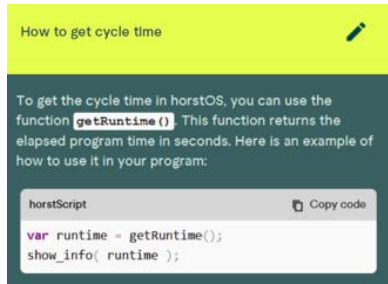


1 AI Copilot

1.1 Status quo 2024.07

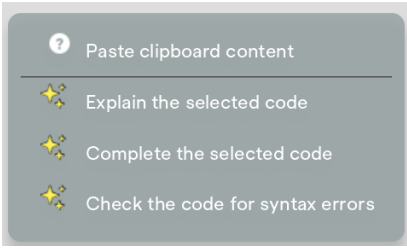
The AI Copilot is your personal assistant and training partner for setting up and programming applications with HORST. It is available at all times and has access to an enormous amount of knowledge: Assembly instructions for the robot systems, robot-specific programming documentation, but also open source sources can be made quickly accessible. The AI Copilot bundles the content from the various sources and provides the right answer.

This table describes the current scope of services of the AI Copilot (as of 2024.07).

Range	Function
AI Support	<p>Support with general questions about the software</p> <ul style="list-style-type: none"> The copilot provides answers and procedure descriptions for general questions. These are helpful, for example, as support for programming or to help new users find their way around the software Example question: <i>"How do I program a palette?"</i> <p>Support with general questions about fruitcore robotics products</p> <ul style="list-style-type: none"> The co-pilot has extensive knowledge of all fruitcore robotics products. He has all the assembly instructions at his disposal. This means that it can quickly provide the required information when setting up an application without having to look it up. Example question: <i>"How much weight can I install on the MRB S?"</i> <p>System-wide search and navigation support in horstOS</p> <ul style="list-style-type: none"> The co-pilot supports system-wide navigation and makes it easier to find menus and settings quickly. The Copilot provides support in finding your way around a settings menu Example question: <i>"How should I set the controller parameters for my robot?"</i> <p>Support with the management of components</p> <ul style="list-style-type: none"> The co-pilot knows which components are set up via horstOS and can provide information about their configuration. Example question: <i>"What is the IP address of my camera?"</i>
AI Programming	<p>Code output</p> <ul style="list-style-type: none"> The AI Copilot can output textual program code to solve problems Code can be copied directly into the robot program using the copy-paste function Example question: <i>"How do I get the cycle time?"</i> <p>Inspiration for solving programming tasks</p> <ul style="list-style-type: none"> Generated code serves as "inspiration" to show the user how a problem can be solved and how a function basically works Example question: <i>"How do I program a circle with a diameter of 5 cm)"</i> (→ If waypoints/coordinates are included in the generated code, this must be checked for executability after it is transferred to the program) <p>Step by step procedure description</p> <ul style="list-style-type: none"> The co-pilot can output a "step by step" description of how a function must be programmed and the user can solve his problem by following the instructions (not direct code output, but support with programming) Example question: <i>"What do I have to do to set up a user-defined coordinate system?"</i> 
AI Error Handling	<p>Troubleshooting</p> <ul style="list-style-type: none"> If an error message occurs on the robot, the "Troubleshooting" button is now always displayed. This function is used to transfer the description of the error message that has occurred directly to the AI Copilot The AI Copilot searches its knowledge of the error message and provides detailed information on the error that has occurred as well as possible solutions for rectifying the error

1.2 Outlook

This table describes further planned functions of the AI Copilot (as of 2024.07).

Range	Function
AI Support	<p>Context-sensitive support</p> <ul style="list-style-type: none"> The AI Copilot recognizes where a user is currently located (in which menu) and offers appropriate assistance without the user having to explicitly ask for it Suitable sample questions are displayed, depending on which screen you are in <p>Application information is increasingly included</p> <ul style="list-style-type: none"> The AI Copilot knows, for example, which robot model has been selected, which settings have been made and which components are in use with the robot. Accordingly, it offers suitable information and assistance on request. Example question: <i>"My robot is swinging up, what can I do?"</i> <ul style="list-style-type: none"> Example response: <i>"The controller parameters "default" are currently set. Go to the Program settings menu and select the controller values "conservative". Observe whether the robot oscillates less with the new controller settings."</i>
AI Programming	<p>Context menu in textual programming</p> <ul style="list-style-type: none"> Additional programming support is made available via a context menu in textual programming If you select a code section with the cursor, the context menu shown on the right is displayed  <p>Explain code section</p> <ul style="list-style-type: none"> "Explain the selected code to me" → The co-pilot provides a step-by-step explanation and thus makes it possible to understand code that you have not written yourself or have not dealt with for a long time <p>Complete code</p> <ul style="list-style-type: none"> You can ask the co-pilot to complete the code via a comment <p>Find syntax errors</p> <ul style="list-style-type: none"> The co-pilot will be able to analyze selected code to detect syntax errors & offer solutions or suggestions for program optimization
AI Error Handling	-
Sources	<p>Reference to sources of an answer</p> <ul style="list-style-type: none"> The AI Copilot provides information about the knowledge on which its answer is based The user can look up further information on his problem in the source himself

2 Technical background

The AI Copilot from fruitcore robotics is based on a Large Language Model (LLM) (GPT-4 from OpenAI) and accesses a comprehensive knowledge database. Thanks to this comprehensive knowledge base, the AI Copilot can answer a wide range of user queries and help them with programming and troubleshooting.

The AI Copilot's data sources primarily come from fruitcore's own knowledge database, which contains detailed expertise and industry knowledge, robot and software specifications and information about the various components used. This knowledge database is updated daily to ensure that the information provided is always up-to-date and relevant.

AI Copilot's search mechanism continuously searches this knowledge database, retrieves relevant documents for answers and performs quality assurance by providing feedback and adapting the data basis. This ensures that the answers are not only correct, but also of high quality.

The AI Copilot is based on the IIoT platform horstCOSMOS. The IIoT platform is used not only to record telemetry data and process data, but also as the basis for the AI services. The same account is used for both program backups and AI services, ensuring seamless integration and synchronization.