Artificial Intelligence

Using future technologies – on PHYTEC embedded systems

In recent years, significant technological advances have been made in the field of artificial intelligence. New approaches and concepts such as deep learning have enabled solutions that would not have been possible without AI. These advances can also be used for embedded systems. Thanks to the use of cloud computing power, current multi-core systems from the ARM® Cortex-A processor family provide the ideal basis for many applications.

OUR EXPERTISE IN YOUR PROJECT

In order to familiarize our customers with the possibilities of AI solutions and to offer the best possible support from a single source, we have established a competence center for AI. Our team of in-house data scientists with many years of experience in the use of artificial intelligence will guide you through the possibilities and find the right solution for your project. According to your skills and requirements we complement the team agile with cloud and security experts as well as software and hardware developers.

- **In-house data scientist**
- **Kits for Data Mining & AI and Edge Computing**
- **Workshops**
- **Agile Team for cloud, security, software and hardware development**
- **Analysis and solution consulting**

FROM MODEL TO EMBEDDED AI APPLICATION

Neutral Tool Selection

AI cloud analysis

Deep Learning

A classic or AI supported cloud service structures and analyzes the data. PHYTEC provides orientation in the jungle of offers and supports the use of a private / local cloud with its own analysis tools.
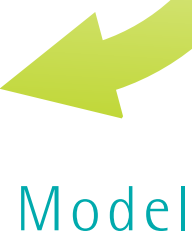
Self-reliant

Runs without cloud connection

Data Mining

Acquisition of application-specific sensor data and transmission to a cloud via PHYTEC hardware.
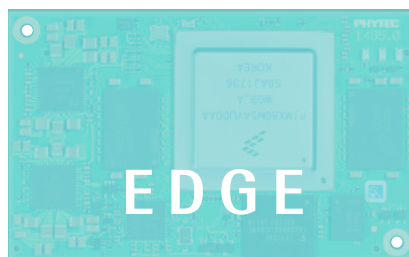
EDGE

Model

AI Solution

The resulting model is exported from the cloud to the PHYTEC Embedded System. There, it analyzes incoming data independently of the cloud. Information from the analysis can be retrieved at any time.

What is CLOUD Computing?

Cloud computing refers to the transfer of computing power to the cloud. The results can be distributed directly online.

What is EDGE Computing?

In edge computing, data is processed at the point of origin. The models for processing may have been created using cloud computing, but they run locally. A cloud connection is possible, but not absolutely necessary. Edge computing is, therefore, also suitable for security-critical applications.

Artificial Intelligence – Machine Learning – Deep Learning

HAS BEEN AROUND A LONG TIME. WHY START NOW? WHAT HAS CHANGED?

The basic ideas and algorithms of machine learning have been known for a long time. In the last 50 years, however, decisive framework conditions have changed and are now leading to the rapid success of AI.

1. Increased computing power

2. Liberalization of computing power through cloud computing

3. Adaptation of the computing power

4. Exponential data increase

5. Inexpensive storage space

6. User-friendly open source analysis tools

The increased computing power makes it possible to manage the resource-consuming computing processes in manageable times. Equally important is the liberalization of computing power, which enables every user to cope with complicated models without having to build and maintain a high-performance infrastructure beforehand. Today we borrow computing power – exactly as much as we need and only for the necessary period of time.

At the same time, the amount of data we have to train modern algorithms is growing exponentially. In the last two years, an estimated 90% of all data was generated. This year, we expect to exceed the two Zettabyte mark. This means that over two Zettabytes (10^{21}) of data will be generated in 2019. This data explosion feeds the success of data-hungry algorithms like Deep Learning. The optimization of open source platforms such as Python for machine learning applications also promoted the success of AI. Since 2015, with the introduction of Keras and TensorFlow, Deep Learning has been integrated into Python in a user-friendly and license-free manner.

What is the difference between Machine Learning, Deep Learning & BigData?

All these terms are subcategories of Artificial Intelligence (AI).

Machine Learning refers to learning from examples. The algorithm does not learn all examples by heart, but learns the basic characteristics of the examples and can then apply them to unfamiliar data.

Deep Learning is a subcategory of Machine Learning and works according to similar principles. The crucial difference is the ability to independently adapt the parameters to achieve optimized results. With Deep Learning, complicated problems with multiple, non-linear dependencies can be solved.

Big Data refers to the use of large amounts of data that cannot be processed by conventional means due to their size. Big Data can be analyzed with Machine Learning or Deep Learning.

Nothing works without hardware

Collecting, storing, structuring and analyzing data are the challenges for the use of artificial intelligence. At the same time, hardware is required to record, pre-process, send to the computer / server, or process the data itself. In order to guarantee optimum functionality as an edge device, the hardware must be both powerful and energy-saving. PHYTEC combines the building blocks of years of experience in hardware development and kernel/software development with expertise in data analytics.

AI needs no special hardware

The computationally intensive part of AI is the creation of a model

Once the model has been created, it can be installed on appropriate hardware. Well-known examples are speech recognition in mobile phones or face recognition in digital cameras. These do not run on special AI hardware, but on classic, performance-adapted hardware. PHYTEC develops the appropriate hardware for each individual solution. For very high performance applications special hardware is developed – e.g. Google TPUs. PHYTEC will take these into account in future developments.

Current dates at:

www.phytec.eu/ events

YOUR DIRECT ENTRY WITH AI:

DATA MINING & AI KIT

sample price
189 €
plus VAT

- Microsoft Azure Cloud Connection prepared
- Create, analyze and manage data
- Use of over 150 Microsoft Azure Services
- USB camera (included in delivery) allows extension of gesture recognition application
- On request support for connection to own / local clouds

EDGE COMPUTING KIT

sample price
189 €
plus VAT

- Microsoft Azure Cloud Connection prepared
- Example model for gesture recognition
- Export of the model to the embedded hardware
- Local execution of the model, without Internet connection

AI – WORKSHOP

Our Data Scientist gives you a general overview of AI. You will get to know possible application areas in order to uncover potentials in your company.

- 1 Day
- max. 15 participants
- 49 Euro / person plus VAT

AI – CONCEPT WORKSHOP

You will receive an overview of the possibilities, opportunities and risks of AI in relation to your company.

- 1 Day
- Exclusive to your company
- 1.200 Euro plus VAT

AI – CONSULTING AND SERVICE

We will deal intensively with the challenges in your company and show you AI solution approaches.

REQUEST AN OFFER:

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