Continuous AI

Is Continuous AI a blessing or a curse?

By Bart de Best

Context:

This blog is derived from my experiences as a DevOps trainer, coach and examiner with the concept of Continuous AI. By speaking to and exchanging ideas with many diverse employees from numerous organisations, I have been able to get to know many sides of Continuous AI. This blog describes my experiences with this part of Continuous Everything and whether it should be seen as a blessing to humanity or a curse.

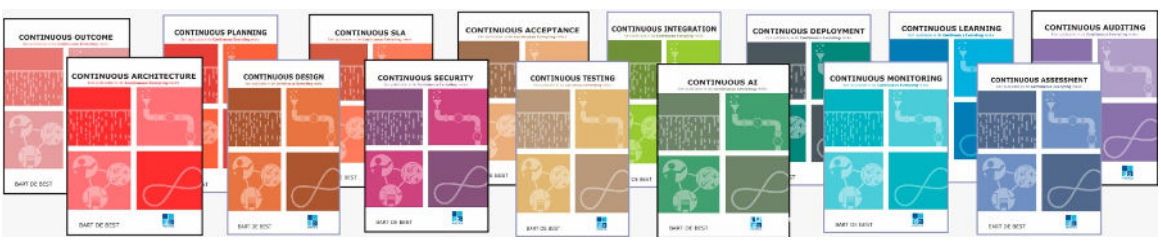
Challenge:

Continuous AI focuses on continuous evaluation where AI can play an important role for Continuous Everything value streams such as Continuous Deployment. By analogy, the approach can of course also be used for business value streams. The challenge of Continuous AI is mainly the speed of development of AI. The possibilities increase quadratically every year and so does the IQ of AI models. It is expected that by 2038 AI will have an IQ of 1,000,000. As a result, AI is becoming increasingly suitable for use due to increasing quality and reliability, and its field of application is also increasing. Where the cloud used to pose a threat to the application, base models are now also sold that organisations can fine-tune into assist models that can run locally. For example, a base model can be purchased that has been trained with millions of images. Based on this, a specific local assist model can be created through fine-tuning for recognising specific images for your own organisation. But what is the beginning of this journey and where does it end?

Solution:

The solution to this challenge has been found in the concept of Continuous AI in which DevOps engineers analyse several times a year which aspects of Continuous Everything are now in need of getting rid of waste through the use of AI. It must always be considered what is ethically responsible. This blog discusses the concept of Continuous AI through the following steps:

1. The definition
2. The principles
3. The method
4. The experiences



1. The definition

AI can be defined as follows:

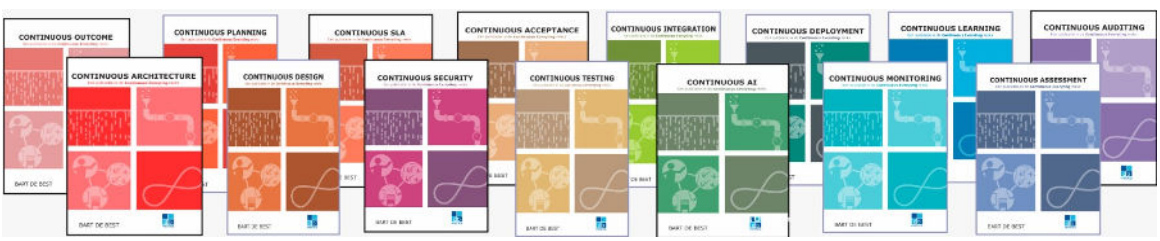
Artificial Intelligence
AI refers to the ability of machines to mimic human-like intelligence, including learning, reasoning, planning, understanding natural language, and sensing the environment.

Based on this, Continuous AI is defined as follows:

Continuous AI
Continuous AI aims to optimise DevOps value streams through the digitalisation of actions / tasks, thereby increasing the outcome.

AI has essentially been a recognised field since 1956. In the 1960s - 1980s, many Symbolic AI and expert systems were created based on hard coding logic. In the AI winter of '80 - '99 there was little interest because the business case for AI was very poor, if only because of the management of developed AI applications. In addition, expectations were not met. With the advent of machine learning and neural networks in the 1990s and 2000s, renewed interest arose. The CNN and RNN models provided the basis for current AI models for image processing and speech recognition. In this century, the breakthrough came through big data and stronger computer systems in the form of deep learning and strong algorithms. This has also boosted robotics that literally give shape to AI.

The essence of AI lies in a number of components. The first component is the AI algorithm. Each problem area for which AI is used has its own algorithm that is capable of solving the problem. The algorithm itself is an inert application that plays no role in the production environment. It is the AI model created by the algorithm that generates the outcome in production. An AI model is therefore nothing more than an application that processes input into output. An algorithm therefore generates an application. In the AI model, the algorithm builds logic based on a training data set. The AI model is then validated for usability by applying a validation data set. Finally, the AI model is tested for performance with a test data set.



