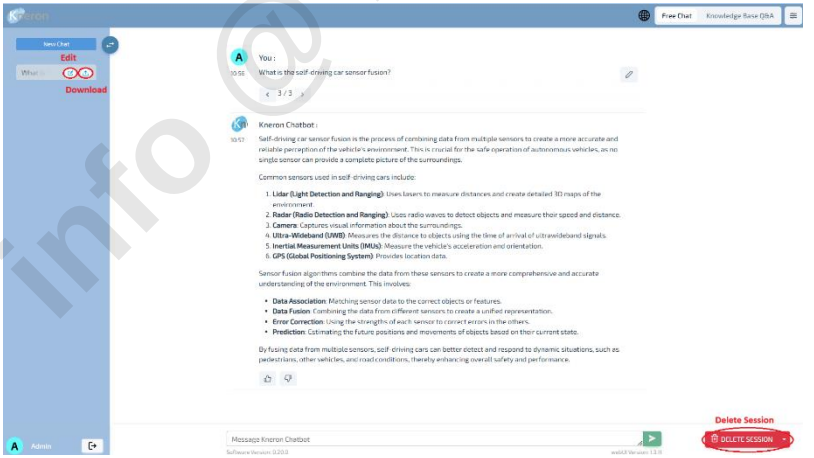


Figure 2-12 Chat Session

The user can click on the chat tag to reopen a chat session, and the chat tag can be modified by using the edit button. To download a chat session, the user clicks the download button; the session will be saved in JSON format and compressed into the local machine Download directory. Additionally, the user can select a chat session and click the DELETE SESSION button to remove it. A warning message will appear, prompting the user to confirm the deletion of the chat session from history.

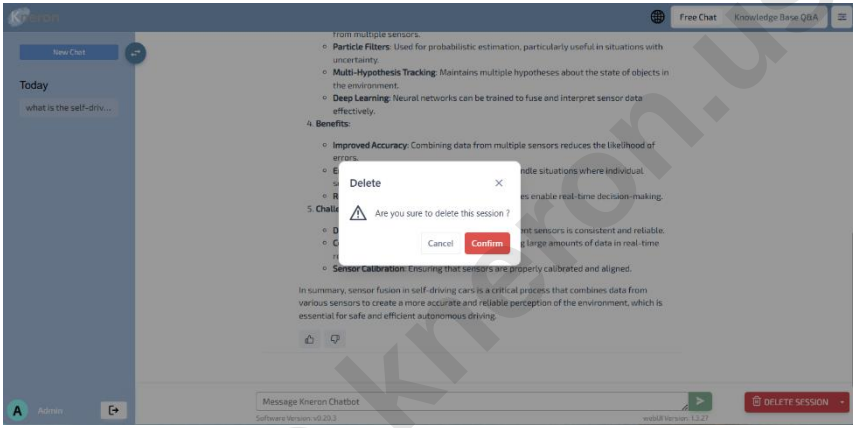


Figure 2-13 Chat Session Delete

The latest software adjusts the LLM parameters to control inquiry results. In Figure 2-14, the Update LLM Params offers two post-processing modes: Top P and Greedy. For Top P mode, the Temperature setting controls output diversity, with lower values producing more conservative and predictable results, while higher values lead to more varied and creative outputs. The range of temperature varies from 0 to 1. The default temperature is set to 0.5. The Top P mode generates random output based on the [Top P] slider, which can be adjusted between 0 and 1. Higher values result in more randomness. The default Top p is set to 0.3. Additionally, the Repetition Penalty prevents repeated outputs by applying a penalty, adjustable between 1 and 1.1. The default Repetition Penalty is set to 1. It recommends maintaining the default settings for general usage. Greedy mode

typically generates the same outputs by selecting those with the highest matching probability, the range is also set between 1 and 1.1

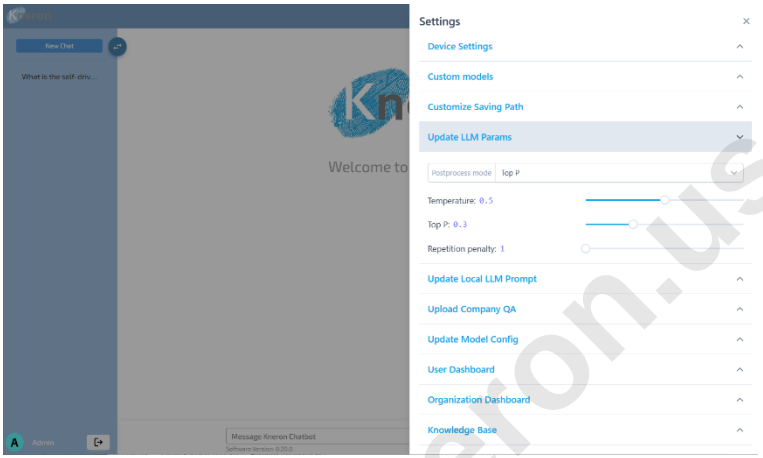


Figure 2-14 Chat Mode Setting

2.4.4 Knowledge Base Mode

The administrator can create a knowledge base to handle all the custom inquiries, the inputs can be either a single file or multiple files stored in a directory. The administrator clicks the MANAGEMENT button to pop up the management menu. The administrator then enters the name <user>/<database> (e.g., public/bda602) in the Knowledge Base List box[6] for knowledge base creation. There are two types of knowledge bases: public and personal. The public knowledge base is accessible to all users, while the personal knowledge base is shared only with invited users within the Company Organization. Next, the administrator clicks the Management button again and uploads the data[7] using the Drop files box and the Upload button. The administrator clicks the Confirm button on the Confirm Settings page, then the system automatically uploads the files to the system,

[6] The system will display an error message if the database name includes special characters.
[7] Multiple files are stored in a directory and compressed into a zip format before uploaded to the system.

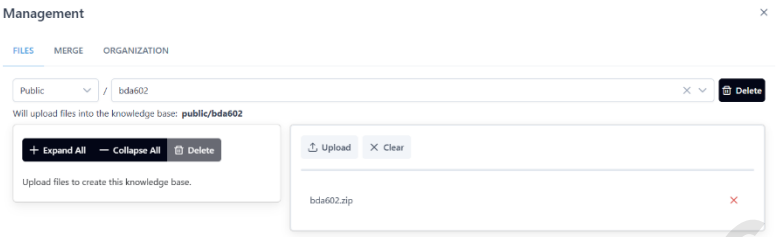


Figure 2-15 Create a Custom Knowledge Base

During the file upload process, the LLM parameters setting pops up. The administrator confirms the parameters. The EXTRACT_TABLE_OCR and EXTRACT_PAGE_OCR parameters are subject to change for document table and page extraction.

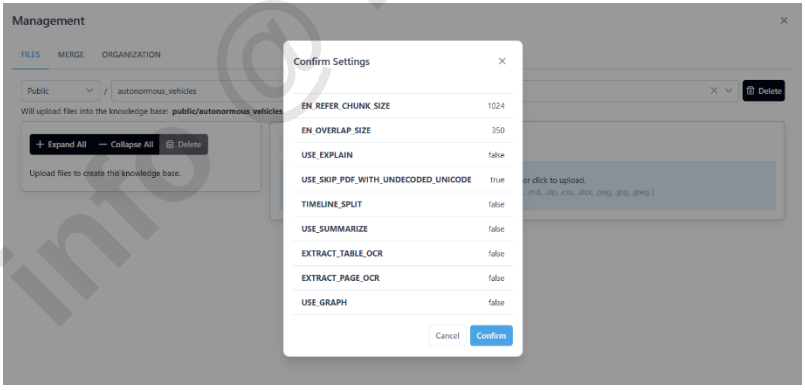


Figure 2-16 Confirm Custom Knowledge Base Creation

For uploading multiple files, the administrator can click + Expand All to display the files within the subdirectory and use - Collapse All to hide the list.

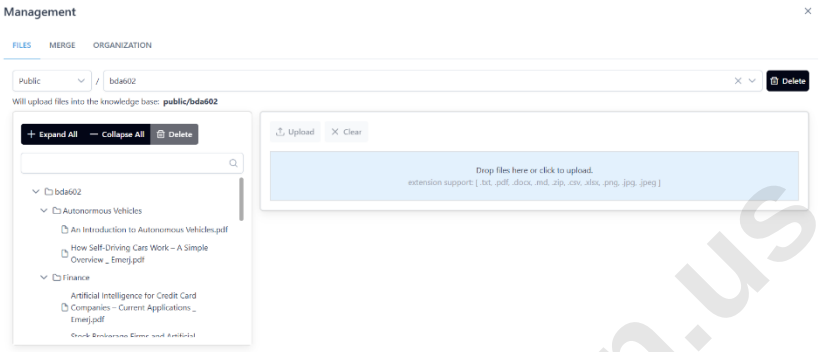


Figure 2-17 Custom Knowledge Base Directory List

The KNEO 330 supports multiple file formats, including .txt (text), .pdf (portable document format), .docx (Microsoft Word Document), .xlsx (Microsoft Excel Worksheet)[8], .csv (Microsoft Excel Comma Separated Value File)[9], .md (Markdown-formatted text), .jpg/.jpeg (Joint Photographic Experts Group), .png (Portable Network Graphic) and .zip (compressed files). File names should not contain special characters such as space, (), {}, or []. Depending on the file size, uploading may take a few minutes or longer. The administrator can create databases in both public and user directories, whereas general users can create databases only within their user directory.

[8] The system supports the Microsoft Excel Worksheet with multiple sheets
[9] When saving the spreadsheet in ".csv" format on a UNIX/LINUX system, please choose “Save cell formula instead of calculated values." option

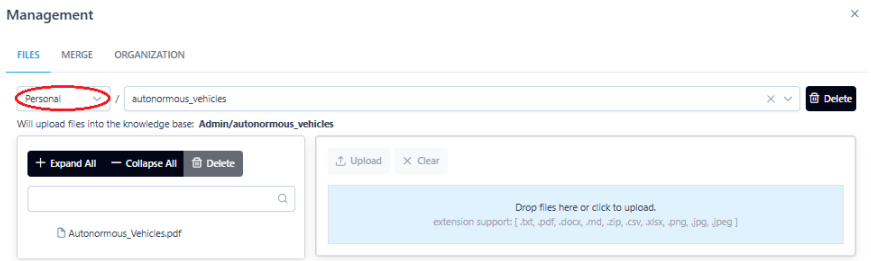


Figure 2-18 Share Custom Knowledge Base

The user can share a custom knowledge base with others in a private group[10] during the database creation process. The administrator should set up the knowledge base using Personal instead of Public shown in Figure 2-18. Once the database is created, the user clicks the ORGANIZATION button, selects the desired knowledge base from the Knowledge Base List, chooses the appropriate organization from the Selected Organizations menu, and presses the ADD button. This allows the knowledge base to be shared with private group users. Additionally, the user can remove the knowledge base from the group by using the REMOVE KNOWLEDGE BASE FROM ORGANIZATIONS option. A symbol (+ or x) is associated with the organization name. During removal, the user should ensure the symbol is set to +.

Once the custom knowledge base is created, the administrator clicks the cross symbol in the top right corner and returns to the knowledge base inquiry page. The knowledge base name appears in the Knowledge Base List box, and loaded files are displayed in the Files in the Knowledge Base box. **The Knowledge Base must be selected before inquiries.**

[10] Please refer to Chapter 2.4.6 Company Organization, it describes how to set up the private group and invite the users to join

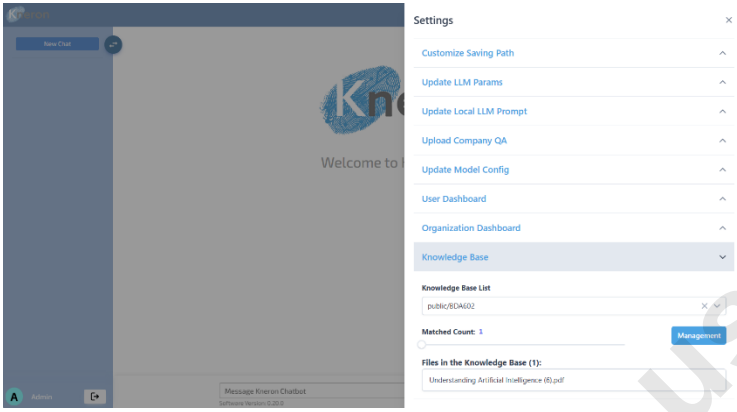


Figure 2-19 Manage Custom Knowledge Base

The user can select different databases from the Files in the Knowledge Base box for inquiry, enter a prompt into the Message Kneron Chatbot, and adjust the Matched Count: [n] sliding bar (where n is 1, 2, 3, 4, or 5) [11] to access more matching results. Based on the matched count, the system displays the related document with its position in percentage and arranges them according to the match relevance.

Additionally, the user clicks the source [n], which directs to the original page source and allows the user to validate that the results are correct and accurate. The OPEN SOURCE [n] displays the document source for further examination. The user cross-references the document with other sources and ensures the data is properly cited.

[11] It recommends setting the Matched Count to 5 if the USE_GRAPH option (Retrieval-Augmented Generation - RAG) is turned on. It improves the knowledge base matching accuracy.

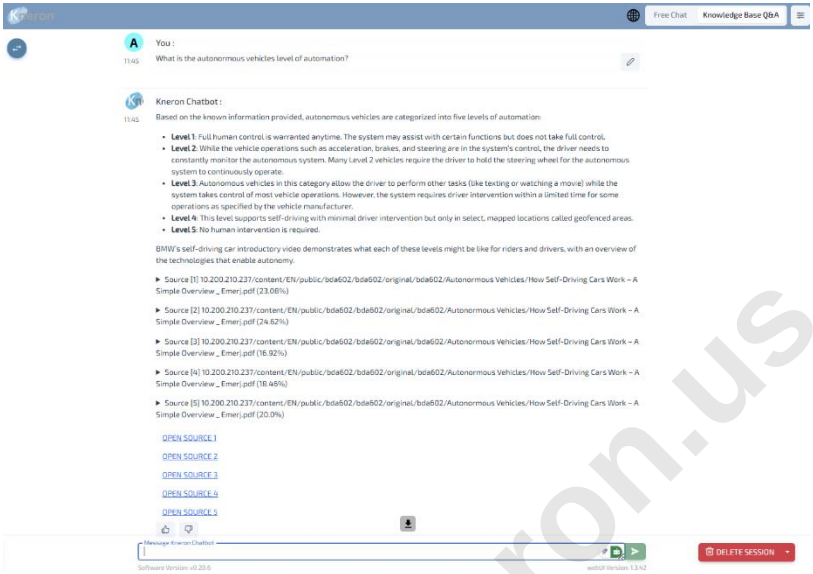


Figure 2-20 Knowledge Base Inquiry

The pop-up menu offers two additional functions: merge and delete. To merge two databases, it first clicks the MERGE button, a new pop-up menu shows how to merge from one database to another.

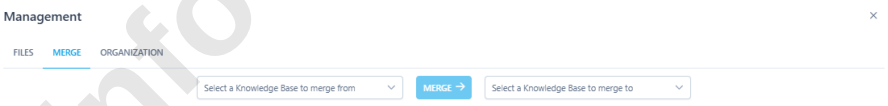


Figure 2-21 Merge Custom Knowledge Base

To delete the database and files, the administrator selects the knowledge base and then clicks Delete button to remove the database from the file system. The administrator can also highlight an individual file from the directory list to delete.

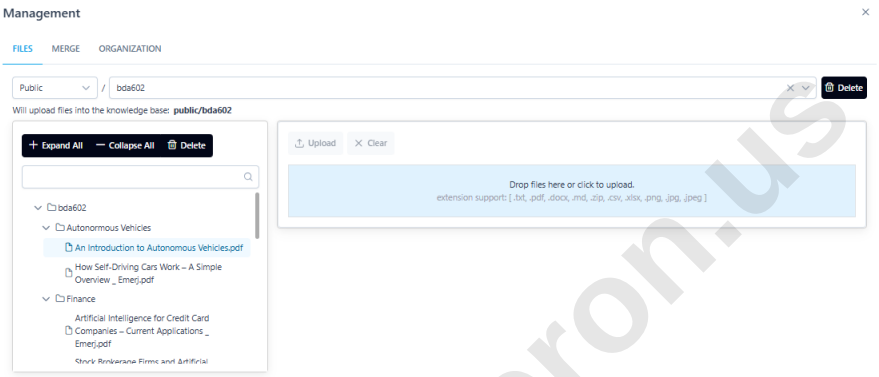


Figure 2-22 Delete Single/Multiple Files or Custom Knowledge Base

The administrator can configure the knowledge base model through the Update Model Config submenu, which includes KNOWLEDGE _BASE_CREATION and KNOWLEDGE_BASE_QA.

