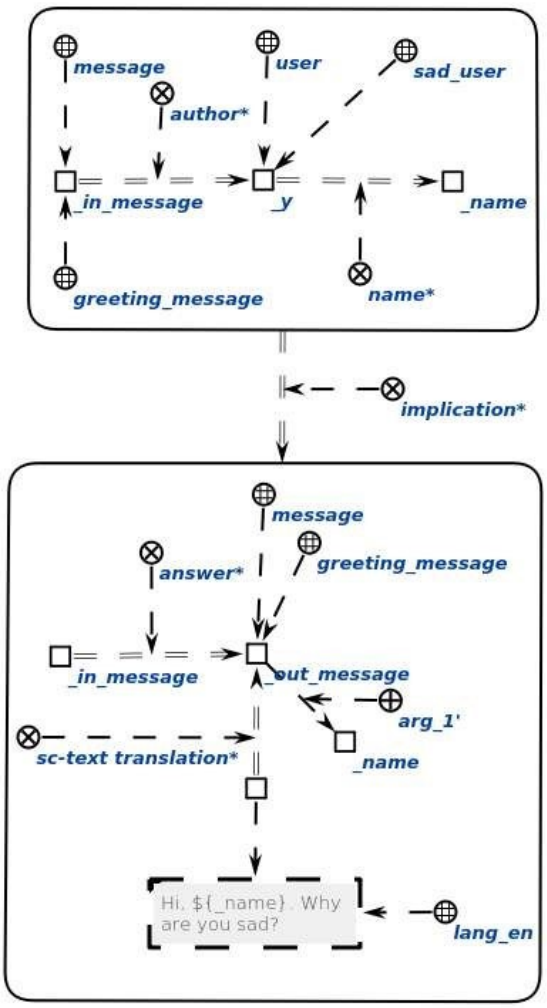

Figure 11: An example of a logical rule that uses the result of recognizing a user's emotion

system knows, then we need to respond to this message with a greeting with a reference by name and ask the reason for sadness.

IV. HARDWARE ARCHITECTURE

The implementation of the represented models within the framework of a hybrid system for analyzing the emotional state requires appropriate support, both from the software and hardware. Therefore, the issue of creating a hardware architecture of the system that allows effectively implementing the functional responsibilities imposed on the system is one of the significant stages for achieving the overall goal.

The developed hardware architecture of the system should take into account the requirements and features of the implementation of both the semantic and neural network components of the system.

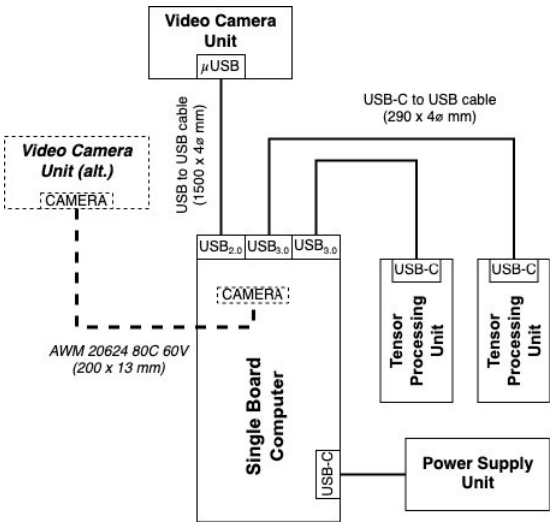

Figure 12: The system hardware architecture

The hardware requirements, from the point of view of the semantic part of the system, include the need to use computing tools with a processor based on the 'x86' architecture. This is due to the fact that initially the OSTIS platform as the basis of the software part of the system was developed for general-purpose CISC processors. Using this type of processor allows eliminating compatibility problems, simplifying debugging and testing the system. Therefore, it is necessary to have a computing device in the system based on this hardware architecture.

On the other hand, to solve computer vision problems, modern neural network architectures require support for tensor operations from the hardware platform, which allows effectively organizing the process of running trained neural network models on the target device. However, general-purpose processors are not suitable for performing such operations with maximum performance. Therefore, to increase the speed of the system, it is necessary to include a special coprocessor device in the hardware architecture, which allows increasing the speed of the neural network part of the system.

Taking into account the listed requirements, we have developed a hardware architecture of the system, the block diagram of which is shown in figure 12:

The main elements that build up the hardware of the system are:

- single-board computer (SBC) that serves as a central device, on which the OSTIS virtual machine is run and, accordingly, the interpretation of intelligent agents and a list of peripheral devices that perform the functions of input and output of video and audio information as well as auxiliary devices that perform the functions of supporting neural network