2. *The principles*

The following principles have been devised for AI to keep it manageable:

1. AI should not be offered on the free internet
2. AI should not program
3. AI should not talk to AI
4. AI may only be used in wars if the enemy does so
5. AI should not be further developed until we hold our breath for 6 months to think about whether we can control it

All five principles have already been violated. So AI has been given free rein. However, the AI act was defined in Brussels in December 2023, which contains rules on the application of AI to protect citizen's, such as not being allowed to identify people on the street with AI systems. This restriction offers the opportunity to secure privacy but has the side effect that less information is obtained to create new AI models. In countries where this legislation does not apply, 10 times more information is expected to be created for training AI models than is available in highly regulated countries. This gives countries with less regulation a great opportunity to build a technological lead that can benefit such a country in many ways. Any form of curbing AI to eliminate or mitigate risks can therefore also have a side effect that must be weighed up.

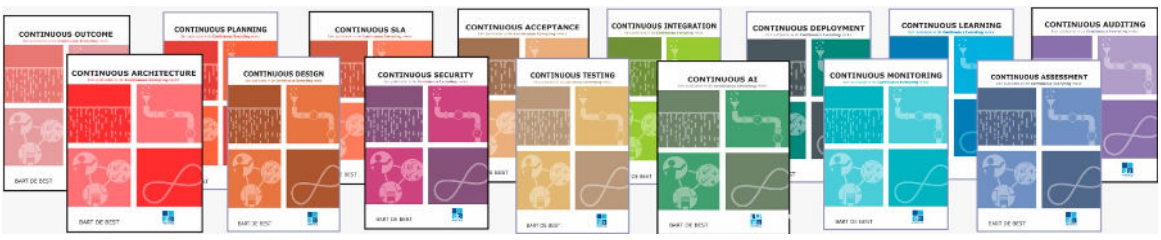
This also applies to limiting the power of the AI models by not being allowed to use all books ever written or certain websites that do not allow access to AI models that search for information online.

In addition to AI principles in general, principles for Continuous AI are also defined in the book Continuous AI. The following principles are a selection from this:

1. AI models only come alive if a management facility has been set up for the model, the data and the algorithms.
2. AI models only go live if a human check has been carried out on the end product.
3. Continuous AI delivers an outcome improvement.
4. The organisation must be able to produce senior programmers itself.

Ad 1. AI models become outdated for many reasons, including adjusted requirements of the value streams within which they are applied. For example, the F1 score must be measured regularly based on new data to test the reliability of the AI model and to train it where necessary. It must also be determined whether new algorithms can provide better performance.

Ad 2. AI models are not flawless. Especially in the case of software creation, 3% of the code is often incorrect. This will improve year on year, but a check is still required for the time being.



Ad 3. AI models are interesting but are not an end in themselves. Outcomes must be generated. This means that AI models should not replace workers if this does not result in a significant outcome improvement.

Ad 4. Senior programmers often give simple tasks to junior programmers because the work is not interesting. However, new code bots can increasingly be used as junior programmers because they also behave like junior programmers. For example, codebots themselves record a task from Jira, create the required source code, ask questions to human colleagues if there are alternatives to consider that do not really result in a preferred alternative, and check in the source code themselves. The codebot has thus become an employee who actively participates and communicates in the development process. This is the beginning of the end of junior programmers deployed. The consequence, however, is that there is no breeding ground left to acquire senior programmers ourselves.

3. The Way of Working

Figure 1 shows the two value streams of Continuous AI.