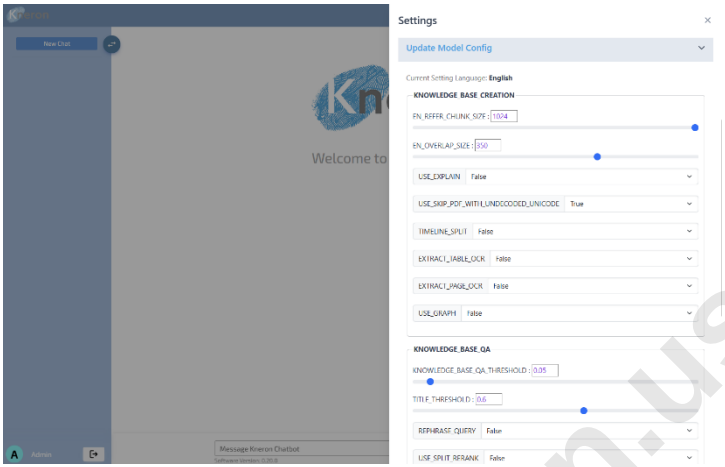


Figure 2-23 Knowledge Base Creation Configuration

The administrator can optimize the model through the option: KNOWLEDGE_BASE_CREATION, which improves performance by adjusting the chunk size (number of characters) using EN_REFER_CHUNK_SIZE[12]. It refers to the amount of processing data ranging from 0 to 1024 during the reasoning. The chunk size can effectively manage memory usage and improve processing efficiency. Reducing the chunk size increases accuracy with longer processing time. The processing chunks are linked together through the overlap controlled by EN_OVERLAP_ SIZE. It refers to the number of words or phrases shared between two or more text segments during the processing. It recommends setting the overlap to approximately 15% to 25% of the chunk size. Overlap can preserve contextual information to achieve better accuracy with more computational resources. The overlap size must be less than half of the chunk size.

USE_EXPLAIN connects the keyword to relevant information during knowledge base creation, offering a more detailed explanation when answering questions. The USE_SKIP_PDF_WITH_UNDECODED_UNICODE option is used to prevent Unicode errors in the PDF files, it bypasses PDF files with undefined Unicode

[12] The prefix EN refers to the English setting and ZH is used for the Traditional Chinese one

characters for knowledge base creation. TIMELINE_SPLIT is the input file option that allows the system to process the video SubRip Subtitle (.SRT) file[13], and then build the knowledge base. The Subtitle file consists of the index, timestamp, and content for sequential data handling.

KNEO 330 offers additional enhanced features: EXTRACT_TABLE_OCR, EXTRACT_PAGE_OCR, and USE_GRAPH to extract data from the different sources in the PDF files, those features improve the overall inquiry accuracy. EXTRACT_TABLE_OCR extracts the embedded table and utilizes the table contents to address inquiry. EXTRACT_PAGE_OCR focuses on the embedded image, which converts the uploaded PDF document into an image and extracts information using OCR. While users can access the data from the embedded images, a downside is that extracting information from images takes more time during the knowledge base creation. USE_GRAPH applies the Retrieval-Augmented Generation (RAG) approach to combine the LLM model with the relevant database to generate the response. It improves the overall accuracy and relevance with the drawback of long processing time.

The administrator can enhance the accuracy of inquiries by adjusting the KNOWLEDGE_BASE_QA_THRESHOLD and TITLE_THRESHOLD. KNOWLEDGE_BASE_QA_THRESHOLD improves the matching between inquiries and sources. A higher threshold makes it easy to match inquiries with the source, but the drawback is that it is less accurate. TITLE_THRESHOLD is

[13] The SubRip Subtitle (SRT) format is a plain-text file format used for video subtitles. It contains a sequence of subtitles, each with an index, start, and end timecodes (formatted as hours, minutes, seconds, and milliseconds), and the corresponding subtitle text with an empty line separating the entries. The timecodes ensure that each subtitle appears at the correct moment in the video. The basic format is listed as below:

1
00:00:05,000 --> 00:00:10,000
Hello, welcome to Kneron.

2
00:00:12,000 --> 00:00:15,000
This is an example of an SRT file.

the matching option that enhances the matching process by using the file names of the knowledge base.

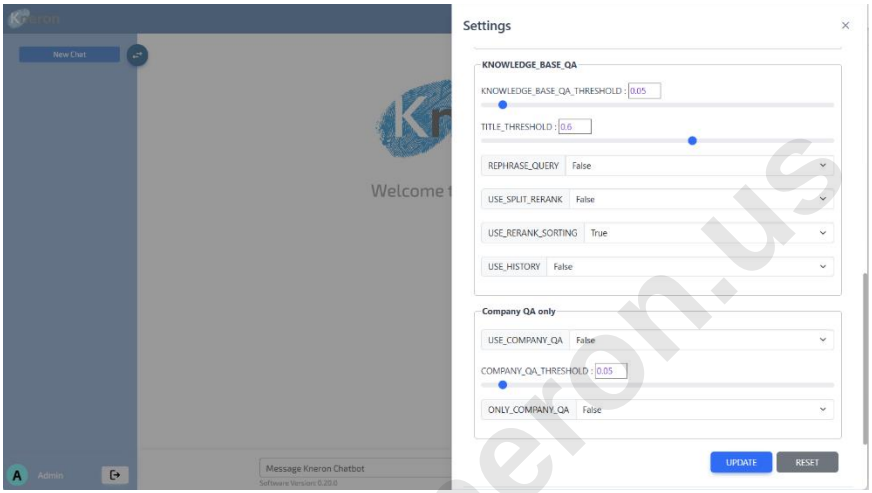


Figure 2-24 Knowledge Base QA Configuration

The administrator can improve the accuracy through the search using REPHRASE_QUERY, USE_SPLIT_RERANK, USE_RERANK_SORTING, and USE_HISTORY. REPHRASE_QUERY allows the system to rephrase the inquiry. USE_SPLIT_RERANK is set to TRUE, which divides and ranks content within the same document for accuracy improvement. Alternatively, USE_RERANK_SORTING is set to TRUE to sort and rank across different sources with longer processing time. The key difference between USE_SPLIT_RERANK and USE_RERANK_SORTING is that the former focuses on a single source (the same document), while the latter applies to multiple sources (various documents). Moreover, the USE_HISTORY utilizes past inquiry history to improve the accuracy of current results.

Enabling both USE_SPLIT_RERANK and USE_RERANK_SORTING may slow down operations. The administrator can toggle these options to balance accuracy and inquiry speed.

2.4.5 Knowledge Base Prompt

Currently, the KNEO 330 supports advanced Prompt Engineering to modify prompts through the Update Local LLM Prompt, which includes the Knowledge Base Q&A Prompt, Table Extraction Prompt, and Page Extraction Prompt options. Knowledge Base Q&A Prompt defines the role of the EdgeGPT server, functioning as a virtual assistant to respond to inquiries. Table Extraction Prompt retrieves the content from the input document table cells. Page Extraction Prompt guides the user in retrieving all the content, including text, tables, and images, from the input document. **Since the accuracy of responses heavily depends on the Prompt settings, please consult the Kneron FAE before making any changes. Otherwise, it is recommended that the default settings be left unchanged.**

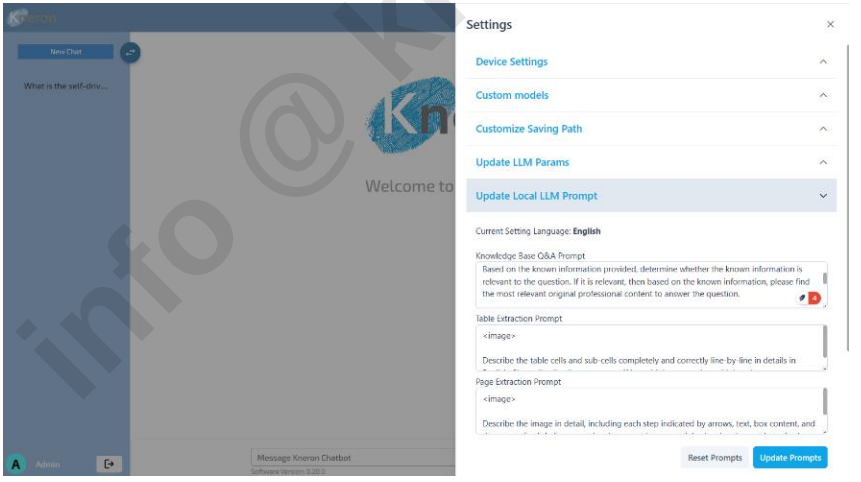


Figure 2-25 Local LLM Prompt Update

2.4.6 Knowledge Base Image Inquiry

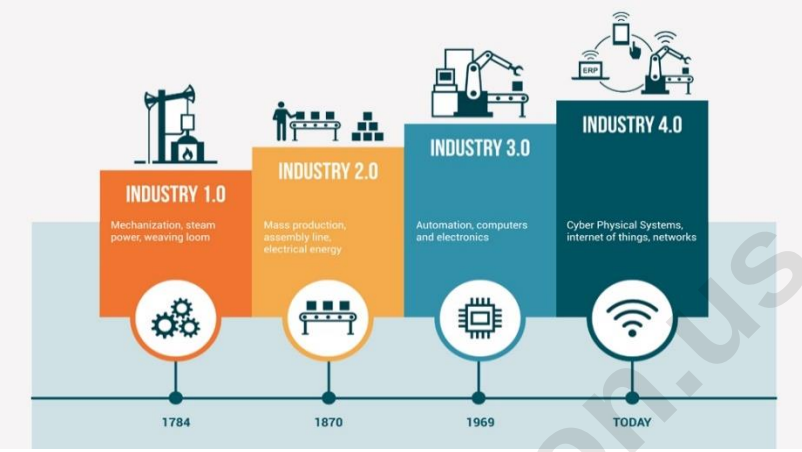


Figure 2-26 4th Industrial Revolution[14]

KNEO 330 allows users to upload images into a knowledge base for further exploration. The user must enable the EXTRACT_PAGE_OCR option in the Update Model Config by setting it to True and then creating the knowledge base. For example, the knowledge base is created using the image of the 4th Industrial Revolution in Figure 2-26, then inquires the system with the prompt "What is the 3rd Industrial Revolution?" It analyzes the image and provides the detail response related with the prompt.

[14] Albert Chun-Chen Liu, Oscar Ming Kin Law, and Iain Law, Understanding Artificial Intelligence: Fundamentals and Applications, Wiley, 2022.

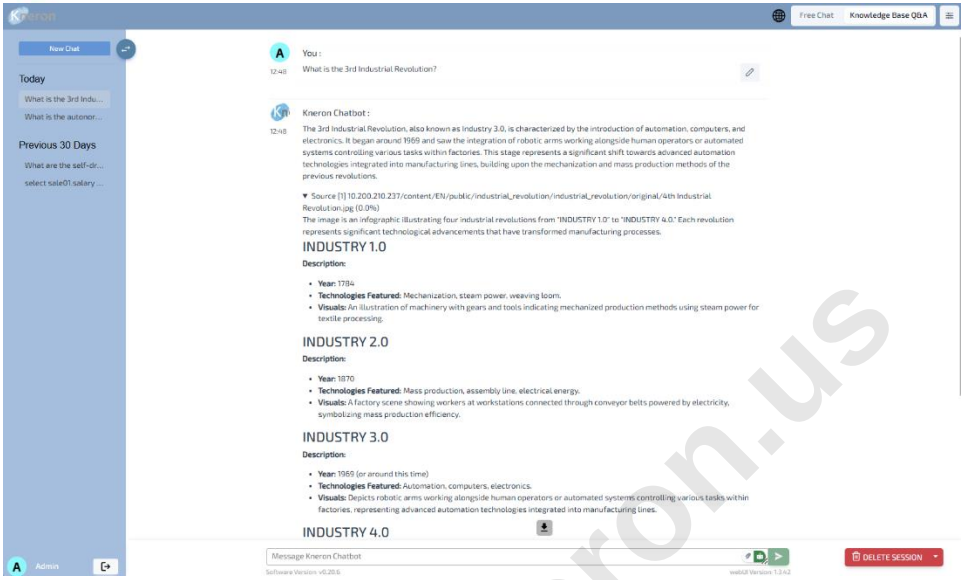


Figure 2-27 Knowledge Base Image Inquiry

In addition to providing the answer, the user clicks the source and offers a comprehensive description of the objects in the image.

2.4.7 Company SQL

	A	B	C	D	E	F	G	H	I
1	ID	First Name	Last Name	Gender	Position	Salary	Bonus	Income	
2	1	John	Smith	Male	Director	$100,000	$15,000	$120,000	
3	2	Mary	Johnson	Female	Manager	$75,000	$10,000	$90,000	
4	3	James	Davis	Male	Manager	$80,000	$12,000	$95,000	
5	4	Emily	Brown	Female	Saleman	$50,000	$5,000	$57,500	
6	5	Robert	Miller	Male	Saleman	$55,000	$5,000	$62,500	
7	6	Jennifer	Wilson	Female	Saleman	$45,000	$4,000	$50,000	
8	7	Michael	Taylor	Male	Saleman	$55,000	$6,000	$62,000	
9	8	Elizabeth	Anderson	Female	Saleman	$50,000	$4,500	$55,000	
10	9	Daniel	Thomas	Male	Saleman	$45,000	$4,500	$50,000	
11	10	Olivia	Moore	Female	Saleman	$50,000	$4,500	$55,000	
12									

Company

Figure 2-28 Company SQL Spreadsheet

KNEO 330 offers a new feature: the relational database using Company SQL, which leverages a large language model (LLM) to manage the database through Structured Query Language (SQL) with multiple spreadsheets/sheets. Initially, the administrator creates the knowledge database using a spreadsheet, but it only supports the Excel Worksheet (.xlsx), not the Excel Separated Value file (.csv). The sample spreadsheet format[15] is shown in Figure 2-28. The first row contains the label keywords, while the column entries correspond to these keywords. The administrator can manipulate the database using general sentences, and the basic commands are demonstrated to access the database using the label keywords.

- The label keywords are specified in the first row
- The corresponding column contents are organized under these label keywords

This document presents the SQL commands, covering basic commands (i.e. lists, display, show, total, sort, select), arithmetic functions (addition, subtraction, multiplication, division), and logical operations (not, equal, greater, less). It advises users to use the symbol " to specify labels (e.g., "label") and ' to represent the values (e.g. "item"). The Large Language Model (LLM) model may interpret different inputs inconsistently

The administrator can display the database content using the keywords list, display, print, show, or select. KNEO 300 outputs all the items in the spreadsheet. The administrator can specify each item's case-sensitive name.

Syntax: LIST <item> <order> <option>

Syntax: DISPLAY <item> <order> <option>

Syntax: SHOW <item> <order> <option>

[15] If the spreadsheet format is invalid, it may lead to incorrect Company SQL data.

