

AI Navigator v1.2.0

Release Note

Introduction

This document describes the contents of AI Navigator v1.2.0, such as changes from the previous version (v1.1.0), restrictions and so on. Please read it before using this tool.

For the installation and use, please also read the AI Navigator Quick Start Guide.

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1. About AI Navigator

1.1 Summary

AI Navigator is a set of plugins for e² studio which is an integrated development environment (IDE) for Renesas devices.

AI Navigator makes it possible to integrate and operate the various functions required for AI embedded system development. This helps the development period shorter.

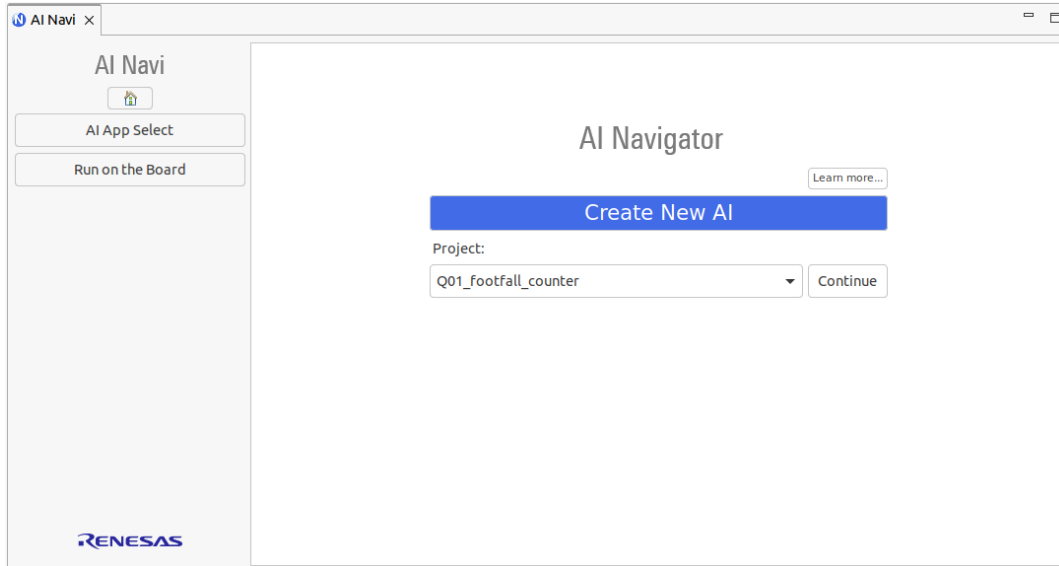


Figure 1-1 AI Navigator Home

The features of AI Navigator are as follows:

- Select the AI application from Renesas AI Application Zoo and download the corresponding e² studio projects. This makes it easy to start AI development.
- AI Navigator provides the transfer learning function. This allows the users to customize AI models in Renesas AI applications with their own datasets.
- AI Navigator also provides conversion of AI models to executable files. For RZ/V, the tool allows conversion to DRP-AI executable code using TVM.

1.2 Target Plugin

- Renesas AI Navigator v1.2.0 (Renesas AI Framework plugin v1.2.0)
- AI Transfer Learning Tool Plugin v1.2.0 (RZ/V AI TLT plugin v1.2.0) *Plugin for Transfer Learning Tool
- AI Model Conversion Tool Plugin v1.2.0 (AI Model Conversion Tool plugin v1.2.0)
*Plugin for AI Model Conversion Tool

Note: From here on, each of the above plugin names is described as follows.

- AI Navigator Plugin
- AI TLT Plugin
- AI Model Conversion Tool Plugin

1.3 Supported Environment

- Ubuntu 20.04 LTS
- e² studio 2024-07 (or later) Linux Host

1.4 Supported MCU, MPU

RZ family

- RZ/V Series RZ/V2L, RZ/V2H group

1.5 AI Navigator Quick Start Guide

Please read the AI Navigator Quick Start Guide to learn how to install and use AI Navigator.

(URL) https://renesas-rz.github.io/rzv_ai_sdk/latest/ainavi_quick_start_guide

2. Changes

This chapter explains the changes of each plugin from the previous version.