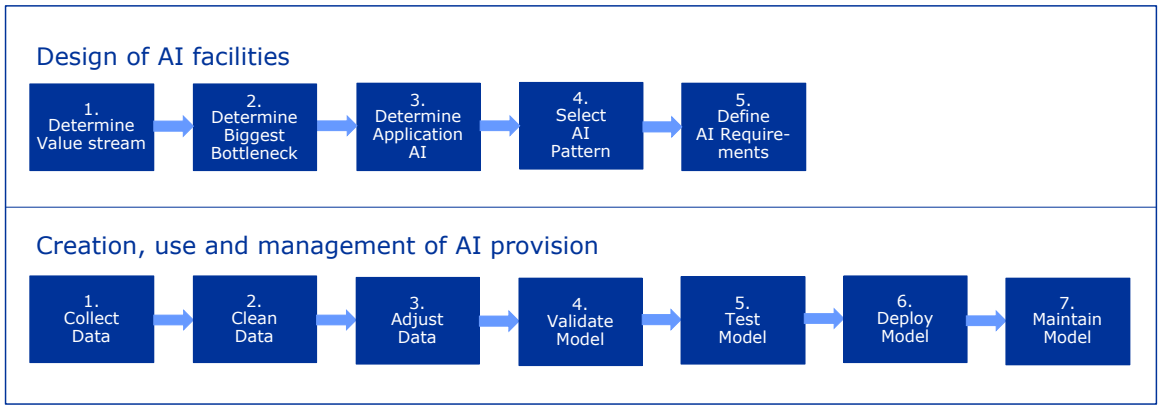
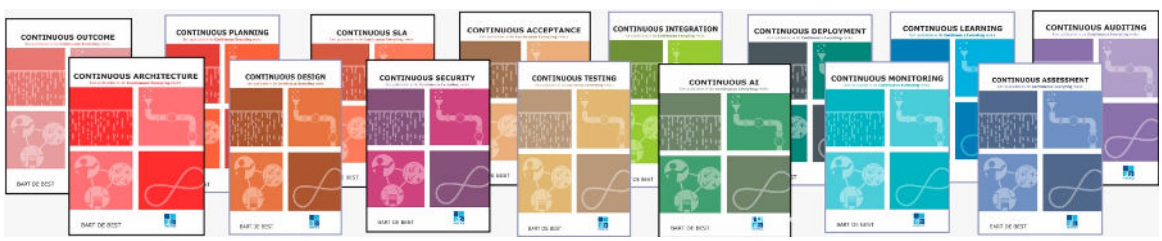


Figure 1, Continuous AI value streams.

The first value stream analyses the Continuous Everything value streams such as Continuous Testing and Continuous Deployment through the application of value stream mapping. An AI pattern is selected based on this. An AI pattern is a solution in the form of AI that applies generically to a generic problem.

In the book Continuous AI, this analysis has already been carried out for 14 Continuous Everything value streams. This results in a timeless book for applying AI within Continuous Everything that is applicable to every organisation.

The second value stream represents the acquisition of an AI model, as described in point 1 of this blog.



4. The experiences

Over the years I have had various experiences with Continuous AI that I would like to share with you.

Own experiences

The use of AI often starts with the formation of a robotics department. This sounds sexy and arouses the interest of the IT employees. By setting up such a team, experience is gained with, for example, ML applications. DevOps teams are also helped with labour-intensive work. Examples of developments that can be delivered by these robotics teams are:

1. Generating dummy test data based on pattern recognition in production databases.
2. Recognising patterns in events that monitor systems produce.
3. Digitising work with or without AI.

At an organisation where AI has been used to digitise tissue and analyse it with Deep Learning, I have been able to learn a lot about the effects this has on the medical world. The cost of sending glass slides with tissue for verification by the pathologist cost as much money as purchasing a tissue scanner. Digital tissues also do not age and require less physical storage space than a computer. But bit patterns can also be seen that indicate cancer that are not visible to the human eye. The development took years because Deep Learning was not yet well developed when the idea was started.

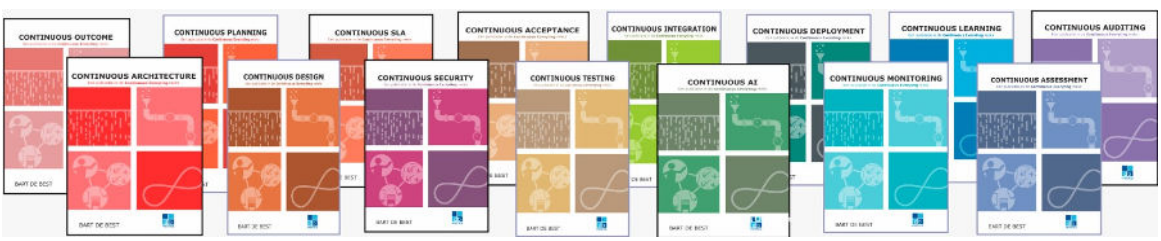
Training experiences

Training courses often give examples of the application of AI in your own organisation. For example, all insurance companies are now working on automatically paying damage claims based on AI models. This often takes a year to prepare for production.

It also appears that all organisations are starting to use AI, but that many people do not yet have an idea of how they should be involved. For example, I provided training to service level managers who did not see a direct relationship. After giving some examples about the data quality of training, validation and test datasets and the periodic control of the quality of the processing, I quickly realised that AI is nothing more than an application about which agreements must be made in the SLA, but mainly about the quality of the data and compliance with laws and regulations.

