United
Innovations

Survey of Tools for
Software Engineering

Release 2 / 2023

www.software-innovations.eu

Foreword

If you believe what many experts are saying, data will be the gold of companies in the future and will be refined into new insights in many ways, but always in real time, by means of artificial intelligence. This will enable us to satisfy customer needs at high speed, reorganize production processes, adjust supply flows, change prices and launch new business models on the market. Time-to-market must be minimized.

Of course, one could reflect on the role humans will play in this future world. To illustrate this, it is suggested to imagine a chess game between two people and two computers. Lightning chess would take on a completely different meaning, and it might be better to allow computers only one thousandth of a second to think about each move.

As IT people who are open to innovation and technology, we don't ask ourselves these questions today. Instead, we work at full speed to make the processes in companies fast, changeable and secure at the same time. These 3 goals are inherently interdependent. The faster you want processes to run, the higher the risk of errors. Change then becomes a bottleneck, because fast processes have to be planned precisely, which costs a lot of time.

We should therefore not disregard people. The dynamic overall system must give the people operating the system the opportunity to test the processes and decisions, to understand their content and, if necessary, to change them. This explains why topics such as Explainable AI and User Experience are now of very high importance. With these words, we would like to prepare you for the upcoming articles and hope you enjoy reading them.

Dr. Gerd Große
Head of United Innovations
Chairman of the Board of
GFFT e.V. & Managing Director
of GFFT Technologies GmbH

co-author:
Julia Stumpenhagen
Solution Architect Digitalization
SVA System Vertrieb
Alexander GmbH

Contents

Calendar

**20/09/2023
15:30-17:30**

GFFT Consortium Project: Challenge DevOps, DevSecOps and BusOps (german)

DevSecOps is a cultural change in software development aimed at improving IT security in rapid development cycles. It relies on standards like OWASP ASVS and BSI Grundschutzkompendium. Companies implementing DevSecOps need to bridge the gap between development and security teams, automating security processes whenever possible. Zero trust principles are widely known, and we'll explore how they can be applied to a security strategy with examples.
Info & Registration

**04/10/2023
15:30-17:30**

GFFT consortium project: Strategies for future-proof Test Data Management (german)

Test data management is becoming increasingly important for various reasons (regulation, economic focus, time-to-market, software quality, agility, ...). Matthias Rasking (Sixsentix) and Julia Stumpenhagen (SVA) present individual solution modules for test data management and answer the users' "Ask the Expert" questions. Info & Registration

**11/10/2023
15:30-17:30**

GFFT Consortium Project: Transformation to a Data-driven Enterprise (german)

The panel will include Marc Gittler (Deutsche Post), Dr. Johannes Berner (Ancud IT) and Dr. Jörg Liebe (Nagarro). Julia Stumpenhagen (SVA) will introduce the topic and Christian Müller (Sanofi) will give the presentation "How Predicitive Analysis Changes Process Mining". Info & Registration

If you are interested in participating in a workshop or event, please send us an email to info@gfft-ev.de. You will then receive the dial-in data.

All events and further information can also be found at
www.software-innovations.eu/kalender

**08/11/2023
15:30-17:30**

GFFT Consortium Project: Strategies for testing AI-based software systems (german)

In this consortium project, strategies for testing AI-based software systems are being developed and solution modules for this are being presented. The experts on the team are Gerhard Runze and Klaudia Dussa-Zieger (both Imbus AG) and Julia Stumpenhagen (SVA). They will also answer the users' "Ask the expert" questions.
Info & Registration

**05/12/2023
16:00-18:30**

Symposium on the Future of Software Quality 2023/2024 (german)

In this symposium, the future of software quality will be discussed. In top-class panels, the current challenges will be presented and the innovation topics of the next year will be highlighted. The German Startup Cup will showcase three of the new tool providers currently on the market. Info & Registration

**07/01/2024
16:00-18:30**

Symposium on the Future of Data-Driven Software Architecture 2023/2024 (german)

This symposium will discuss the future of software architecture and a Raltime Enterprise. In top-class panels, the current challenges will be presented and the innovation topics of the next year will be highlighted. As part of the German Startup Cup, three startups pitch, all participants determine the finalist for the presence final in summer.
Info & Registration

United Innovations
- The innovation network -

United Innovations (UI), a subsidiary of GFFT e.V., is a driving force behind innovation in Germany, Europe, and beyond.

Our comprehensive platform boasts an extensive network and a diverse range of offerings, including the techL© technology database, surveys, awards for evaluating new technical solutions, startups, and scientific prototypes, as well as hosting various events and supporting proofs of concepts and launch projects.

Join Our Network at UI

Our focus extends across a wide range of topics positively impacted by IT, including manufacturing, logistics, business processes, and cybersecurity. Our services encourage knowledge sharing, incremental improvements, proactive development of new solutions, and talent recruitment. Embrace the power of collaboration and be a part of our innovation network.