2.1 AI Navigator Plugin

Table 2-1 Changes (AI Navigator Plugin)

Items	Change details	
	Previous version (v1.1.0)	This version (V1.2.0)
Plugin version	AI Navigator Plugin v1.1.0	AI Navigator Plugin v1.2.0
Supporting Customized Linux	Support only the AI application frameworks (Linux environment) provided in the SDK.	Users can develop and run AI applications on custom Linux with AI Navigator. Added the Information icon in the Project Information view to guide the procedures for implementing the custom Linux.
Help page for AI Navigator	-	Updated for v1.2.0.
Perspective	Only one initial time to view the switch dialog for Renesas AI perspective.	Not only the initial time but also show the perspective according to your desire. Select the view timing by clicking [Window] -> [Preferences] -> [Renesas] -> [AI Navigator] and select your preference.
Progress dialog	Display the progress bar that moves from left to right until the target process is completed.	Display the progress bar, which changes as the target process progresses.
View design	-	For the case described in the left cell, the following messages will appear. <ul style="list-style-type: none"> Added the AI model conversion icon. Fixed the bug with displaying the set path name.

2.2 AI TLT Plugin

Table 2-2 Changes (AI TLT Plugin)

Items	Change details	
	Previous version (v1.1.0)	This version (V1.2.0)
Plugin name & version	AI Transfer Learning Tool Plugin v1.1.0	AI Transfer Learning Tool Plugin v1.2.0
Supported version of the transfer learning tool (RZ/V AI TLT)	RZ/V AI TLT v2.10	RZ/V AI TLT v4.00
Display the transfer learning tool web guide	-	Added the function to display the RZ/V AI TLT Web Guide on startup.
Transfer Learning tool installation function	There is no retry function for entering the root password when installing RZ/V AI TLT with AI Navigator.	Users can retry entering the root password if you enter an invalid root password during installation.
Remove restriction	Restriction to AI application Q08. * The following numbers indicate the chapter number in the V1.1.0 Release Note. - 3.2.1 [AI TLT Plugin] Transfer learning in AI applications including multiple AI models	The AI model provided in Q08 can be trained just like any other AI application.
Remove notes	Note to e ² studio project name. * The following numbers indicate the chapter number in the V1.1.0 Release Note. - 3.1.7 [AI TLT Plugin] Changing the name of e ² studio project	Train an AI model with the RZ/V AI TLT even if the e ² studio project name is changed.

2.3 AI Model Conversion Tool Plugin

Table 2-3 Changes (AI Model Conversion Tool Plugin)

Items	Change details	
	Previous version (v1.1.0)	This version (V1.2.0)
Plugin name & version	AI Model Conversion Tool Plugin v1.1.0	AI Model Conversion Tool Plugin v1.2.0
RZ/V AI SDK Docker image	-	Allows to delete the selected RZ/V AI SDK.
Preprocessing settings	Restrictions on preprocessing settings. * The following numbers indicate the chapter number in the v1.1.0 release note. <ul style="list-style-type: none"> 3.2.2 [TVM Plugin] The default preprocessing setting is cleared with the trained AI model file 	Save the preprocessing setting under the left condition.
Sample code generation function	Not supported to generate sample code for RZ/V2H.	Supported to generate sample code for RZ/V2H. *Please refer to 3.1.10 too for the feature of sample code generation.
Quantization parameter search function *RZ/V2H only	-	Estimate appropriate quantization parameters on the GUI. *Refer to the AI Model Conversion Tool help page to learn how to quantize with this tool.
AI Model Conversion Tool Help page	-	Updated for v1.2.0.

3. Notes / Restrictions

This section describes the usage considerations and restrictions for each plugin in this release.

3.1 Usage Considerations

The following items are new usage considerations in this release.

- 3.1.7 [AI TLT Plugin] In the case of launching e² studio from the terminal

3.1.1 [AI TLT Plugin] Installation time of RZ/V AI TLT

Installation of the RZ/V AI Transfer Learning Tool (hereafter referred to as RZ/V AI TLT) may take some time depending on network conditions.

3.1.2 [AI TLT Plugin] Interruption during RZ/V AI TLT installation

If you cancel the RZ/V AI TLT installation by clicking "Cancel" during the RZ/V AI TLT installation by clicking [Start Settings...] in the AI Navigator. The installation results up to the point of interruption remain as it is. To complete the installation, click [Start Settings...] again and continue the installation to the end.

3.1.3 [AI TLT Plugin] Operation when reinstalling RZ/V AI TLT

After installing the RZ/V AI TLT from the AI Navigator, clicking [Start Settings...] will start the reinstallation process, but an error will occur due to the installation of the Docker container. If the reinstallation is interrupted, the operation of the RZ/V AI TLT is not affected.

3.1.4 [AI TLT Plugin] Individual installation

When installing RZ/V AI TLT by clicking [Start Settings...] or launching RZ/V AI TLT using [Transfer Learning...] on AI Navigator, installation and starting may not be successful if RZ/V AI TLT itself has already been installed separately. If you have already installed RZ/V AI TLT individually, please remove the existing Docker container.