Syntax: SELECT <item> <order> <option>

Syntax: GET <item> <order> <option>

where

item: the database item name

order: sort order (i.e. ascending and descending)

option: display option (i.e. once)

Figure 2-29 Company SQL List Command

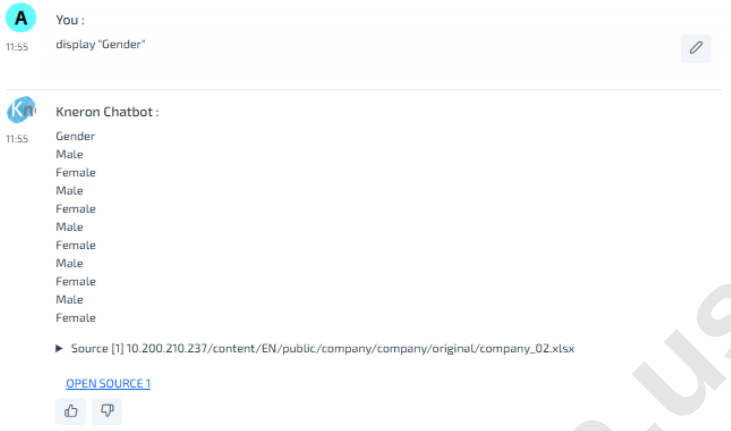


Figure 2-30 Company SQL Display Command

Figure 2-31 Company SQL Show Command

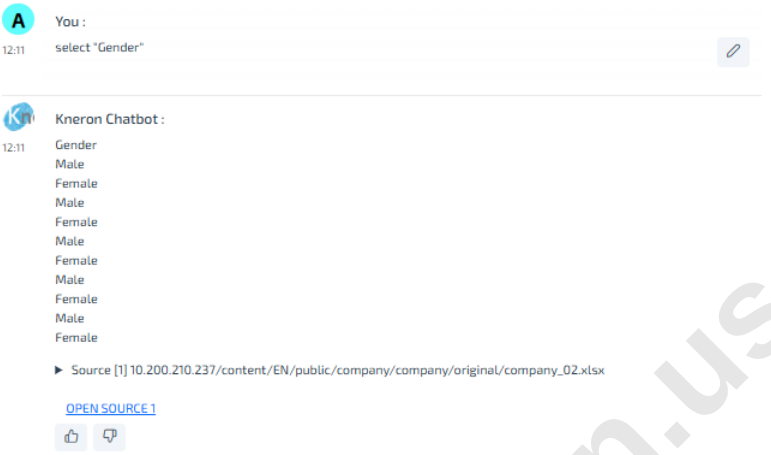


Figure 2-32 Company SQL Select Command

Figure 2-33 Company SQL Get Command

The administrator can limit the output to display once

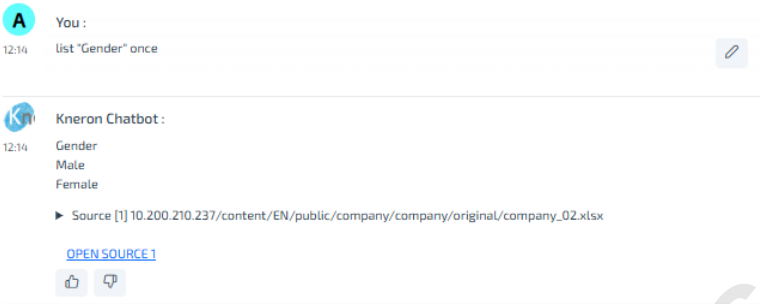


Figure 2-34 Company SQL List Once

The administrator can use the name to display[16] the database item:

Figure 2-35 Company SQL List Content Command

[16] The administrator can display all the items using the commands, display, print, show, and select

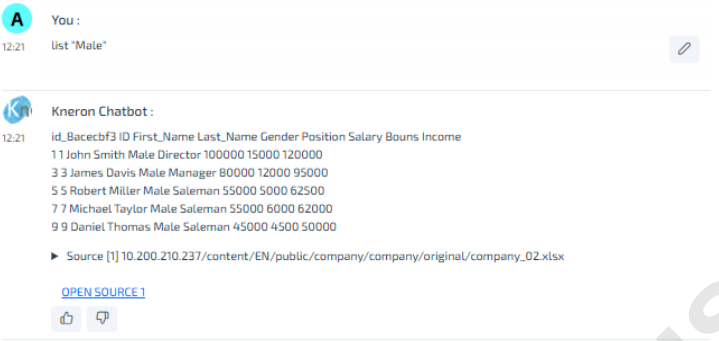


Figure 2-36 Company SQL List Items Command

The administrator can sort the output in ascending or descending order.

Figure 2-37 Company SQL List (Ascending) Command

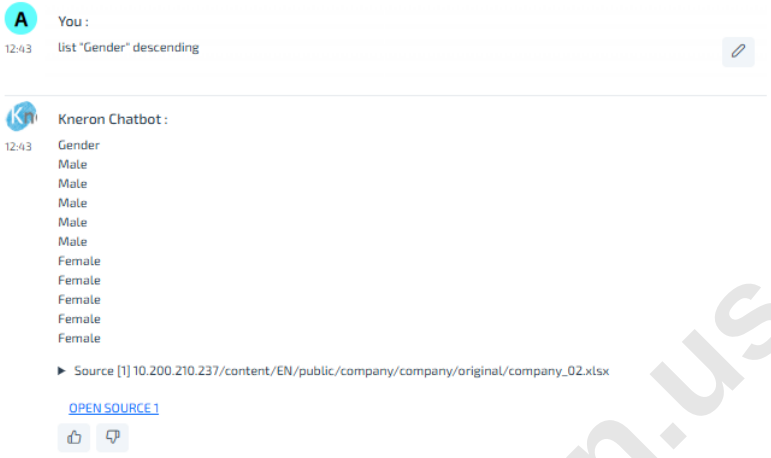


Figure 2-38 Company SQL List (Descending) Command

The administrator outputs multiple columns, the order is based on the prompt description[17].

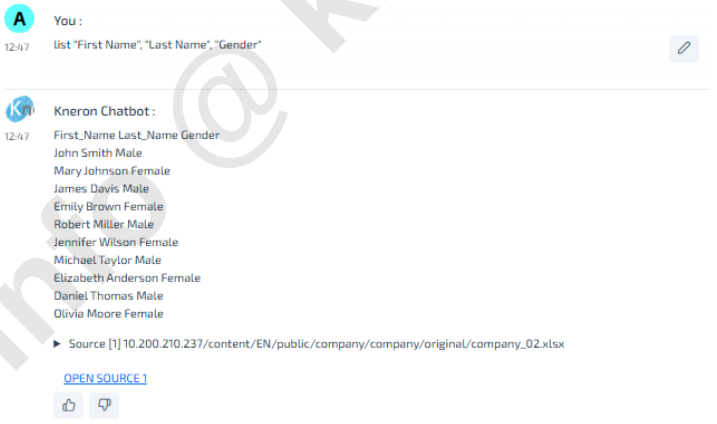


Figure 2-39 Company SQL List Multiple Column

[17] The administrator can output similar multiple columns using the commands, display, print, and show

The administrator can select the database item with a multiple-column display[18]

Syntax: LIST <item> DISPLAY|SHOW <item> …

Syntax: SELECT[19] <item> LIST|DISPLAY|PRINT|SHOW|LIKE[20] <item> …

where

item: the database item name

Figure 2-40 Company SQL Select (List) Multiple Items Command

[18] The simple keywords: and/or are permitted to use in the operation
[19] SELECT is also used to access multiple spreadsheets and sheets, that is explained later.
[20] LIKE selects the substring for the comparison

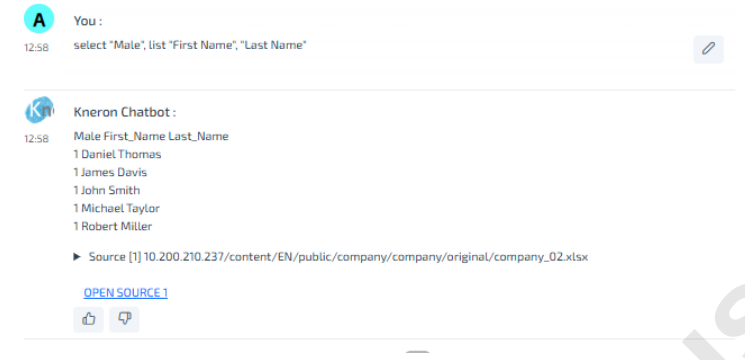


Figure 2-41 Company SQL Select Multiple Items Command

Figure 2-42 Company SQL Select Like Item Command

The administrator organizes the database items using the sort commands and displays the results in ascending and descending orders.

Syntax: SORT <item> <order>

where

<item>: the database item name

<order>: sort order (i.e. ascending and descending)

Figure 2-43 Company SQL Sort (Ascending) Command

Figure 2-44 Company SQL Sort (Descending) Command

The administrator counts the database items

Syntax: COUNT <label>| <item>

where

object: item type

item: item name

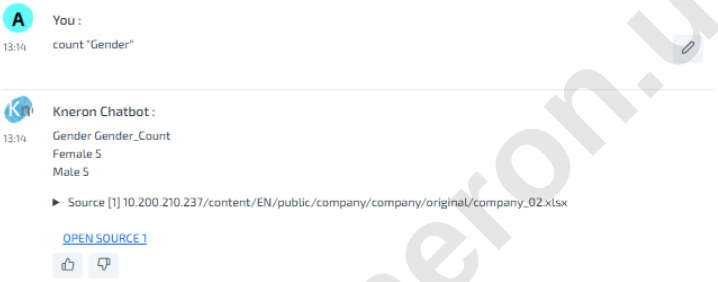


Figure 2-45 Company SQL Count Label Command

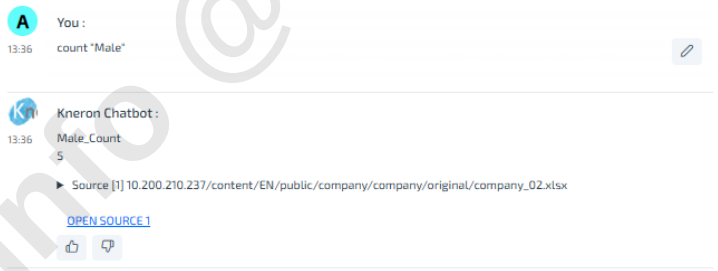


Figure 2-46 Company SQL Count Item Command

The administrator calculates the column value of database objects (i.e. amount) using the command: total and then displays the results.

Syntax: TOTAL <object | item>

where

object: item type

item: item name

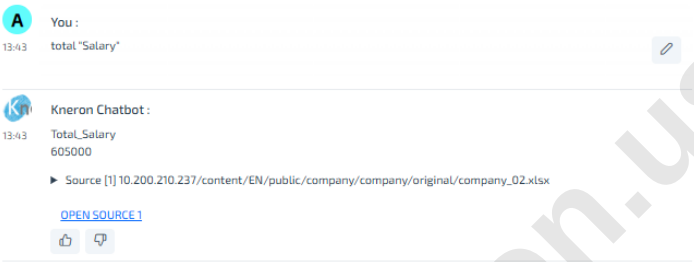


Figure 2-47 Company SQL Total Command

The administrator performs simple arithmetic operations[21] using the syntax, addition: +, add, plus, sum, subtraction: -, sub, minus, diff, multiplication: *, mul, times, and division, -, div.

Syntax: + (operation)

Syntax: ADD (<object | operation>)

Syntax: PLUS (<object | operation>)

Syntax: SUM (<object | operation>)

Syntax: - (operation)

Syntax: SUB (<object | operation>)

Syntax: MINUS (operation)

Syntax: DIFF (operation)

[21] Perform the arithmetic operations on individual items, it prefers to use the arithmetic symbols: +, -, *, / because the LLM interprets differently for the commands: plus, minus, times, div etc.

Syntax: * (operation)

Syntax: TIMES (<object | operation>)[22]

Syntax: / (operation)

Syntax: DIV (operation)

Syntax: ** (operation)

Syntax: ^ (operation)