Examinator experiences

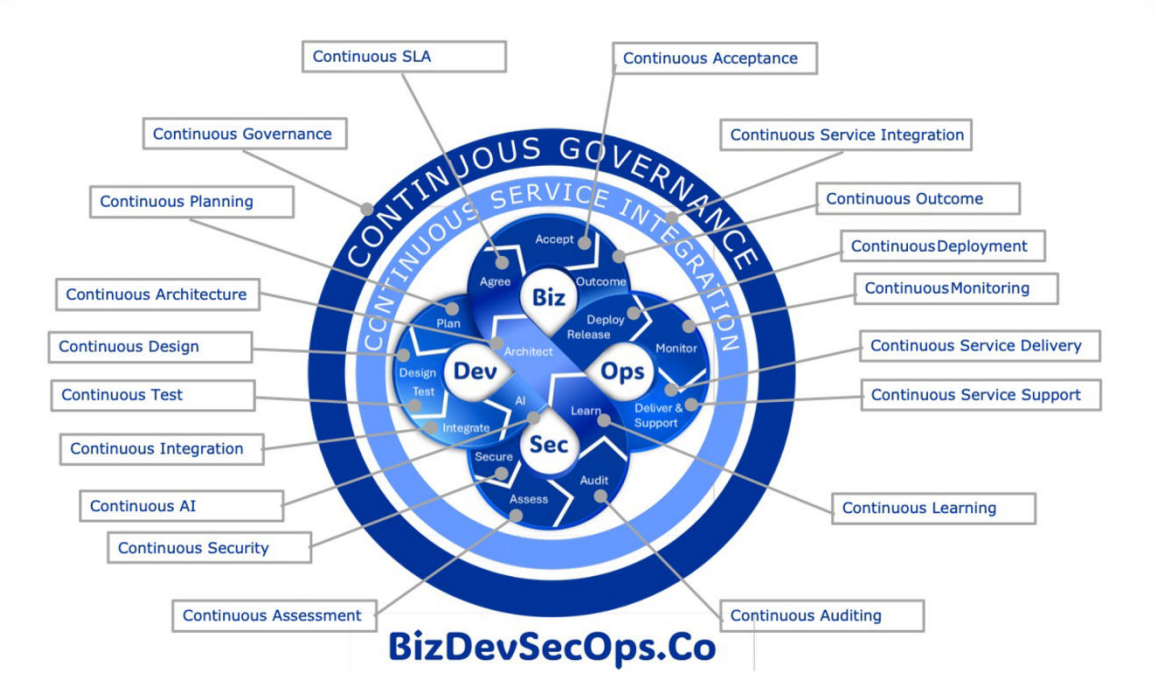
More and more students that I coach as a 2nd examiner or assess as a 1st examiner have AI as part of their Business IT Management bachelor graduation assignment. This is very interesting because it keeps you up to date in the field. A recurring observation is that students experience that organisations are still afraid to apply AI.



This is due to the unfamiliarity, the fear that data will fall into the wrong hands and the failure to comply with internal company policies and external laws and regulations. This perception appears to be effective to adjust, but it does require a lead time that should be seen as an investment. Existing analysis tools such as Lean management also appear to be an effective means of defining the focus of the use of AI.

The question remains whether AI is a blessing or a curse for humanity. I think it can take both forms. Take the example of an ML model that, in 2 years of construction, was able to make the molecular 3D print of all 200 million proteins known on Earth. It takes a PhD chemist 5 years to produce 1 protein or 1,000,000,000 years to produce 200 million proteins. This has made new medicines possible. Yes, that is a blessing for humanity. The diagnosis of tissue for containing cancer cells is also a boon. Accelerating the resolution of disruptions also has many advantages. And preventing accidents due to self-driving cars will eventually become so.

Eliminating workplaces may be perceived as a curse. However, these are shifts in labour that we have known for centuries in agriculture, building houses, constructing roads, producing books, transport, etc. Agriculture alone has become more efficient by a factor of 100 in 100 years. The difference now is that the shift is more disruptive and that the shift takes on quadratic forms. Consider the proposed plan to deploy approximately 30,000 robots in warehouses by 2025, thereby replacing as many or more warehouse employees. The question is whether the people who lose their jobs will be able to find a new position given the speed of job replacement by AI and therefore the number of people who will have to go through the transformation. These new functions must create value that increases the outcome of the business value stream and for which AI does not yet have a solution. And that is mainly a question for the government and the training institutes of our country to put this on priority 1 because a quadratically increasing benefits cannot be afforded by the people still working.



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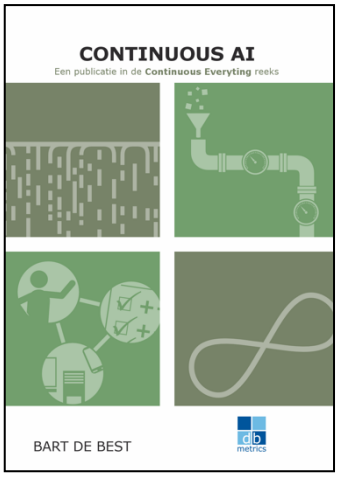

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