Contact

info@gfft-ev.de
+49 6101 95498-10

Social Media

in   www.linkedin.com/company/gfft-ev/

▶   www.youtube.com/GFFTeV

Imprint

GFFT Innovationsförderung GmbH
Dr. Gerd Große
Niddastraße 6
61118 Bad Vilbel

Web

www.united-innovations.eu

Print

Flyeralarm GmbH

Review German Startup Cup + Use Case Award 22/23

DEUTSCHER STARTUP-POKAL
UNITED INNOVATIONS AWARDS

USE CASE AWARD
UNITED INNOVATIONS AWARDS

German Startup Cup

On the inspiring grounds of the PHOENIX group campus in Mannheim, Kenbun, summetix, and Erium, leading software and AI startups, presented their groundbreaking business models to an enthusiastic audience of around 100 guests, who had the chance to cast their votes. Erium GmbH's Dr. Theo Steiniger clinched the coveted startup trophy with an impressive 50% of the votes, while Summetix garnered 31%, and Kenbun secured 19%.

Use Case Award

In the Software/AI Use Case Award, the companies Energy4You, Q-Perior, Delphix, and SVA competed to showcase the most innovative solutions. All three pitches centered around test data, data quality, masking, and synthesis. The presentation by Julia Stumpenhagen (SVA) and Christian Bersch (Delphix) triumphed with an overwhelming 85% of the votes.

Keynotes and Panel Discussions

Daniel Hofmann, CISO of the Phoenix Group, delivered an insightful keynote on cybersecurity. During a thought-provoking lunch talk, Cup President Professor Dr. Zimmerli explored whether AI was a mere hype or a transformative reality. The panel discussions sparked intense discussions on fostering innovation in Germany. Dr. Andreas Nauerz, CTO of Bosch Digital, urged for boldness in driving innovation, and Julia Stumpenhagen (SVA) championed the cause of "technological courage."

An Empowering Environment In addition to the startup showcases and awards, our event provided a vibrant platform for other startups, technology providers, and partners of United Innovations to present themselves at information booths. Participants had ample opportunities throughout the day for networking and engaging in meaningful conversations.

More information and pictures of this year's cup can be found on the next page and under the following link.

The winners of the Use Case Award and German Startup Cup in the categories Cybersecurity and Software/KI (from left): Florian Eder (Phoenix group), Julia Stumpenhagen (SVA), Christian Bersch (Delphix), Dr. Theo Steininger (Erium), Jan Wendenburg (Onekey), Ramon Weil (Secuinfra) and Dr. Gerd Große (GFFT).

Photo: GFFT/phoenix

DEUTSCHER STARTUP-POKAL
UNITED INNOVATIONS AWARDS

USE CASE AWARD
UNITED INNOVATIONS AWARDS

## Calling all innovators - New Season of Startup Cup & Use Case Award!

Get ready for an exciting new season of the Startup Cup & Use Case Award! We extend a warm invitation to aspiring startups and companies with innovative Use Cases to embark on this thrilling journey. Two captivating symposia will carefully select startup finalists for the grand finale. Engaging panel discussions focusing on Software/KI topics await your participation. Don't miss out on the opportunity to showcase your technology to the world!

Apply now:

German Startup Cup: www.united-innovations.eu/deutscher-startup-pokal-saison-2023-24/

Use Case Award: https://www.united-innovations.eu/use-case-award/

Click here to watch our best-of film from the 2023 finals **>>**
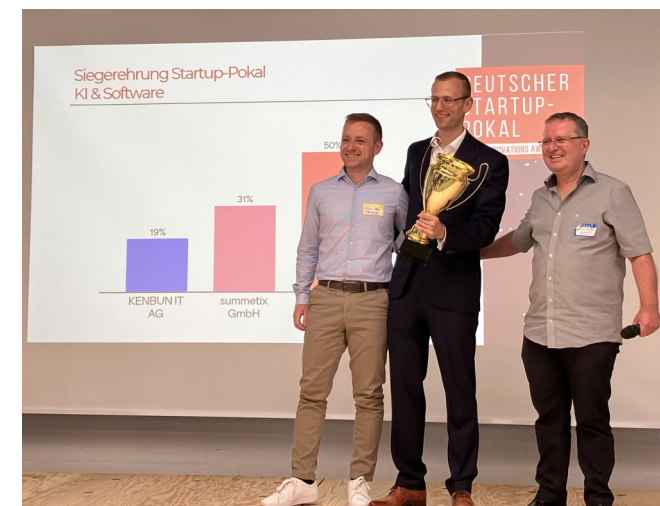
3

Solution strategies for your individual progress

General progress in companies does not proceed randomly but happens often in many companies at the same time. It seems as if companies move in a channel that depends on the same external influences such as newly identified threats, new technologies, legal requirements, or the introduction of standards. For example, many companies are working at more or less the same time on introducing SAP S/4HANA. They evaluate different steps, obtain advice on implementation plans, and introduce necessary tools for data preparation.