where

object: item type

operation: basic arithmetic operations

Figure 2-48 Company SQL Add (+) Command

[22] TIMES also functions as COUNT to count the number of the items

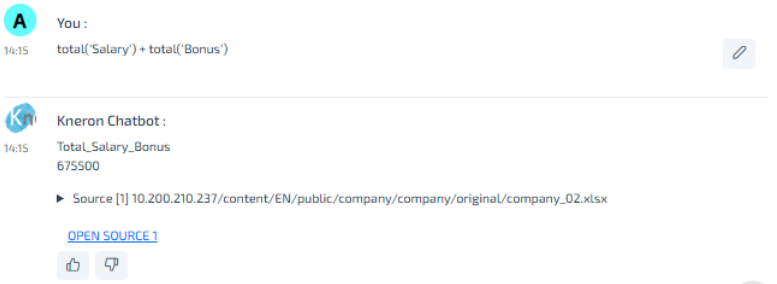


Figure 2-49 Company SQL Add (+) Results Command

Figure 2-50 Company SQL Add Results Command

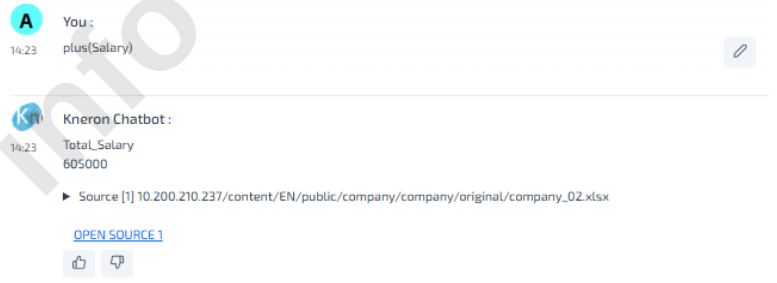


Figure 2-51 Company SQL Plus Command

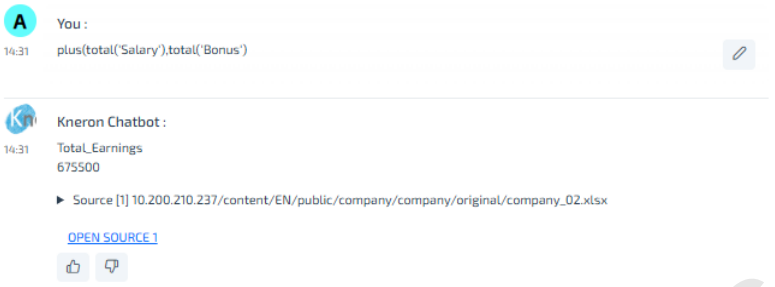


Figure 2-52 Company SQL Plus Results Command

Figure 2-53 Company SQL Sum Command

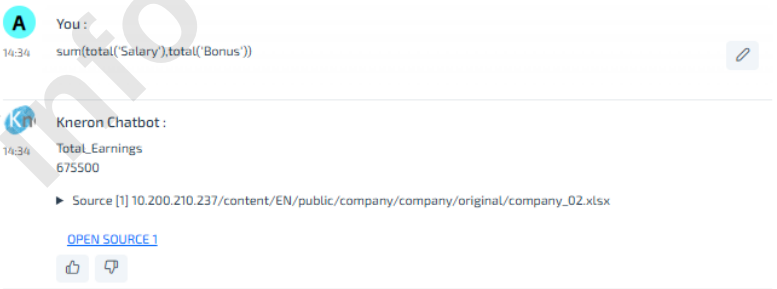


Figure 2-54 Company SQL Sum Results Command

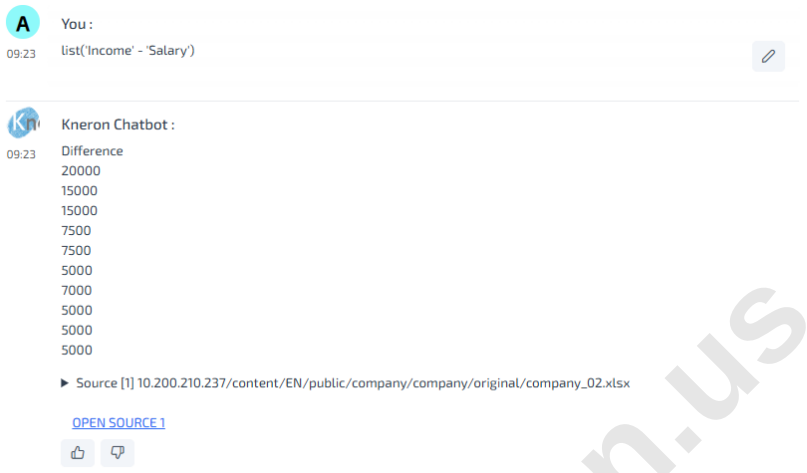


Figure 2-55 Company SQL Sub (-) Command

Figure 2-56 SQL Sub Command

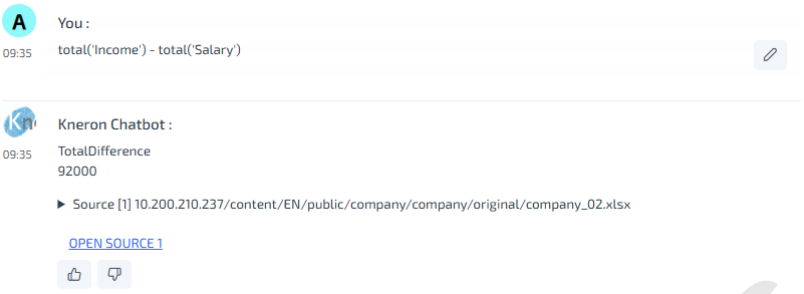


Figure 2-57 Company SQL Sub (-) Results Command

Figure 2-58 Company SQL Minus Results Command

Figure 2-59 Company SQL Diff Results Command

Figure 2-60 Company SQL Mul (*) Command

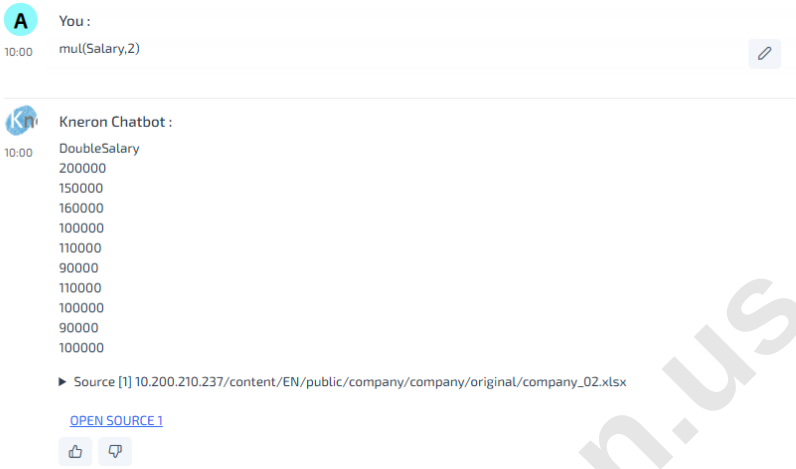


Figure 2-61 Company SQL Mul Command

Figure 2-62 Company SQL Times (Count) Command

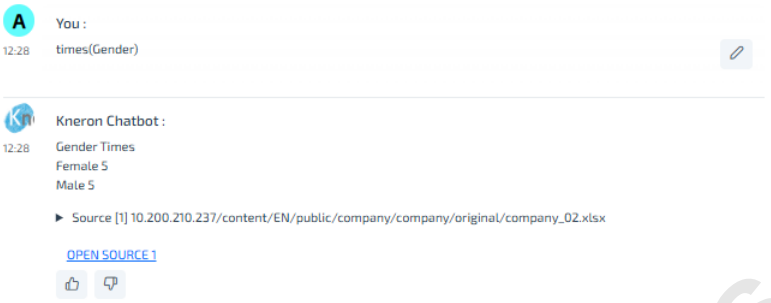


Figure 2-63 Company SQL Times II (Count) Command

Figure 2-64 Company SQL Times Command

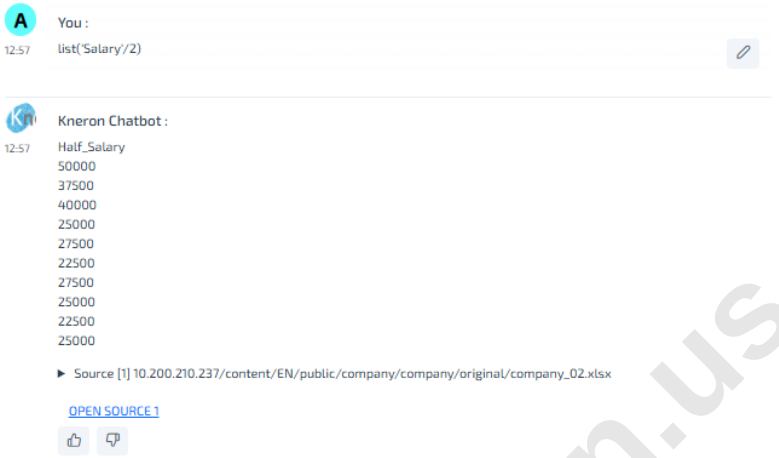


Figure 2-65 Company SQL Div (/) Command

Figure 2-66 Company SQL Div (/) Results Command

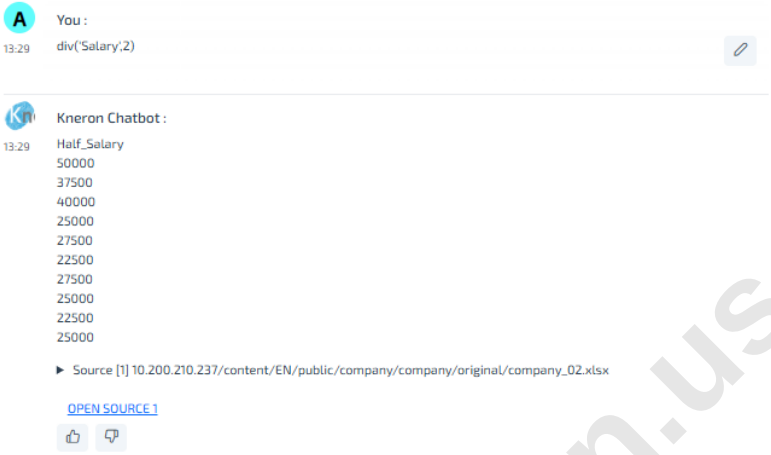


Figure 2-67 Company SQL Div Command

Figure 2-68 Company SQL Power (**) Command

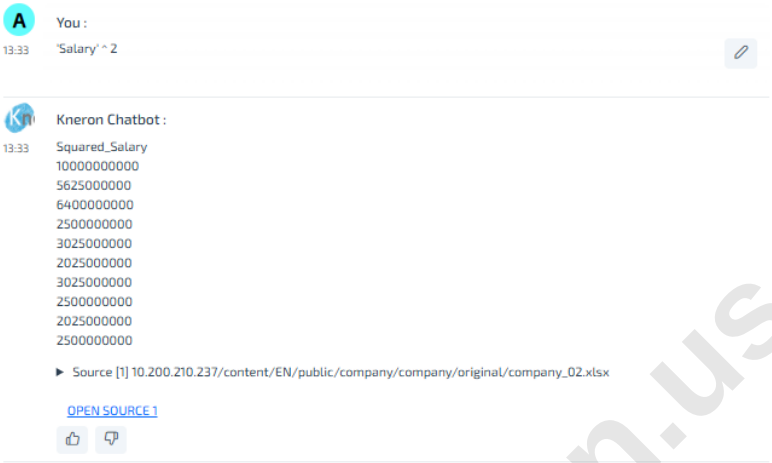


Figure 2-69 Company SQL Power (^) Command

The administrator executes the logical operations (i.e. greater/larger, less/smaller, equal, not, between) with the database objects.

Syntax: IF	<logical operations>
Syntax: SELECT	<logical operations>
Syntax: AND	<logical operations>
Syntax: OR	<logical operations>
Syntax: BETWEEN	<logical operations>
Syntax: >	<item> <actions>
Syntax: >=	<item> <actions>
Syntax: GREATER THAN	<item> <actions>
Syntax: LARGER THAN	<item> <actions>
Syntax: <	<item> <actions>
Syntax: <=	<item> <actions>

Syntax: LESS THAN <item> <actions>

Syntax: SMALLER THAN <item> <actions>

Syntax: == <item> <actions>

Syntax: EQUAL <item> <actions>

Syntax: NOT <item> <actions>

where

item: item name

actions: basic actions

Figure 2-70 Company SQL IF Command

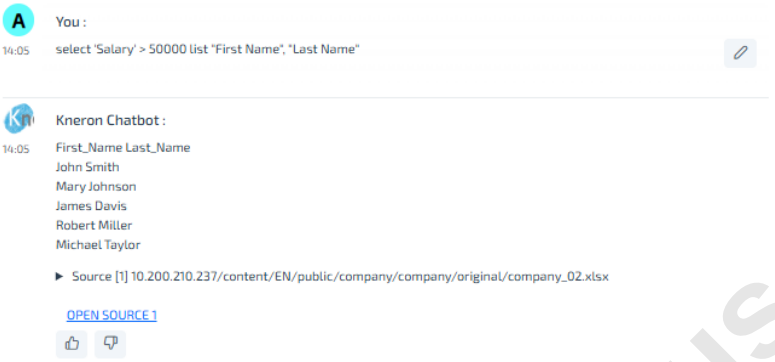


Figure 2-71 Company SQL Greater (>) Command

Figure 2-72 Company SQL Greater and Equal (>=) Command

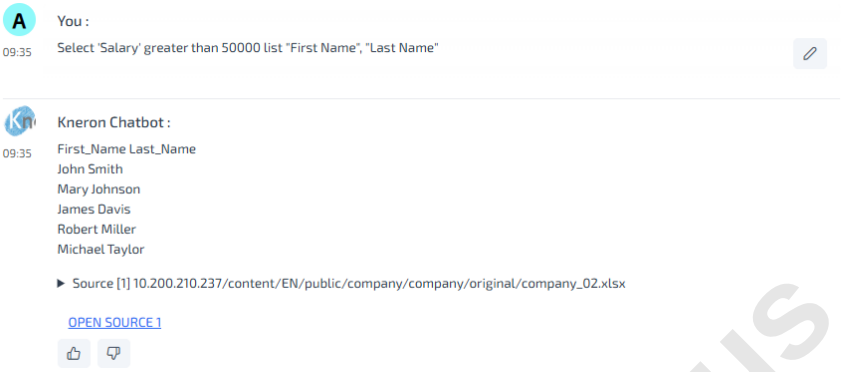


Figure 2-73 Company SQL Greater Command

Figure 2-74 Company SQL Larger Command

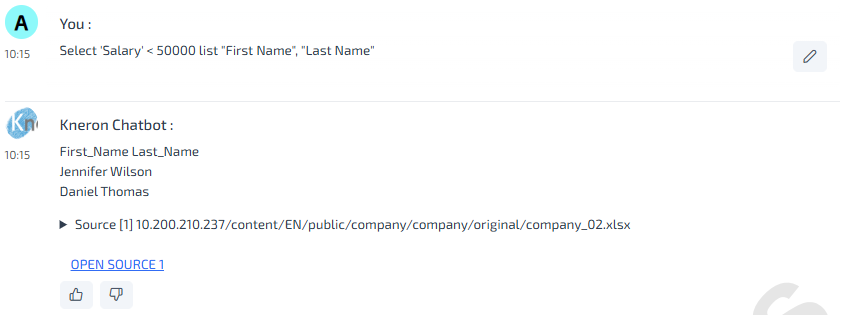


Figure 2-75 Company SQL Less (<) Command

Figure 2-76 Company SQL Less and Equal (<=) Command

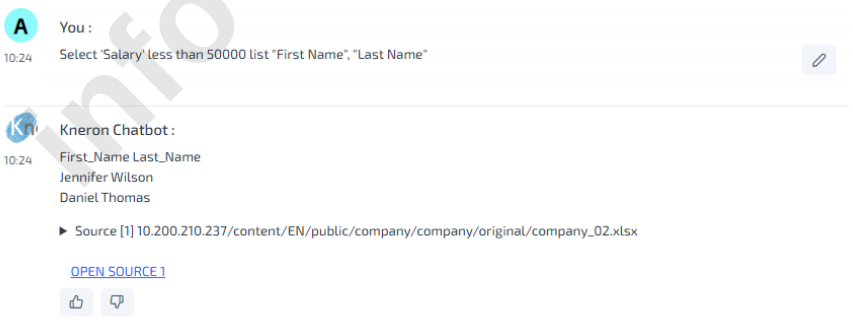


Figure 2-77 Company SQL Less Command

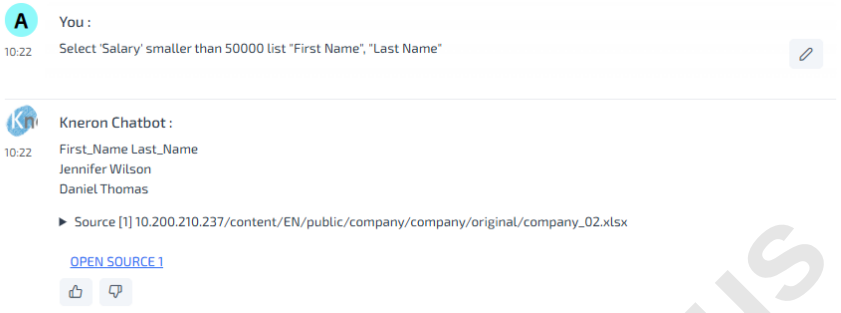


Figure 2-78 Company SQL Smaller Command

Figure 2-79 Company SQL Equal (==) Command

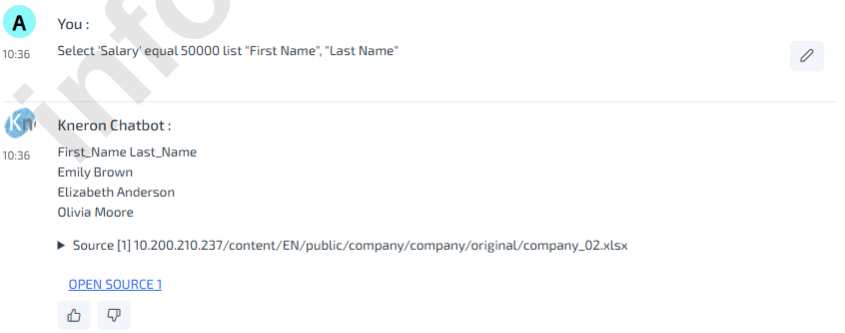


Figure 2-80 Company SQL Equal Command

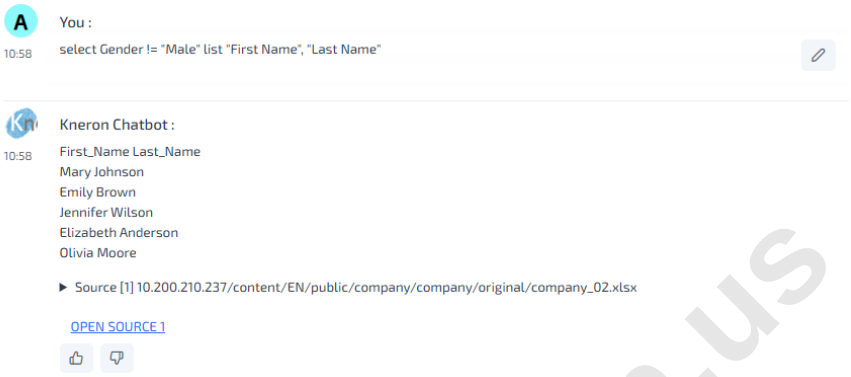


Figure 2-81 Company SQL Not (!) Command

Figure 2-82 Company SQL Not Command

The administrator selects the range of the database objects using the keywords: between and from:

Syntax: BETWEEN <range> <operation>

Syntax: FROM <range> <operation>

where

range: items range

actions: basic actions

Figure 2-83 Company SQL Between Commands

Figure 2-84 Company SQL Range Commands

The administrator can select the max/min value of the object (i.e. amount)

Syntax: MIN(object)