3.1.5 [AI TLT Plugin] End of transition learning tools through dialogue

If you click the cancel button in the modal dialog while the RZ/V AI TLT is being started by clicking [Cancel], the RZ/V AI TLT will also be terminated. In addition, the function for automatically inputting the ONNX model obtained as a result of transition learning by the RZ/V AI TLT into the AI Model Conversion Tool Plugin may not work.

3.1.6 [AI TLT Plugin] AI applications RZ/V AI TLT supports

Please refer to the following web page for the AI applications supported by the RZ/V AI TLT.

(URL) https://renesas-rz.github.io/rzv_ai_sdk/4.00/howto_retrain.html

When you click [Transfer Learning...] in these application projects, the error message "No executable transfer learning plug-ins were found" is displayed. RZ/V AI TLT may support these applications in the future.

3.1.7 [AI TLT Plugin] In the case of launching e² studio from the terminal

When starting the e² studio from the terminal, you may need to enter your root password to start RZ/V AI TLT after clicking [Transfer Learning...] in the AI Navigator.

3.1.8 [AI Model Conversion Tool Plugin] Setup the environment

If you click [Start Settings...] without specifying the directory path of the downloaded RZ/V AI SDK zip file, the warning window indicates that the directory path has not been specified appears. Click [Start Settings...] again after specifying the directory path.

Also, setting up the environment for AI Model Conversion Tool Plugin may take some time depending on network conditions.

3.1.9 [AI Model Conversion Tool Plugin] Open and Close the TVM GUI tool

Open TVM plugin GUI only when converting models.

If you keep opening TVM plugin GUI during another process, the correct directory/file path would not be set. (For example, RZ/V AI SDK directly downloaded path and the trained AI model file path from RZ/V AI TLT.)

3.1.10 [AI Model Conversion Tool Plugin] Sample code generation

The sample code generation function in AI Model Conversion Tool Plugin supports only RZ/V2L, and the input model must be image format. Other format input models such as multi-layer perception (1D and another model) are not supported.

3.1.11 [AI Navigator Plugin] Notes on the Run on the Board

If you click the [Create a bootable disk] on the Run on the Board screen without specifying the directory path where the RZ/V AI SDK zip is downloaded in the AI App view, you will be prompted to specify the download destination directory path.

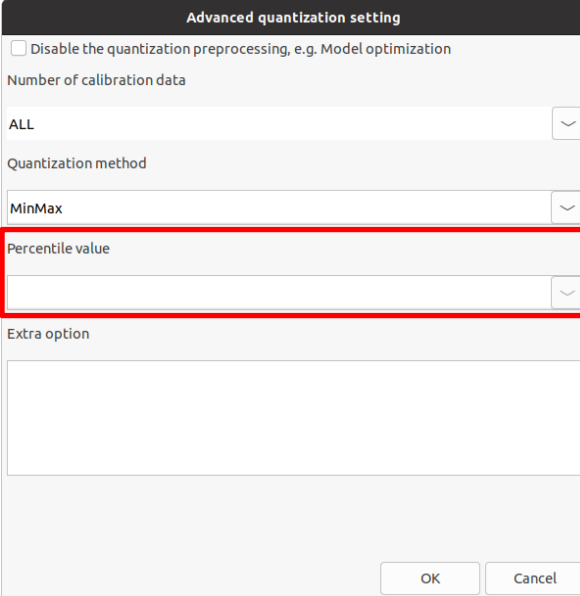
After specifying the directory path, click the [Create a bootable disk...] button again. After specifying the directory path, click the [Create a bootable disk...] button again.

3.2 Functional Restrictions

No new restrictions from the previous version.

3.2.1 [AI Model Conversion Tool Plugin] Percentile value in the advanced quantization setting

The percentile value in the advanced quantization setting has no effect on the conversion result. Quantization is performed with a percentile value of 99.999.



The image shows a dialog box titled "Advanced quantization setting". It contains several settings:

- Disable the quantization preprocessing, e.g. Model optimization
- Number of calibration data: ALL (dropdown menu)
- Quantization method: MinMax (dropdown menu)
- Percentile value: (dropdown menu, highlighted with a red rectangle)
- Extra option: (empty text area)

At the bottom right, there are "OK" and "Cancel" buttons.

Figure 3-1 Advanced quantization setting

Workaround: None

Revision History

Rev.	Date	Description	
		Page	Summary
1.20	Oct 11, 2024	-	First version issued.

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity.

Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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