The more similar the companies are, e.g., two medium-sized production companies, as greater the similarities and as higher the saving poten-

tial that can be achieved through cooperation. It is easy to see that implementation time, cost, and quality equally benefit from a joint approach.

In the next articles, we will look at solutions for the testing area.

Isabella Rieger's piece, courtesy of Q-Perior, elucidates the role of synthetic test data as a catalyst for test automation enhancement. Evgeniia Antonova, representing Sixsentix, delves into the realm of test data management for SAP, while Julia Stumpenhagen of SVA expounds on the transformation towards a data-driven corporate paradigm.

All projects can be found in the

Software Lab

www.software-innovations.eu/themen

Test more efficiently and successfully manually or automatically

Synthetic, accurately fitting test data generated automatically with succest thus act as a "booster" for test automation; they enable and reinforce the positive effects of automation.

An article by Isabella Rieger

High software and IT quality - THE key to success

The desire for more digitalisation, the demands of customers for intuitive and fully integrated applications that deliver the desired results immediately and without detours, is changing the role of IT from "service provider" to "business enabler" and "business innovator".

This means that IT is increasingly the driver of innovation - and high software and IT quality is therefore a key factor in determining how satisfied the customer is. High software and IT quality will therefore increasingly be THE key to success.

More efficient and more successful testing - the challenges

While the demands on software and IT quality continue to increase, the processes for ensuring quality often do not develop at the same speed. Testing continues to be a major challenge in many projects - there is often too little time and too little budget available for testing, and this lack too often results in too high error rates in production.

To compensate for this lack, various approaches are being evaluated that are intended to reduce the testing effort for the current project or as a strategy for future projects through "quick measures". For example, an attempt is made to prioritise test cases on the basis of obvious criteria in order to reduce the scope of testing. Or the use of a test automation tool is supposed to compensate for the lack of test capacities as a quick fix.

A closer look shows that these measures do not necessarily show sustainable success in terms of efficiency and, above all, do not enable the necessary increase in software quality. The prioritisation of test cases is often "risk-based" with a focus on the most frequently used functions. At first glance this sounds plausible: functions that are often used could have more frequent errors in production. However, risk-based testing has to start much earlier - namely by looking at where in the company's value chain the greatest risks can arise from undetected errors in the software used.

During the realisation of test automation, it often becomes apparent that the existing test cases are not so mature that they cannot easily be automated, because essential information such as the preconditions of the test case, the concrete steps to be executed or the required test data are described insufficiently. Sometimes the problem does not primarily lie in the description of the test cases, but begins with the definition of the requirements, which are not documented in such a way that "speaking test cases" with unambiguous test data can be derived from them.

In order to test more efficiently with the use of a test automation tool, it therefore makes sense to consider not only the actual test process, but the entire process starting with requirements management - i.e. the "extended test process" with regard to potential for improvement.

Suitable test data is a major challenge in many software projects. The obtainment or generation of the necessary test data usually consumes a large part of the time and capacities in testing - regardless of whether manual or automated testing is used. However, in order to realise the potential of test automation in the best possible way a high-performance and efficient acquisition or generation of the necessary test data is essential.

For an efficient increase in software quality on the basis of automated tests, two aspects in particular play an essential role: the optimisation of the "extended test process" and the use of an efficient and effective method for test data acquisition.

Analysis & optimisation of the "extended test process"

At the beginning of the optimization of the "extended test process" there should be a comprehensive & target-oriented analysis of the current test procedure and the relevant accompanying processes in the company. This will lead to an overview of which processes are already working very well and where targeted measures and adjustments are necessary in order to be optimally prepared for further requirements in terms of software and IT quality.

Test data generation with success - database-independent & cross-technology

FMC's success is modern, powerful software for the automated generation of synthetic test data. success creates valid, realistic new test data - precisely tailored to the respective test case. The generation of the data in the system to be tested is carried out independently of the underlying database by addressing the (migration) interface of the application to be tested; the validation of the data is taken over by the process layer of the application. This makes it possible to generate realistic historical data (contracts, loans, etc. with "past"). The generation of test data is possible with success across technologies and industries; precisely fitting test data can be generated

for all common target systems - also for cloud solutions, for systems without a web interface and for legacy systems.

success - flexible use in the project

For manual tests, success offers a convenient "self-service" with the success KIOSK. The success KIOSK is a user-optimised web application with which the testers can directly generate the test data required for the respective test case exactly as and when the data is required for the respective test case.