Syntax: MAX(object)

where

object: item type

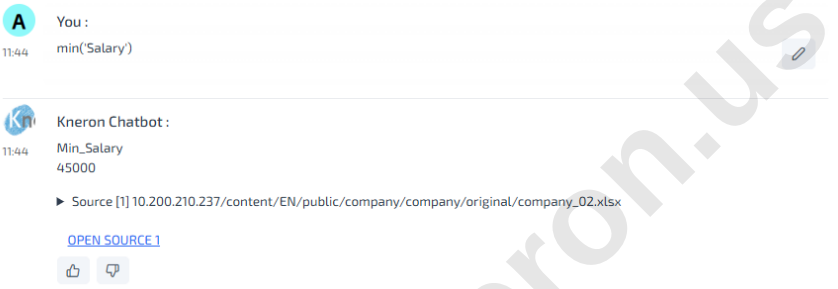


Figure 2-85 Company SQL Min Command

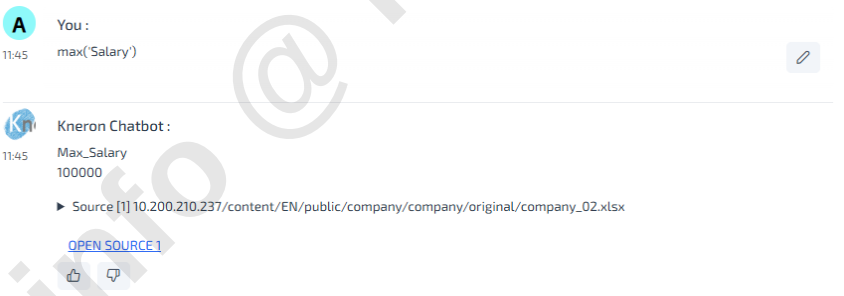


Figure 2-86 Company SQL Max Command

Company SQL can also average the column value of the object (i.e. amount)

Syntax: AVERAGE(object)

Syntax: AVG(object)

where

object: item type

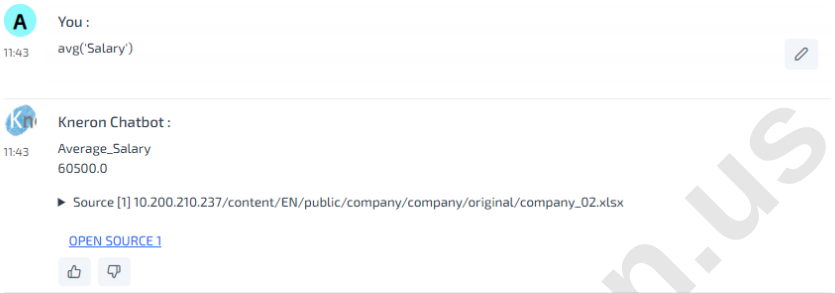


Figure 2-87 Company SQL Average Command (I)

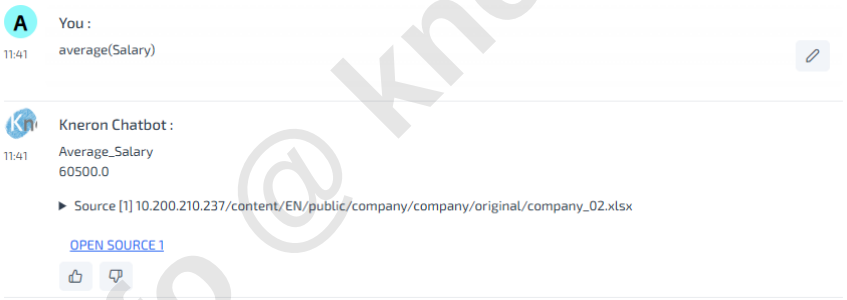


Figure 2-88 Company SQL Average Command (II)

Company SQL displays the date along with the time tag "00:00:00". The administrator can use the substring command to extract the date only

	A	B	C	D	E	F	G
1	Invoice	Date	Product	Volume	Price	ID	
2	1	1/22/2024	A	3	$5,000	3	
3	2	2/12/2024	B	2	$3,000	1	
4	3	2/28/2024	C	2	$4,000	7	
5	4	3/21/2024	A	1	$5,000	4	
6	5	4/8/2024	D	3	$4,500	1	
7	6	4/18/2024	B	2	$3,000	6	
8	7	5/15/2024	D	2	$4,500	5	
9	8	6/9/2024	A	1	$5,000	9	
10	9	7/12/2024	D	1	$4,500	2	
11	10	8/26/2024	C	3	$4,000	10	
12	11	9/29/2024	C	2	$4,000	8	
13	12	10/10/2024	A	2	$5,000	2	
14	13	11/17/2024	D	3	$4,500	1	
15	14	11/25/2024	B	1	$3,000	2	
16	15	12/11/2024	A	1	$5,000	3	
17							

Invoice

Figure 2-89 Company SQL Spreadsheet (Date)

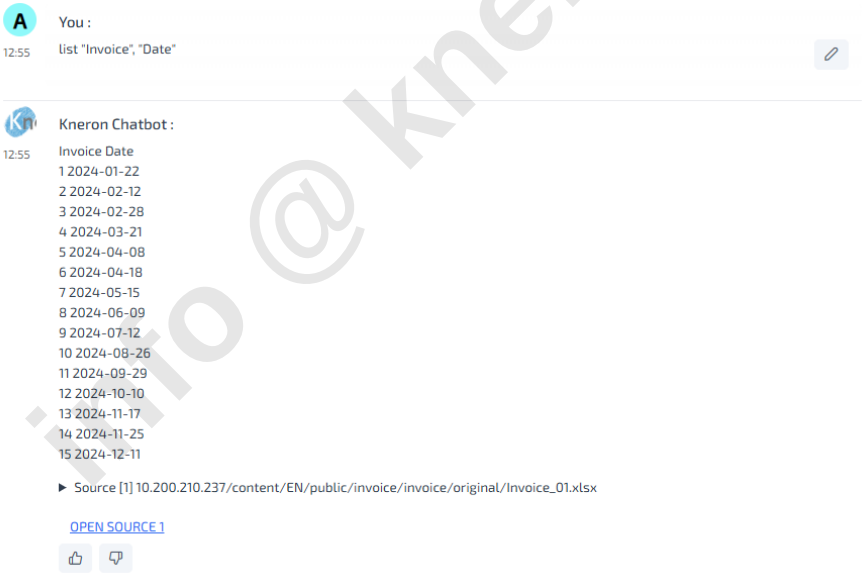


Figure 2-90 Company SQL Date Format

The administrator can search the data transaction using the command:

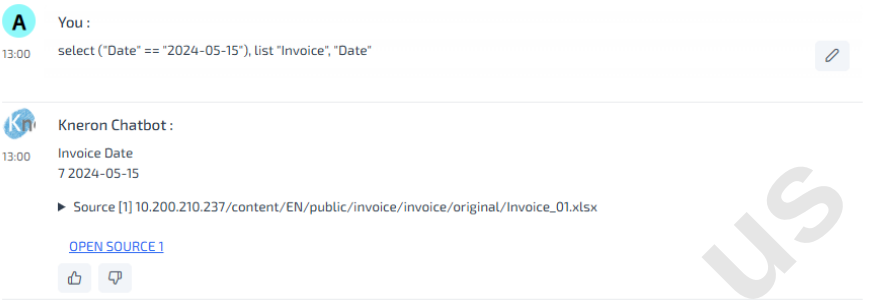
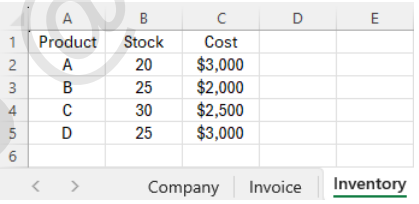


Figure 2-91 Company SQL Date Search Command

Company SQL supports multiple spreadsheets and sheets for relational database inquiry. The administrator first creates the knowledge base and loads it with the spreadsheets where the spreadsheet can contain several sheets. The administrator can access the content using the following commands:



	A	B	C	D	E
1	Product	Stock	Cost		
2	A	20	$3,000		
3	B	25	$2,000		
4	C	30	$2,500		
5	D	25	$3,000		
6					

Company | Invoice | Inventory

Figure 2-92 Company SQL Spreadsheet with Multiple Sheets

Syntax: spreadsheet(sheet)

Syntax: spreadsheet.sheet

where

spreadsheet: spreadsheet name

sheet: sheet name

In the example, the administrator accesses the spreadsheet: database with the sheet name: Company

Figure 2-93 Company SQL Multiple Spreadsheet/Sheet Command (I)

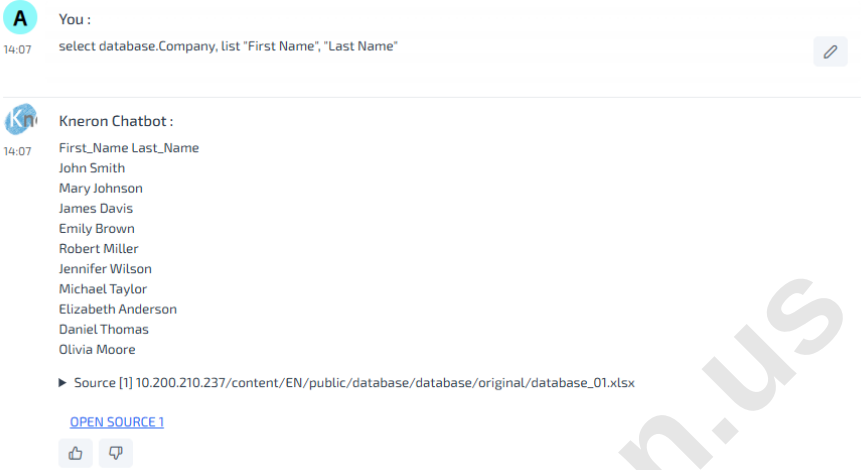


Figure 2-94 Company SQL Multiple Spreadsheets/Sheets Command (II)

Syntax: SELECT <spreadsheet.sheet1>, <spreadsheet.sheet2> FROM <spreadsheet.sheet1> JOIN <spreadsheet.sheet2> ON <sheet1.item> == <sheet2.item>, <action>

where

spreadsheet: spreadsheet name

sheet: sheet name

item: item name

action: operations

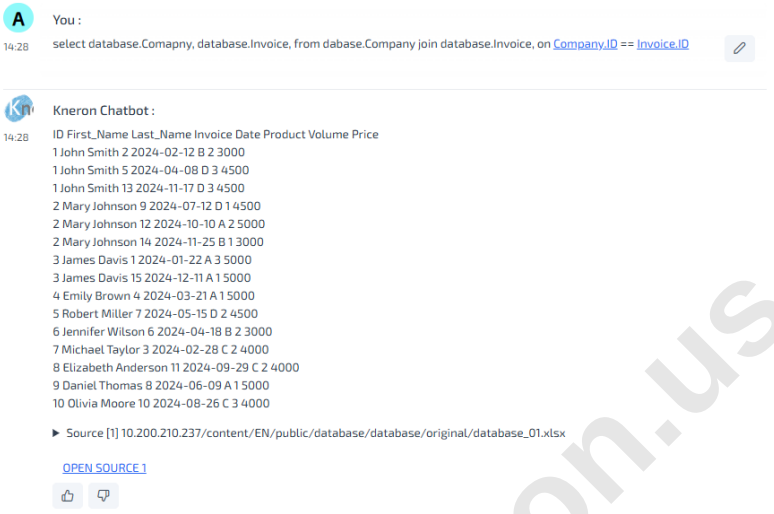


Figure 2-95 Company SQL Relational Database Command

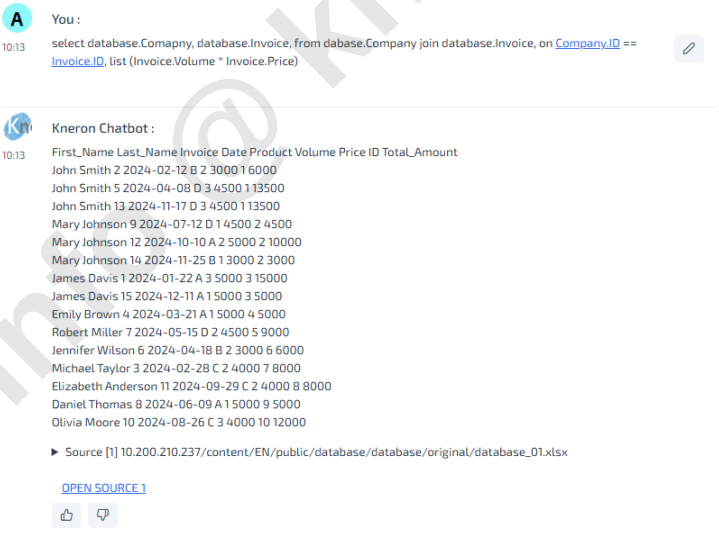


Figure 2-96 Company SQL Relational Database Operation

2.4.8 Company QA

	A	B
1	Questions	Answers
2	Who is the first American president?	George Washington
3	Who is the longest British ruler?	Queen Elizabeth II
4	When is the Boston tea party?	December 16, 1773.
5	Which countries are the axis in the World War 2?	Germany, Italy and Japan
6	Who first landed on the moon?	Neil Armstrong
7	Why the first industrial revolution was so important?	The First Industrial Revolution (1760-1840) revolutionized manufacturing, transportation, and communication, laying the groundwork for modern industrial society.
8	What is the nobel prize ?	The Nobel Prize is a prestigious international award recognizing outstanding contributions in Physics, Chemistry, Medicine, Literature, Peace, and Economic
9	Who is the first black American president?	Barack Obama
10	What were the four important inventions in the ancient China?	Paper, Printing, Gun Powder, and the Compass
11	What was the most famous Pyramid?	The Great Pyramid of Giza, also known as the Pyramid of Khufu

Figure 2-97 Company QA Spreadsheet

Company QA provides a standard one-to-one question-and-answer conventional chatbot feature. It allows users to set questions with predefined answers using a spreadsheet in the Knowledge Base. The system supports multiple spreadsheets, and the matching is based on the input order. The search engine searches for the results from the first spreadsheet to the last one until it finds the answer. The system supports the spreadsheet in .xlsx (Microsoft Excel Worksheet)[23] and .csv (Microsoft Excel Comma Separated Value File). The administrator can input a new spreadsheet to overwrite the old one for inquiries. An example of the input file is shown in Figure 2-97. The first row includes comments indicating that column A contains questions and column B contains answers. The actual questions and their corresponding answers begin from the second row onward.

- The comments are defined in the first row (i.e. row 1), which is ignored during the processing
- The questions are defined in the first column (i.e. col A)
- The answers are defined in the second column (i.e. col B)

[23] Company QA only supports the Microsoft Excel Worksheet with single sheet only

The administrator can directly load the spreadsheet into the system using the Upload Company QA in Figure 2-98 and drag the spreadsheet into the box, then click the button UPLOAD FILES to upload the spreadsheet to the system.

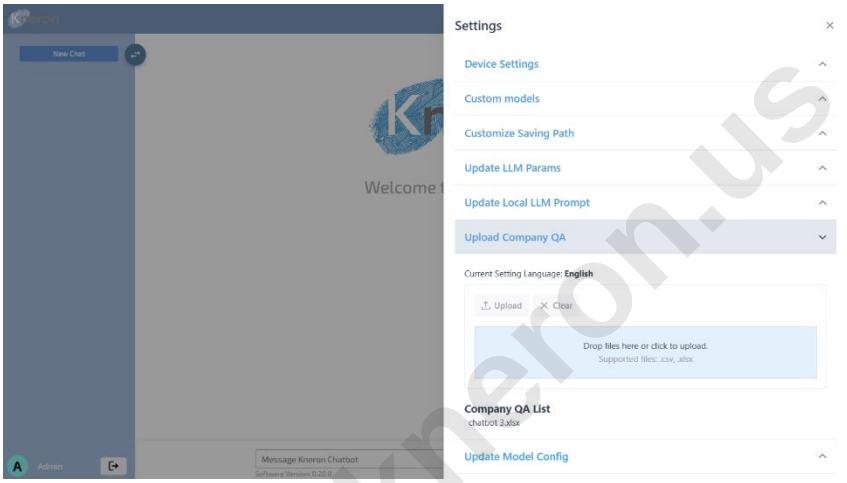


Figure 2-98 Company QA Spreadsheet Upload

The system replies to the inquiry based on the Company QA spreadsheet shown in Figure 2-99.

