KI WISSEN
Automotive AI Powered by Knowledge

3.5 AI Net Observer

Johann Kelsch | DLR

Formal Methods and Knowledge Representation

Motivation

The human developer of an AI system as part of an Human AI Training System selects data and methods in advance for the training of its AI net (Fig. 1). Such selection is usually based on the developer's experience, which may be high or low, and the developer's preferences, which may be optimal for the training or not.

This rather qualitative approach can be sub-optimal for the efficiency of the training process as well as for the overall performance of the system after training. Therefore, it is seen as necessary to support the developer's decision-making process in respect to the AI training through the use of an AI Net Observer.

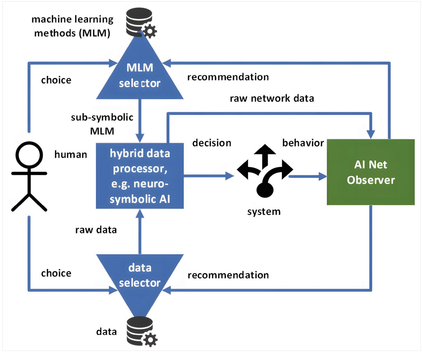

Figure 1: AI Net Observer within Human AI Training System (© DLR e.V.)

The AI Net Observer is connected to the developer via a front end and can provide feedback on the efficiency of the training and after that of the system usage. In this way, the AI Net Observer can influence the developer's decisions on the selection of the amount or type of data, the necessary training time as well as on the choice of the training method itself, thus optimizing the overall performance of the Human AI Training System (Fig 1).

Development

Since the purpose of the AI Net Observer is to support the human developer in making decisions, one of the most important requirements for the AI Net Observer and its front end must be intuitive and fast perception and interpretability of the information presented.

Since the observation of AI training is a highly dynamic process, the selected presentation must not lead to an overload of information, but also not to a large reduction of information. Therefore, one effective observation approach similar to Griesche [1] of large dynamic data is necessary.
The development of the AI Net took place in four design steps:

1. Semantics design (Fig. 2, upper left): different semantics for the symbols used were designed and tested according to the HMI best practice method.
2. Topological design (Fig. 2, lower left): various display methods for the topology of the AI networks were designed and tested according to the HMI best practice method.
3. Frontend design (Fig. 2, mid): the results of the steps 1 and 2 were joined to a design decision for a human developer compatible frontend design.
4. Backend design (Fig. 2, right): the backend design was implemented in Bouml [2] and Python.

References:

[1] Griesche, S., Dziennus, M.: Images in mind – Design metaphor and method to classify driver distraction in critical situations. In: VDI-Berichte 2205, pp. 85 – 99, 2013
[2] Pagès, B. : Bouml 2.7.6. https://www.bouml.fr/, 2024

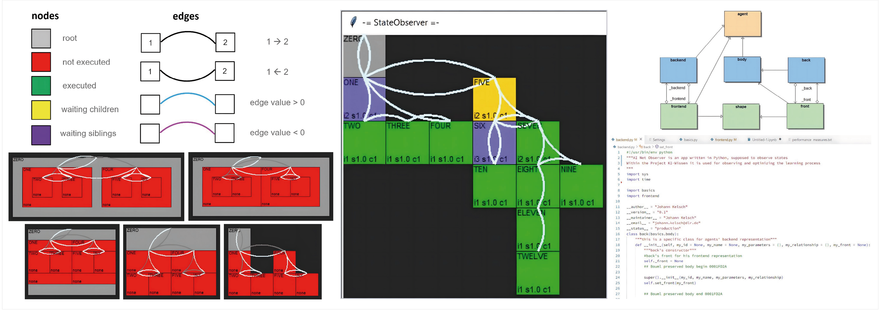

Figure 2: Four development steps of the AI Net Observer:
1. Semantics design (upper left), 2. Topological design (lower left), 3. Frontend design (mid), 4. Backend design (right) (© DLR e.V.)

Partners

Continental, BOSCH, Valeo, [at], AVL, BTC embedded systems, Capgemini engineering, e:fs, DFKI, DLR, fortiss, Fraunhofer IAIS, Fraunhofer FOKUS, FZI, Universität des Saarlandes, bast

External partners

eict

For more information contact:
johann.kelsch@dlr.de

KI Wissen is a project of the KI Familie. It was initiated and developed by the VDA Leitinitiative autonomous and connected driving and is funded by the Federal Ministry for Economic Affairs and Climate Action.

KI FAMILIE
VDA LEITINITIATIVE

Funded by the European Union NextGenerationEU

Supported by: Federal Ministry for Economic Affairs and Climate Action on the basis of a decision by the German Bundestag