

Your First Machine Learning Project in Just 60 Days

Follow These Steps to Implement a Machine Learning Tool for Artificial Intelligence at Your Company



Introduction

Machine learning (ML) is closer than you might think. Speech recognition on your mobile phone, your email spam filter, photo management with facial recognition, and personalized online advertising are all controlled by programs based on machine learning.

But this technology isn't reserved for large corporations alone. Companies of all sizes can optimize their business and cut costs through targeted use of machine learning. The aim is to use artificial intelligence (AI) as an assistance system to automate processes.

We reveal how a machine learning project can be implemented in a short period of time and at a reasonable cost. Develop your own lighthouse project that opens doors for further AI applications – with a partner experienced in machine learning and AI.

What You Will Learn from This Guide



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How Machine Learning Works

Machine learning is an area of artificial intelligence. It helps IT systems recognize patterns and rules in existing and growing data. To achieve this, it requires an algorithm based on data. This algorithm is then 'trained' so that it can work. While the algorithm works, the data pool constantly grows as changing conditions are observed. By incorporating this additional data, the algorithm continues its training, 'learns', and expands its capabilities step by step. The findings can be used to solve new problems, such as calculating the probability of certain events.

In a machine learning scenario, human and machine complement each other perfectly. The machine provides insights that a human cannot achieve alone due to the scale and multiple dependencies involved. Experienced employees can then use that knowledge to improve processes or develop new business models.

In short, machine learning generates artificial knowledge from experience. This is the basis for artificial intelligence, which in turn supports self-organization and enables automated or autonomous processes.

Before software and its algorithms can learn independently and discover solutions, they require relevant data. In addition, specific parameters such as the number of manual work steps, risk of failure, or market trends are needed to analyze the data pool and recognize patterns. If these conditions have been established, machine learning systems are capable of:

- Finding, extracting, and summarizing relevant data
- Making predictions based on analyzed data
- Calculating probabilities of specific events
- Adapting independently to new developments
- Automating processes based on recognized patterns

Machine learning systems are specialized systems that can only be used efficiently and to their full potential in their trained areas.





Days 1 to 10:

Project Preparation

The first step is to establish the desired outcome and think about any prerequisites of the ML project.

1. Establish a relevant issue to solve in your company.

Which department and which tasks are known to be particularly inefficient or error-prone? Incoming goods, warehouse logistics, and machine maintenance are three common examples.

- **Quality control scenario:** Cameras and image recognition can detect faults in components in production or seeds in agriculture. But in order to effectively identify rust or other quality defects, it is necessary to train AI via an image database. Only then will the AI function reliably.
- **Production scenario:** On the shop floor, manufacturing managers can use a tablet camera to identify machines. By seeing an overview of information about the current shift on the tablet display, for example, they can perform their tasks more efficiently.
- **Predictive maintenance scenario:** Predictive maintenance is about detecting failures and incidents in locations such as production plants before they occur. In practice, machine learning can be used to monitor and determine the optimal rotational speed range for fans and pumps in a cooling tower, for example. Under normal circumstances, factors such as speed, temperature, and air pressure and the dependencies between them are difficult for humans to manage.
- **Finance scenario:** Machine learning can automate booking and billing, while continuing to learn from the activity of accountants, to ensure future payments are correctly assigned. Monotonous and laborious clearing processes can be automated and accuracy increased. This accelerates booking processes and payment runs, ensuring all parties are more satisfied.

2. Clarify whether your questioning and scenario are suitable for a ML project.

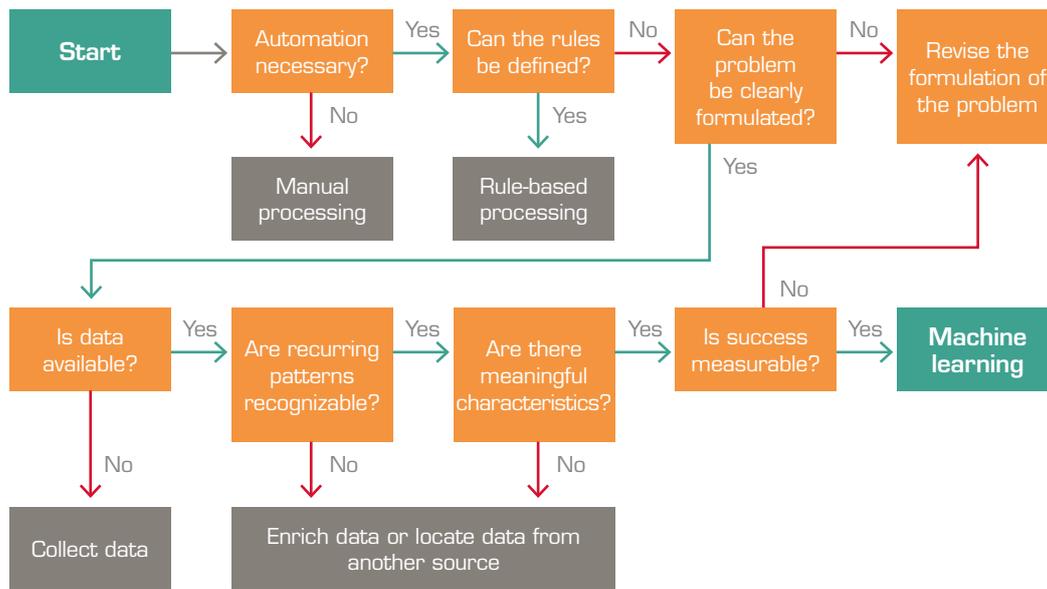
You should be able to answer “yes” to the following four questions:

- Is it necessary to automate this business process?
- Is it possible to define the rules manually?
- Is it possible to formulate a clear problem?
- Is there enough data available to train the algorithm?

Refer to Figure 1 on the following page to find out whether ML is the right approach to answer your questions.

In many scenarios, rules can be defined manually and organized into sets. After this, such tasks can usually be processed automatically by an ML tool. Machine learning is particularly relevant for cases in which the interrelationships are too complex to be understood by humans. In these cases, it makes sense to train and implement AI as an assistance system to support processes.

Figure 1: Machine Learning – When does It Make Sense?



3. Assemble your project team and define the scope of the project.

Build your project team with members of your IT department and suitable people from other relevant departments. These could be manufacturing, maintenance, customer service, or logistics. A data scientist is essential to master the mathematical and analytical procedures. It is even advisable to source external consultants and data scientists with the relevant experience from other customer projects.

4. Think about the outcome of your project and plan for change management.

Which processes and departments will the project affect? This should be considered at an early stage. It would be a mistake to confront unprepared employees with AI-derived suggestions.

Take accounting, for example. Data flows into the system and then the ‘classifier’ (see Page 6) analyzes it and initiates automated payment steps. From this, it’s evident that AI can complete some of the tasks of one or two employees. Employees will be pleased to hand over routine tasks to AI tools, but want to preserve their existing status.

It is therefore better to involve all users in the topic from an early stage. The process, including the reason behind the project and the optimization steps, must be discussed openly. Change management is key. The acceptance of an AI tool ultimately depends on how decisions are made. You should ensure that users still have a say.



Days 11 to 20:

Providing Data

Particularly in data science, it can be necessary to call upon external partners for your ML project. At this point, your ML partner can begin their actual work. In data analysis, your data scientist checks the quantity and type of data, the access options and, if necessary, the quality of the devices capturing data, such as sensors.

In many cases, data can be extracted from the ERP system. However, in some scenarios, adjustments to the interface are necessary.



Days 21 to 40:

Training the Classifier: Trial and Error Using Test Data

During this phase, your ML partner will view and prepare the relevant data. They will extract a relatively small set of data, classify it, identify any patterns, and categorize it using labels. Various tools are used during this process. In this phase it will become clear which characteristics are needed to perform the end task. The goal is to create a classifier. There are premade classifiers available for image recognition and text. Depending on your task, however, you will likely need to build new classifiers or adapt existing ones.

Test data will be used to train the classifier. In this step, a human will confirm that the classifier has made the right decision, or correct it if it was wrong. The algorithm will then adapt and learn continuously.

While this is happening, the threshold of your set of data is refined. The new evaluation is then saved. When the error value is small enough, the test phase is complete.

In the first phase, your results should reflect practical experience. If this is achieved, your team will know they are on the right track. The ML process continues, and you can look forward to receiving the findings.

It's important that the selected stakeholders understand their tasks, both in terms of procedure and in a mathematical sense. This will be reflected in the quality of your classifier and its integration into the desired process.



Days 41 to 60:

Implementation, Support, and Further Development

The machine learning tool is finalized and can be applied to any process you would like to automate. Depending on the intended use, SAP Leonardo, a predictive solution, mobile devices, and other applications and platforms can be used to implement the new support system.

Using an AI tool every day will help your company gain valuable experience that can be reflected in further AI scenarios. This is where your “domain knowledge” is particularly effective. Your knowledge of market dynamics, company objectives, and your IT architecture is especially important in finding new ways to use AI.

In the months that follow, it is important to have a consistent and profitable support model or to hold a ‘lessons learned’ workshop so you and your team can assess the actual benefits of the project.

Glossary and further explanation:

[Designing Digitization with the Periodic Table of Artificial Intelligence](#). Digital association Bitkom explains all AI-related terminology and classifies it into overall context. Source: bitkom.de (2019).



We Turn Innovation into Value

Every innovation project has a start point and an end point. But not every innovation project has a point. Too many businesses innovate without having a real, tangible objective in sight. They innovate for innovation's sake and cannot be sure whether the project is truly creating value.

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Innovation to the Point. ■