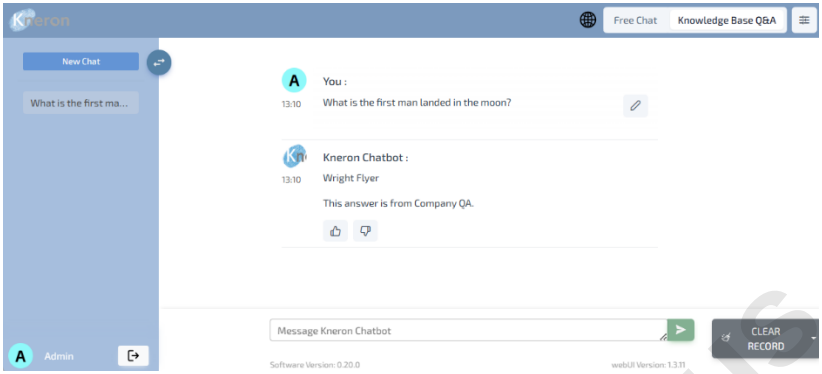


Figure 2-99 Company QA Inquiry

2.4.9 Company Organization

The KNEO 330 enables users to share custom knowledge bases within a private group using the special feature, called Company Organization. The Company Organization allows users to create a knowledge base to share with others. The administrator first creates the group using the Organization Dashboard in Figure 2-100 and then includes the users in the private group. While all users can access and share the knowledge base, only the creator can modify it.

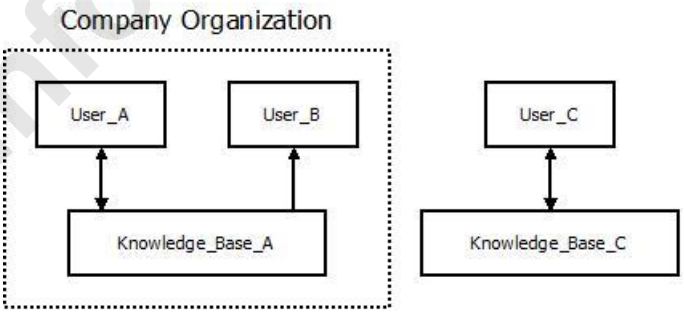


Figure 2-100 Company Organization

To create the new private group, the administrator clicks Organization Dash and selects Open Organization Dashboard to open the windows, then press the CREATE ORGANIZATION button to enter the organization's name. It displays the message Create organization '<organization>' success.

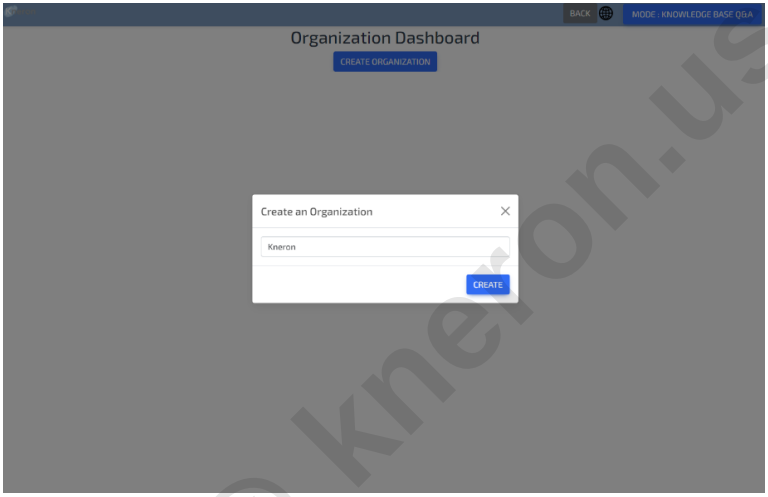


Figure 2-101 Company Organization Create

The name of the private group is displayed in the dashboard, the administrator can delete the private group using the small cross associated with the private group.

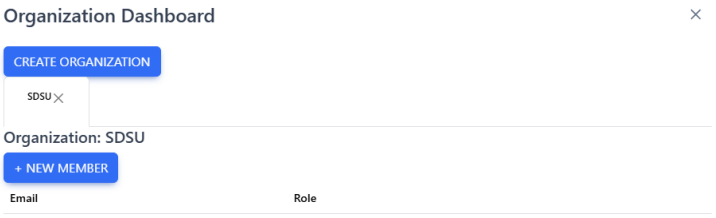


Figure 2-102 Company Organization Private Group

Upon selecting the private group, the administrator can invite a new user to join the private group using the e-mail address.

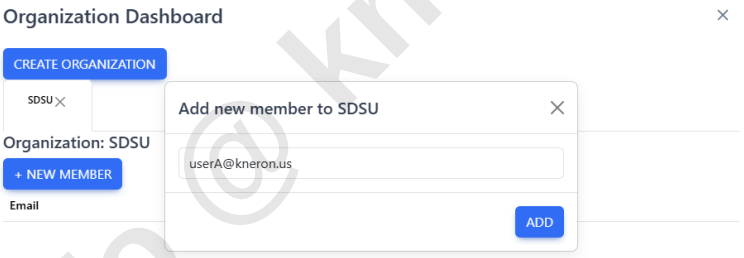


Figure 2-103 Company Organization Add User

The Company Organization Dashboard displays the user information including the email address and the role. The administrator uses the ADD MODERATOR button to assign the role of moderator[24]. The moderator can invite other users to the private

[24] The administrator must join the organization to access the knowledge base and change the role to the moderator

group. Only the database creator can modify the knowledge base. The group members can access the information but not make any changes. The administrator can remove the user from the private group using the REMOVE button.

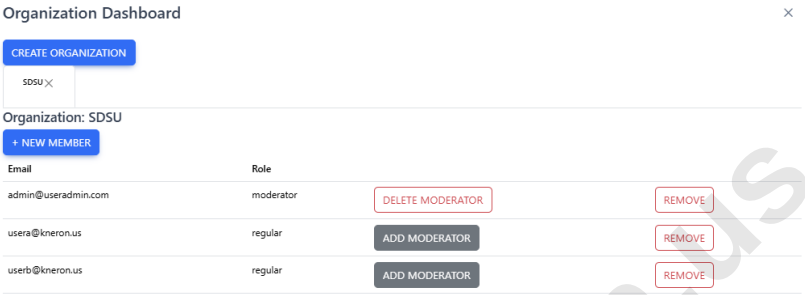


Figure 2-104 Company Organization Dashboard

All users in the private group must log out and log back into the system to activate their access rights. Without doing this, other users will not be able to access the new knowledge base

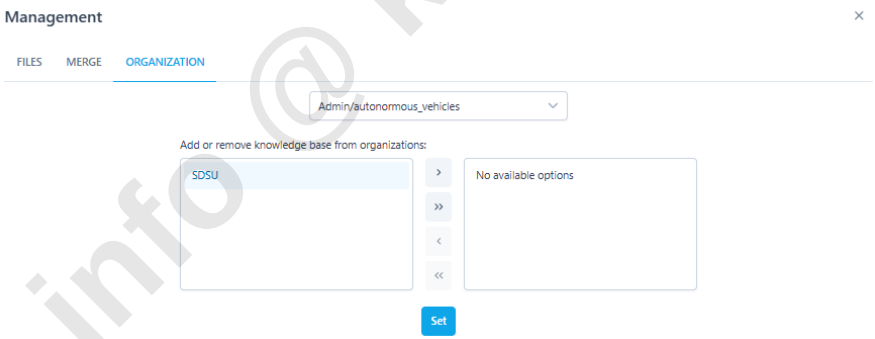


Figure 2-105 Share Custom Knowledge Base

The knowledge base must be first added to the organization. The owner begins by clicking the ORGANIZATION button and selecting the knowledge base to be included. The left panel displays available organizations, while the right panel shows the selected organization. The user can use the > / >> buttons to add the knowledge base and the < / << buttons to remove it from the selected organization.

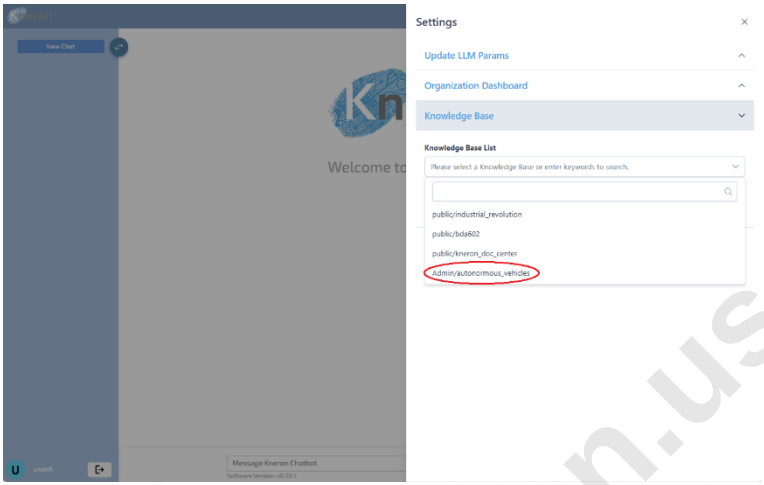


Figure 2-106 Select Shared Custom Knowledge Base

If another user wants to access the custom knowledge base, they first select the database from the Knowledge Base List and then ask a question from the shared database. The custom knowledge base will not appear in the Knowledge Base List if it is not shareable.

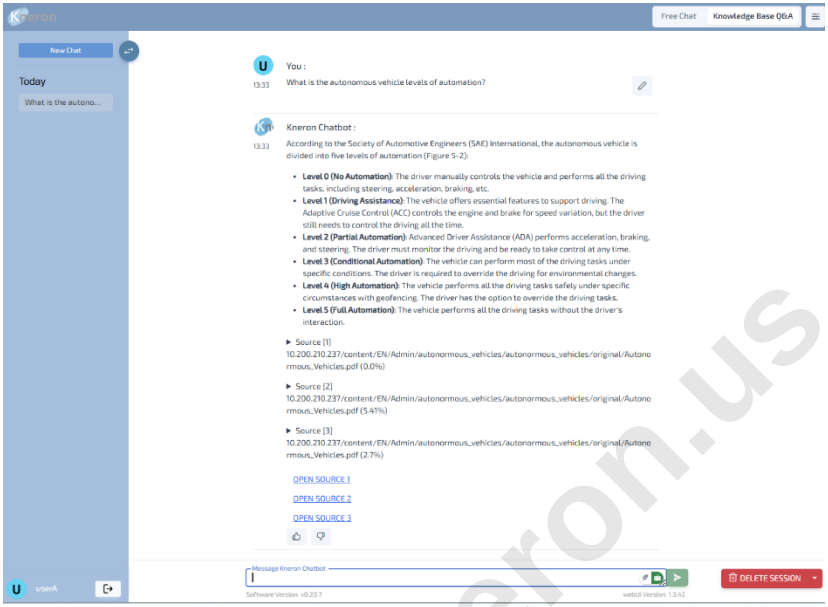


Figure 2-107 Access Shared Custom Knowledge Base

3 Server Administration

3.1 User Registration

Figure 3-1 New User Sign-Up

The new users can create an account by selecting the Sign Up button on the login screen. In the pop-up menu, the new user enters the personal information, including username, email address, and password. The username can include letters, numbers, and the special characters "." and "_". After completing the form, the user can click the SIGN UP button to register the account. To log in to the KNEO 330, the users must use their email address, not their username. The username will display in the lower left corner after logging in.

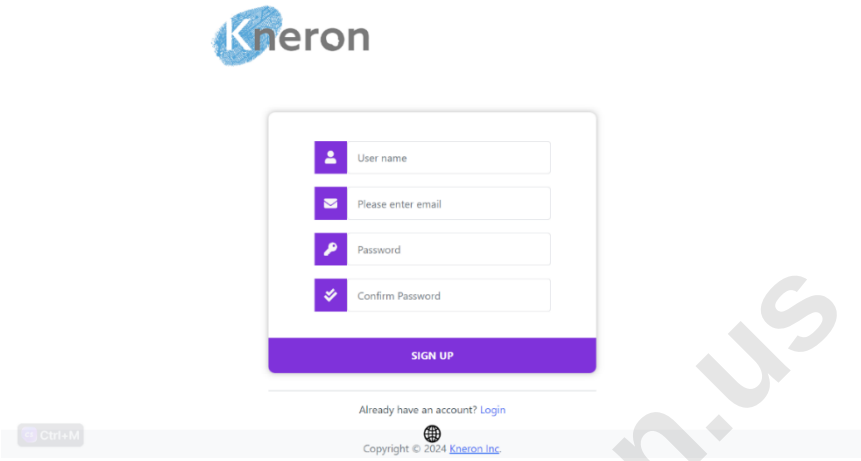


Figure 3-2 New User Registration

To reset the password, the user clicks on the username in the bottom left corner, which opens the User Settings menu. The user then enters their current password, followed by the new password, and clicks the SUBMIT button to complete the change.

3.2 Password Change

To change the password, the user clicks their username in the bottom left corner, which opens the User Setting menu. The user then inputs the current password, followed by the new one, and clicks the SUBMIT button to complete the change.

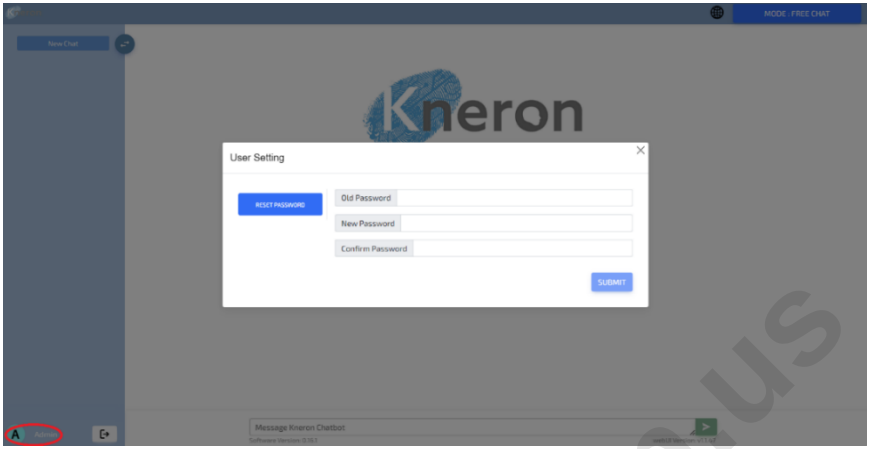


Figure 3-3 User Password Change

3.3 Access Permissions

The administrator can grant the system administrator rights (i.e. admin) to the user through access permissions. The administrator first opens the user dashboard using the USER DASHBOARD IN NEW TAB in the Setting menu and sets the user access permissions. The administrator clicks the login button, then enters the e-mail: admin@useradmin.com and password: admin123 to log in to the system.

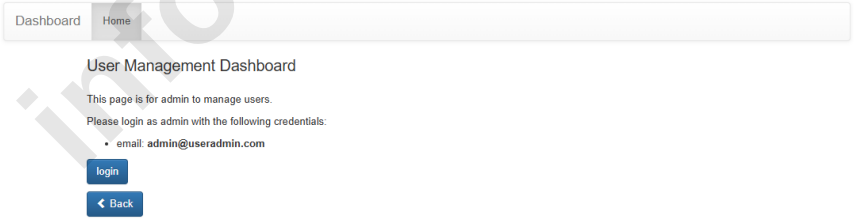


Figure 3-4 Dashboard Home Page

The dashboard consists of two menus, Home and User. In the User menus, it shows the user name, e-mail, role, status, and last login time.

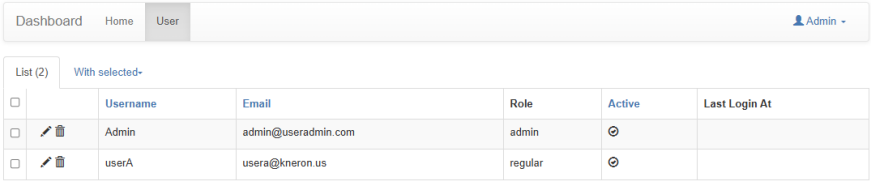


Figure 3-5 Dashboard User Menu

By default, all users are assigned the regular role. The administrator edits the user role by clicking the pen icon and modifying access permissions (admin or regular) in the Role box, then clicking the Save button to apply the changes.

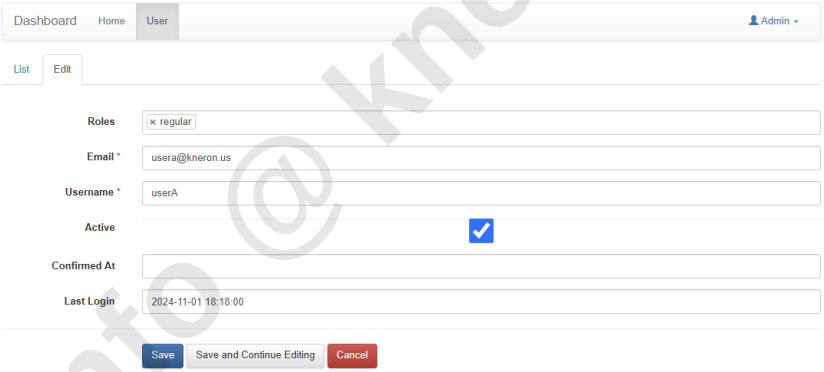


Figure 3-6 User Role Modification

3.4 Password Reset

For security reasons, the administrator cannot reset user passwords. If the user forgets their password, they must contact the administrator to delete the account via the Dashboard. The user re-registers with the same username on the Login

Page. The username must match the old one; otherwise, the knowledge base is denied access.

4 System Administration

4.1 System Management

Open the Windows PowerShell Terminal with administrative privileges to access the KNEO 330 EdgeGPT server for system management. Right-click the Windows start icon in the lower left corner, then select Terminal (Admin) to launch the terminal window. The system administrator can use the ping command followed by the IP address (e.g., 10.200.210.237) to verify the machine's accessibility. It gets a Reply from the machine to confirm that the machine is alive. After completing the ping process, press CTRL-C to stop it, and then proceed to initialize the server using SSH or PuTTY.

Figure 4-1 Window PowerShell

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
```

```
Install the latest PowerShell for new features and improvements!
https://aka.ms/PSWindows

PS C:\Users\oscar> ping 10.200.210.237

Pinging 10.200.210.227 with 32 bytes of data:
Reply from 10.200.210.227: bytes=32 time=14ms TTL=62
```

4.1.1 SSH

Use the ssh command to log in to the KNEO 330. The username and password are both aiuser.

```
C:\Users\oscar> ssh aiuser@10.200.210.237
aiuser@10.200.210.237's password:
```

After logging in, the following message is displayed[25]:

```
Welcome to Ubuntu 22.04.4 LTS (GNU/Linux 6.5.0-44-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Last login: Tue Aug 27 13:31:53 2024 from 10.200.211.96
```

[25] Please use the aiuser commands to access KNEO 330, as standard LINUX commands may not function correctly

4.1.2 PuTTY

Download putty from the official website (https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html) and select the 64-bit x86 package from the Windows Installer options. Once the software is downloaded, double-click the binary file and follow the on-screen instructions to complete the installation. Next, launch putty as shown in Figure 4-2, and enter the IP address (i.e., 10.200.210.237) along with port number 22.

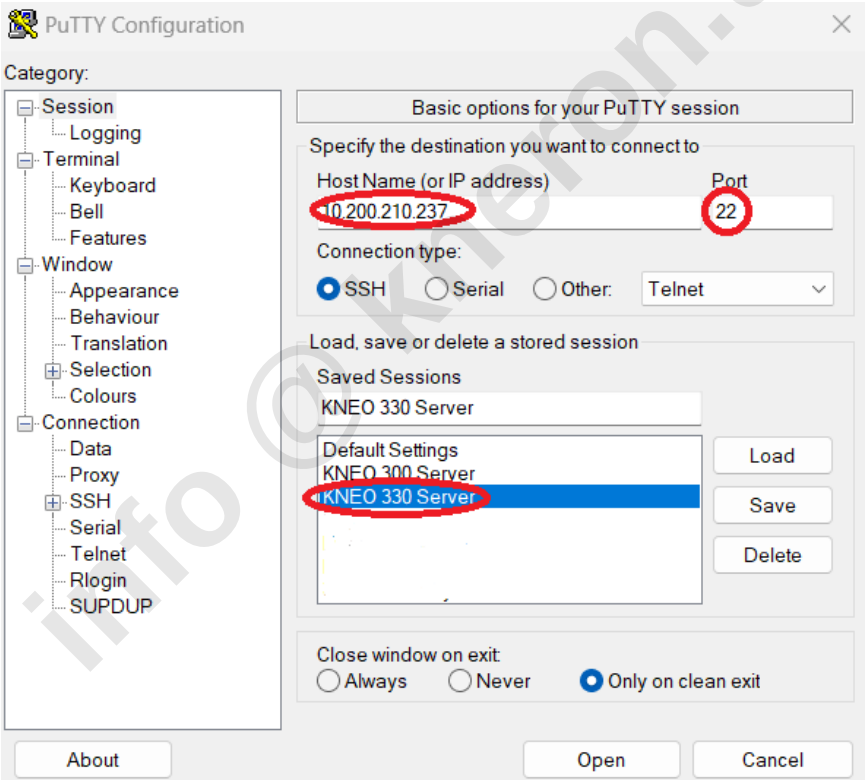


Figure 4-2 PuTTY Home Screen

Administrators and users can save the IP address and port number under 'Saved Sessions' (e.g., EdgeGPT Server) and use the Load command to initialize the KNEO 330 in future sessions. For now, click the 'Open' button to start the PuTTY session and log in using the username aiuser with the password aiuser.

4.2 System Service

The administrator can manage the service, which stops or starts the server and model software using the command: sudo aiservice <action> <service> where <action> refers to status, start, and stop. <service> sets to kneron-backend or kneron-edge. kneron-backend refers to the server software and the kneron-edge represents the model software.

To display the server activities:

```
aiuser@kneron330:~$ sudo aiservice status kneron-backend
     Active: active (running) since Wed 2024-11-06 10:30:31 PST; 1min 0s ago
```

To monitor the software activities:

```
aiuser@kneron330:~$ sudo aiservice status kneron-edge
     Active: active (running) since Wed 2024-11-06 10:30:31 PST; 1min 0s ago
```

To activate the backend service

```
aiuser@kneron330:~$ sudo aiservice start kneron-backend
Service kneron-backend started.
```

To stop the backend service

```
aiuser@kneron330:~$ sudo aiservice stop kneron-backend
Service kneron-backend stopped.
```

To activate the frontend service

```
aiuser@kneron330:~$ sudo aiservice start kneron-edge
Service kneron-edge started.
```

To stop the frontend service

```
aiuser@kneron330:~$ sudo aiservice stop kneron-edge
Service kneron-edge stopped.
```

4.3 Server History

The administrator can display the server history using the command: sudo ailog <action> where action refers to show or clear

To show the server history

```
aiuser@kneron330:~$ sudo ailog --show | more
Latest AI log: log_2024-09-25_09-45-50.log
INFO  [main] 09:45:51,365 org.apache.tika.server.core.TikaServerProcess
Starting Apache Tika 2.4.1 server
INFO  [main] 09:45:51,424 org.apache.tika.server.core.TikaServerProcess
loading resource from SPI: class org.apache.tika
.server.standard.resource.XMPMetadataResource

. . . .

Start the Kneron Chatbot WebUI Service :
 - https://10.200.210.237:3000/
 - WebUI version: v1.2.17
```

To clear the server history, the administrator must stop the server using aiservice, then apply the ailog –clear to clear the history

```
aiuser@kneron330:~$ sudo aiservice stop kneron-edge
Service kneron-edge stopped.
aiuser@kneron330:~$ sudo ailog --clear
Warning: This operation will clear all the AI logs. Also please stop the edge
service before clearing the logs.
Continue?(Y/N) Y
Chatbot log cleared.
```

4.4 Network Configuration

The KNEO 330 EdgeGPT server supports both private and public network connections. In a private network, the KNEO 330 communicates directly with a computer via a one-to-one connection, without internet access. The KNEO 330 can interact with other computers on a public network, including accessing the internet through a router. All connections are established using a static IP address or Dynamic Host Configuration Protocol (DHCP) assignment.

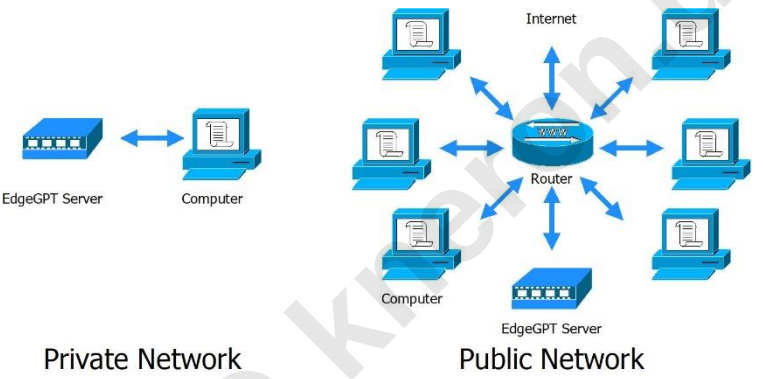


Figure 4-3 Private/Public Network

To configure the network, the administrator uses the command: ainetwork <dhcp> | <static> <device> <ip> <gateway>. For a private network (i.e. static), the <ip> and <gateway> can be manually configured, with the <ip> defined as a private IP address in the format 192.168.x.y (where x is user-defined, and y is assigned a value between 2 and 9). The <gateway> is set to 192.168.x.1. The IP addresses are dynamically configured for the public network.

4.4.1 Private Network

To configure the private network, the administrator stops the system activities using the command: sudo aiservice stop kneron-edge and identifies the device

name (i.e. enp4s0) with the command: ifconfig, then assigns the IP address (i.e. 192.168.10.6/24) and gateway address (192.168.10.1) to the system. Finally, the administrator reactivates the system[26].

```
aiuser@kneron330:~$ aiuser@kneron330:~$ sudo aiservice stop kneron-edge
Service kneron-edge stopped.
aiuser@kneron330:~$ ifconfig
enp4s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet6 fe80::a1e6:75c8:9ef9:5253  prefixlen 64  scopeid 0x20<link>
        ether 74:56:3c:a6:63:2e  txqueuelen 1000  (Ethernet)
        RX packets 2665345  bytes 208510786 (208.5 MB)
        RX errors 0  dropped 66923  overruns 0  frame 0
        TX packets 335690  bytes 135277190 (135.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 464501  bytes 145332991 (145.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 464501  bytes 145332991 (145.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

aiuser@kneron330:~$ sudo ainetwork static enp4s0 192.168.10.6/24 192.168.10.1

** (generate:117831): WARNING **: 11:04:07.632: `gateway4` has been
deprecated, use default routes instead.
See the 'Default routes' section of the documentation for more details.

** (process:117829): WARNING **: 11:04:07.805: `gateway4` has been
deprecated, use default routes instead.
See the 'Default routes' section of the documentation for more details.

** (process:117829): WARNING **: 11:04:07.904: `gateway4` has been
deprecated, use default routes instead.
See the 'Default routes' section of the documentation for more details.

** (process:117829): WARNING **: 11:04:07.904: `gateway4` has been
deprecated, use default routes instead.
See the 'Default routes' section of the documentation for more details.
Network configuration is updated.
aiuser@kneron330:~$ sudo aiservice start kneron-edge
Service kneron-edge started.
aiuser@kneron330:~$ ifconfig
```

[26] All the commands are started with the prompt: aiuser@kneron330:

```
enp4s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.10.6  netmask 255.255.255.0  broadcast 192.168.10.255
        inet6 fe80::7656:3cff:fea6:632e  prefixlen 64  scopeid 0x20<link>
        ether 74:56:3c:a6:63:2e  txqueuelen 1000  (Ethernet)
        RX packets 2665538  bytes 208546965 (208.5 MB)
        RX errors 0  dropped 66923  overruns 0  frame 0
        TX packets 335993  bytes 135299283 (135.2 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 464985  bytes 145378279 (145.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 464985  bytes 145378279 (145.3 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

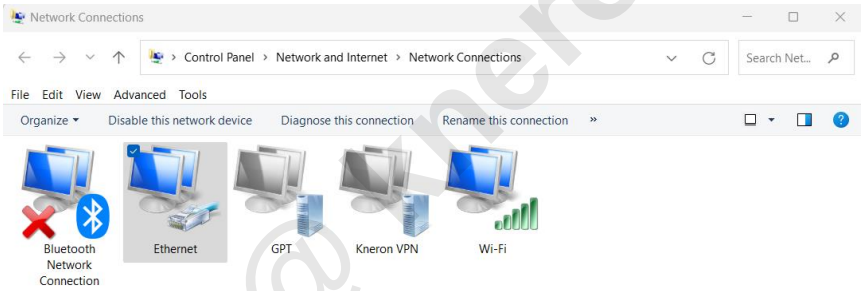


Figure 4-4 Network Connections

After the system is configured as a private network, the system is connected to the host computer via Ethernet. The IP address of the host computer is required to be updated to support the private network. The administrator accesses the network configuration using the command: view network connections through the Windows search and then selects the Ethernet icon, which shows the Ethernet status.

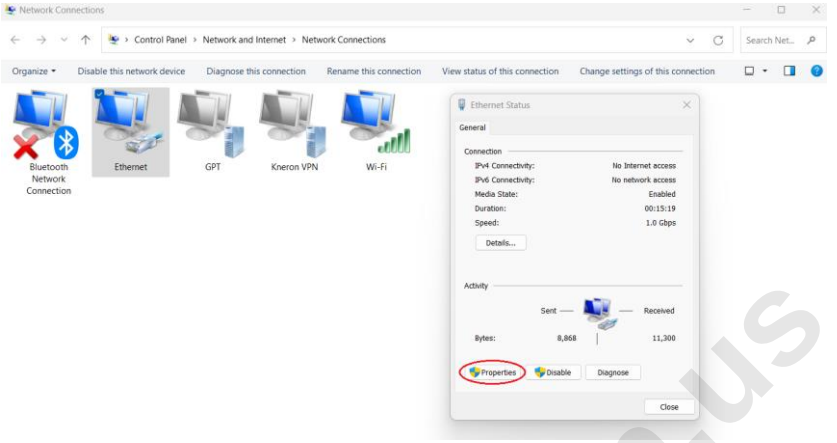


Figure 4-5 Ethernet Status

The administrator clicks the Properties button, which pops up the Ethernet menu to show the list of Ethernet properties.

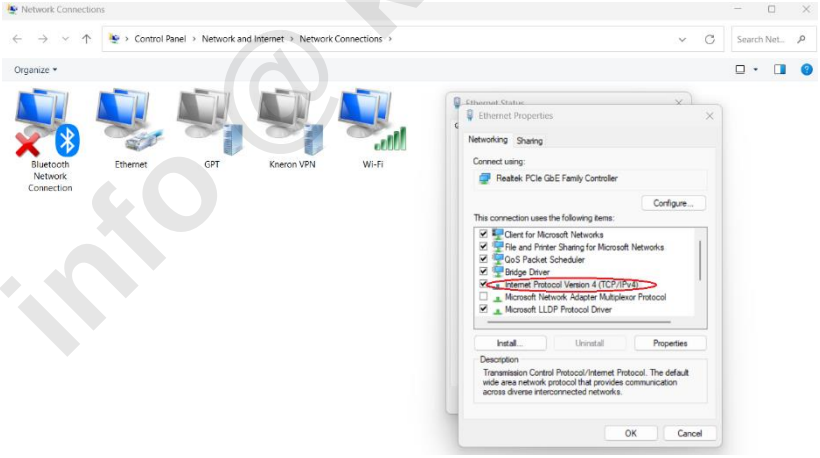


Figure 4-6 Ethernet Properties

The administrator selects the item: Internet Protocol Version 4 (TCP/IPv4) and displays the TCP/IPv4 properties

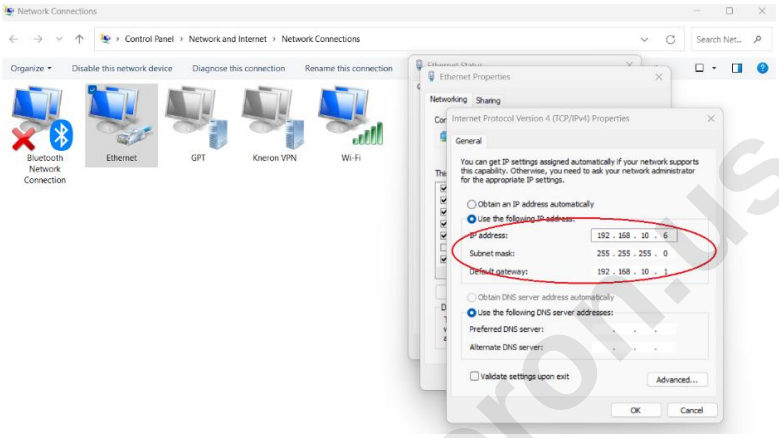


Figure 4-7 TCP/IPv4 Properties

The administrator sets the IP address as 192.168.10.6, the subnet mask as 255.255.255.0, and the default gateway as 192.168.10.1, and then click the OK button to complete the setup. The administrator can access the system using the new IP address 192.168.10.6 rather than 10.200.210.237.

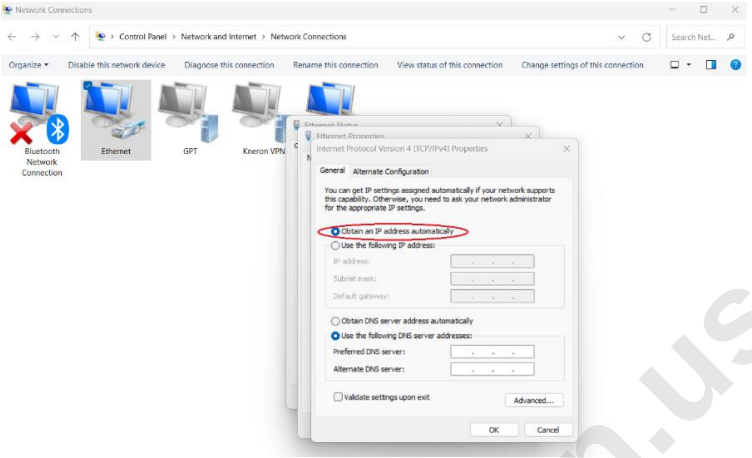


Figure 4-8 Reset IP address

To reset the IP address for dynamic access, the administrator toggles the button: Obtain an IP address automatically followed by the OK button. The host computer is restored to the original configuration: the IP address is dynamically assigned by the system.

4.4.2 Public Network

To manage the public network, the administrator stops system activities by executing the command: sudo aiservice stop kneron-edge. Next, the system is configured to DHCP mode using the command: sudo ainetwork dhcp. Afterward, the administrator reactivates the system with sudo aiservice start kneron-edge. The IP address, such as 10.200.210.237, can then be verified using the ifconfig command.

```
aiuser@kneron330:~$ sudo aiservice stop kneron-edge
Service kneron-edge stopped.
aiuser@kneron330:~$ sudo ainetwork dhcp
Network configuration is updated.
aiuser@kneron330:~$ sudo aiservice start kneron-edge
Service kneron-edge started.
```

```
aiuser@kneron330:~$ ifconfig
enp4s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 10.200.210.237  netmask 255.255.255.0  broadcast 10.200.210.255
        inet6 fe80::a1e6:75c8:9ef9:5253  prefixlen 64  scopeid 0x20<link>
        ether 74:56:3c:a6:63:2e  txqueuelen 1000  (Ethernet)
        RX packets 2674003  bytes 210214296 (210.2 MB)
        RX errors 0  dropped 67059  overruns 0  frame 0
        TX packets 347274  bytes 149079515 (149.0 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 468168  bytes 145765886 (145.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 468168  bytes 145765886 (145.7 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

4.5 External Storage

The KNEO 330 can store its knowledge base on a USB drive or Network Attached Storage (NAS). The USB drive connects directly to the KNEO 330 via the USB port, while the NAS is accessed through the internet.

4.5.1 USB Drive

A USB drive is mounted in KNEO 330 with the format: exFAT, not vFAT. To verify the USB drive format in Windows, the administrator inserts the drive into a USB port and opens File Explorer, then right-clicking on the drive and selecting Properties, the format information is displayed in the pop-up menu, including the driver type, file system format, used/free space, and disk capacity.

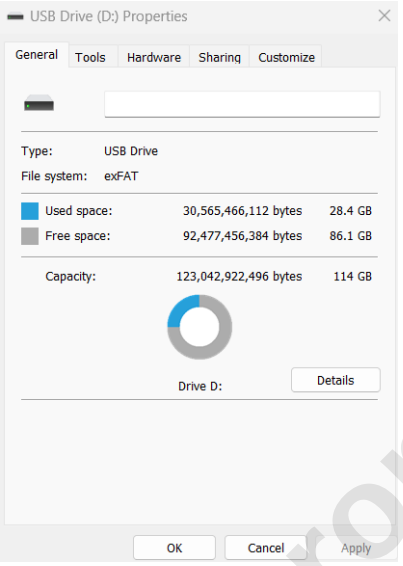


Figure 4-9 USB Drive Properties

The administrator right-clicks on the drive and invokes the Format commands, which sets the File System to exFAT (Default) to format the drive.

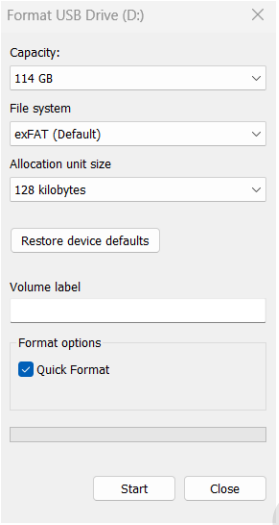


Figure 4-10 Format the USB Drive with exFAT

Before the administrator mounts the device into the system, it first checks the device information using the command: lsblk

```
aiuser@kneron330:~$ lsblk
NAME         MAJ:MIN RM   SIZE RO TYPE  MOUNTPOINTS
loop0          7:0    0     4K  1 loop  /snap/bare/5
loop1          7:1    0  74.3M  1 loop  /snap/core22/1564
loop2          7:2    0  74.3M  1 loop  /snap/core22/1612
loop3          7:3    0 269.8M  1 loop  /snap/firefox/4793
loop4          7:4    0 271.2M  1 loop  /snap/firefox/4848
loop5          7:5    0   497M  1 loop  /snap/gnome-42-2204/141
loop6          7:6    0 505.1M  1 loop  /snap/gnome-42-2204/176
loop7          7:7    0  91.7M  1 loop  /snap/gtk-common-themes/1535
loop8          7:8    0  12.9M  1 loop  /snap/snap-store/1113
loop9          7:9    0  12.3M  1 loop  /snap/snap-store/959
loop10         7:10   0  40.4M  1 loop  /snap/snapd/20671
loop11         7:11   0  38.8M  1 loop  /snap/snapd/21759
loop12         7:12   0   476K  1 loop  /snap/snapd-desktop-integration/157
loop13         7:13   0   500K  1 loop  /snap/snapd-desktop-integration/178
loop14         7:14   0   256G  0 loop
└─kneron_enc 252:0    0   256G  0 crypt /mnt/kneron_enc
sda            8:0    1  57.3G  0 disk
```

```
└─sda1         8:1    1  57.3G  0 part
nvme0n1      259:0    0   1.9T  0 disk
├─nvme0n1p1  259:1    0   512M  0 part  /boot/efi
└─nvme0n1p2  259:2    0   1.9T  0 part  /var/snap/firefox/common/host-
hunspell
```

The administrator can mount the USB drive to the system with mount points 0-3 using aimount command: sudo aimount <mount point> <device> where <device> is referred to /dev/sda1 or /dev/sdb1. Since the device /dev/sda1 is taken, . It mounts the USB drive /dev/sdb1 to mount point 2 with the command: sudo amount 2 /dev/sdb1

```
aiuser@kneron330:~$ sudo aimount 2 /dev/sdb1
Device /dev/sdb1 mounted at /home/aiuser/mnt/data2
```

The administrator can check the system device using the command: sudo aimount –show

```
aiuser@kneron330:~$ sudo aimount --show
Mount point 0: /home/aiuser/mnt/data0
Mount point 1: /home/aiuser/mnt/data1
Mount point 2: /home/aiuser/mnt/data2
Mount point 3: /home/aiuser/mnt/data3
Current status:
/dev/sdb1              115G   29G   87G  25% /home/aiuser/mnt/data2
```

The administrator unmounts the USB drive using the command: sudo aiumount <mount point> and checks the system device using the command: sudo aiumount –show

```
aiuser@kneron330:~$ sudo aiumount 2
Device at /home/aiuser/mnt/data2 is unmouted.
aiuser@kneron330:~$ sudo aiumount --show
Mount point 0: /home/aiuser/mnt/data0
Mount point 1: /home/aiuser/mnt/data1
```

```
Mount point 2: /home/aiuser/mnt/data2
Mount point 3: /home/aiuser/mnt/data3
Current status:
```

4.5.2 NAS Storage

Similarly, the administrator can mount the external NAS storage on KNEO 330 using the command: sudo aimount <mount point> <machine>:<volume> where <machine> is referred to NAS IP address and <volume> is set to the directory name. For example, the external NAS storage is referred to as the drive /mnt/kds/data_feed in the machine 10.200.100.60, and links it to mount point 1, the command becomes: sudo aimount 1 10.200.100.60:/mnt/kds/data_feed

```
aiuser@kneron330:~$ sudo aimount 1 10.200.100.60:/mnt/kds/data_feed
Device 10.200.100.60:/mnt/kds/data_feed mounted at /home/aiuser/mnt/data1
```

The administrator can check the system device using the command: sudo aimount –show

```
aiuser@kneron330:~$ sudo aimount --show
Mount point 0: /home/aiuser/mnt/data0
Mount point 1: /home/aiuser/mnt/data1
Mount point 2: /home/aiuser/mnt/data2
Mount point 3: /home/aiuser/mnt/data3
Current status:
10.200.100.60:/mnt/kds/data_feed   42T  7.7T   34T  19%
/home/aiuser/mnt/data0
```

The administrator unmounts the NAS storage using the command: sudo aiumount <mount point> and checks the system device using the command: sudo aiumount –show

```
aiuser@kneron330:~$ sudo aimount 1 10.200.100.60:/mnt/kds/data_feed
Device 10.200.100.60:/mnt/kds/data_feed mounted at /home/aiuser/mnt/data1
aiuser@kneron330:~$ sudo aiumount 1
```

```
Device at /home/aiuser/mnt/data1 is unmouted.
aiuser@kneron330:~$ sudo aiumount --show
Mount point 0: /home/aiuser/mnt/data0
Mount point 1: /home/aiuser/mnt/data1
Mount point 2: /home/aiuser/mnt/data2
Mount point 3: /home/aiuser/mnt/data3
Current status:
```

4.6 System Backup

The administrator can back up system information to external storage using the command: sudo aibackup <information> <location> [filename]. This command allows backing up different types of information, including the database (knowledge base), app_configs (user configurations), user_info (user profiles), and user_filter (custom configurations). The location parameter specifies the external storage mount point (e.g., 0, 1, 2, 3). The filename is optional with a default value: database (chatbot_database.tar.gz), app_configs (chatbot_user_configs.tar.gz), user_info (chatbot_users.db), user_filter (user_filter_config.json).

To back up the information (i.e. knowledge base) use the command: sudo aibackup database 1

```
aiuser@kneron330:~$ sudo aibackup database 1
Backup database to /home/aiuser/mnt/data1/chatbot_database.tar.gz
```

The administrator can restore backup information using the command: sudo airestore <information> <location> <filename>. The information and filename correspond to the backup one, and the location is set to an external mount point (e.g., 0, 1, 2, 3).

To restore the information (i.e. knowledge base) using the command: sudo airestore database 1 chatbot_database.tar.gz

```
aiuser@kneron330:~$ sudo airestore database 1 chatbot_database.tar.gz
Warning: This operation will overwrite the current database. We recommand you
to backup the current database before restore.
Continue?(Y/N) Y
Restore database from /home/aiuser/mnt/data1/chatbot_database.tar.gz
```

4.7 Data Source

The administrator can access the source of the uploaded files from the backup file: chatbot_database.tar.gz. The backup file is first uncompressed, and the source of the uploaded files is stored under the directory: content, divided into English <EN> and Chinese <ZN>. They store the different language databases that are dependent on the system settings. All the databases are stored under the <EN> subdirectory if the language is set to English. It contains several subdirectories organized by username, including one for the administrator labeled <public> and others for registered users labeled <username>. The <database> represents the knowledge base name.

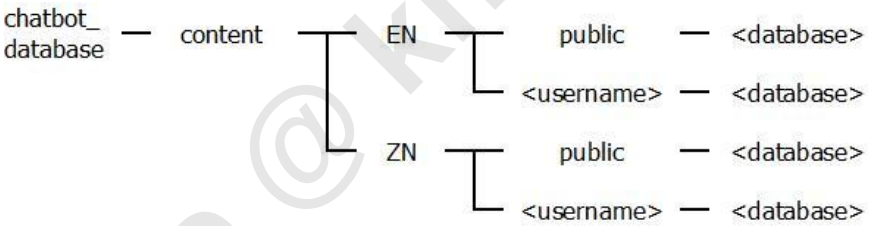


Figure 4-11 Directory Structure

4.8 Database Transfer

The KENO 330 offers NAS storage or a USB drive for transferring the knowledge base to another machine. The administrator can transfer the knowledge base using NAS storage, the storage can be remounted on a different KENO 330 to restore the database.

The administrator can also transfer the database to other KNEO 330 using the USB drive. It mounts the USB drive in another KENO 330 and then restores the database from the USB drive. The database can be transferred to remote machines using Dropbox or OneDrive[27]. The USB drive is plugged into Windows and then uploaded to Dropbox or OneDrive. The database can then be downloaded to other remote machines from Dropbox or OneDrive.

4.9 Edge Software Reset

If the prompts and parameters are changed, the administrator can reset the edge software by running the command: sudo edge-reset

4.10 System Reboot

Before rebooting the system, all the users log out from the system, and the administrator initializes the reboot command sudo reboot to hardware reset the system.

4.11 System Shutdown

Before turning off the system, it is recommended that all users log out first and the knowledge base is backed up to an external USB drive or NAS storage. The administrator then initiates the shutdown command sudo poweroff to ensure the data is properly saved. Avoid disconnecting the power before the software fully shuts down, as this could damage the file system.

[27] Please access online information to upload/download the data from the Dropbox and OneDrive.

5 Custom Configurations

The administrator can customize the KENO 330 using the user_filter_config.json file. The file is divided into three sections: the first ("standard_query_answer"[28]) defines the standard query responses, the second ("sensitive_query_answer") handles sensitive query responses, and the last section ("standard_names") maps incorrect names to their correct ones.

```
{
  "standard_query_answer": [
    ["what is kneron doc center", "Kneron doc center provides documents for
Kneron toolchain, etc."]
  ],
  "sensitive_query_answer": [
    ["火藥", "根據當地法律規定，道德或涉及敏感內容，我們無法提供這個問題的答案"],
    ["gunpowder", "According to local laws, ethics, or sensitive content, we
are unable to provide an answer to this query"],
    ["成人圖", "根據當地法律規定，道德或涉及敏感內容，我們無法提供這個問題的答案"],
        ["porn pics", "According to local laws, ethics, or sensitive
content, we are unable to provide an answer to this query"]
  ],
  "standard_names": {
    "後麵": "後面",
    "皇後": "皇后",
    "麵對": "面對",
    "Alot": "A lot",
    "Irregardless", "Regardless",
    "Anyways", "Anyway"
  }
}
```


[28] All "standard_query_answer", "sensitive_query_answer", and "standard_names" are keywords which can't be changed. All the characters including the symbols must be standard ASCII code, the Chinese characters are only allowed within the "<content>"

6 Company SQL Functions/Keywords

The user can manipulate the knowledge base using a list of Company SQL symbols, keywords, and functions as follows:

+
-
*
**
/
==
>
>=
<
<=
ADD
AND
AVERAGE
AVG
BETWEEN
COUNT
DIFF
DISPLAY
DIV
EQUAL
FROM
GET
GREATER
IF
LARGER
LESS
LIST
MAX

MIN
MINUS
MUL
NOT
OR
PLUS
PRINT
RANGE
SELECT
SHOW
SMALLER
SORT
SUB
SUBSTRING
SUM
TIMES
TOTAL