For automated tests, success can be easily integrated into a test automation tool via an asynchronous JSON-based REST interface - both in standard software and in test automation tools developed in-house.

Synthetic, accurately fitting test data generated automatically with success thus act as a "booster" for test automation; they enable and reinforce the positive effects of automation.

Isabella Rieger
Senior Manager
Q-PERIOR AG

Detailed information in the techL profile:
FMC GmbH

Join the GFFT consortium project: Strategies for future-proof Test Data on October 4th 2023, 15:30-17:30.

On whose way to becoming a data-driven company - a gigantic task?

The digitization of business models is plunging many companies into a race for which they do not yet feel well trained. In order to keep up with the current pace, many managers are wondering where to start the race and how to keep a synchronized grip on all fields of action.

An article by Julia Stumpenhagen
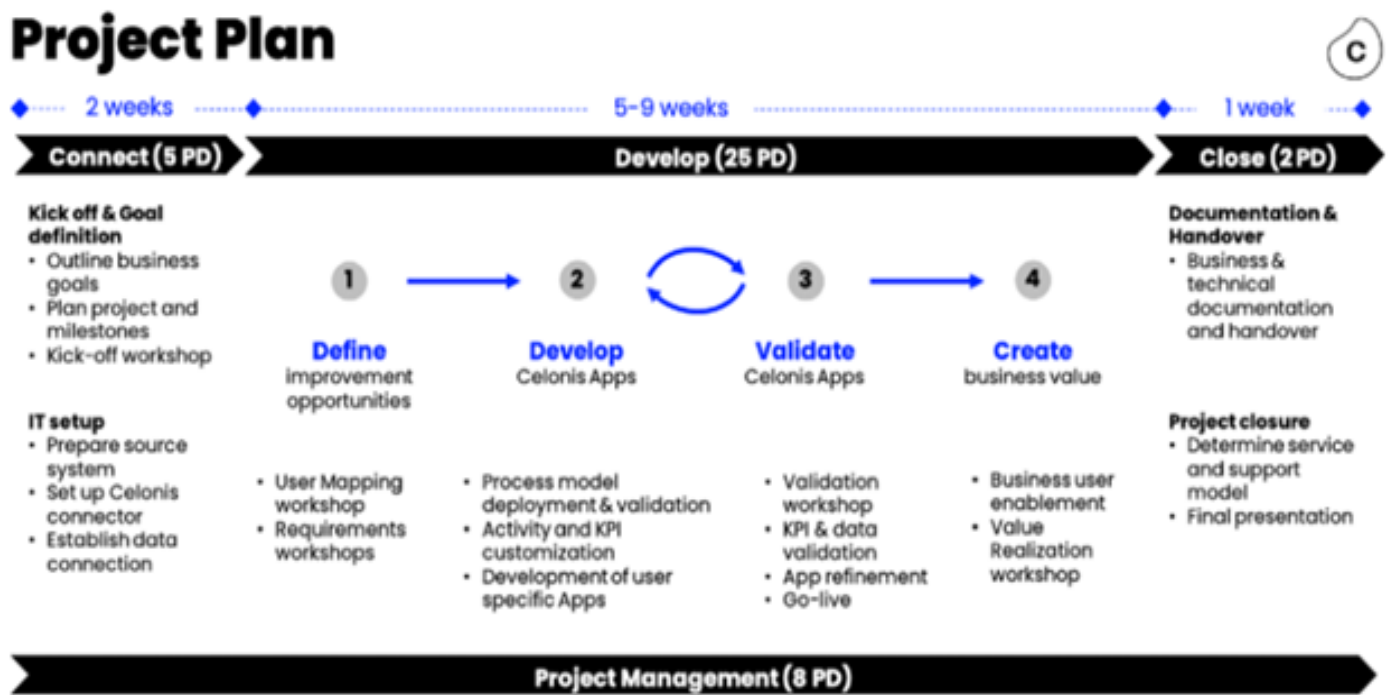
Typical project plan with our partner CELONIS

What is needed is a completely new approach to developing innovations in a targeted manner - data-driven.

As a solution architect for digitalization, I have developed a procedure for our customers together with my colleagues from the various specialist departments (at SVA there are 9 central specialist departments that have specialized in a particular subject area) in order to on the one hand,

- to identify the need for innovation in a targeted manner and

- to derive a concrete business benefit in the course of the project application.

The whole process is data-based and uses real data from the customer.

The first step is to connect to a company's data sources. We proceed along the customer's process map. We recommend starting with the critical processes with a high need for adaptation. During the analysis of the process, the standard processes are determined, deviations are identified and process key figures such as lead times are determined.

In the subsequent step, the strategic goals that the analyzed process must achieve are determined with the process owner, IT department and management. This is applicable to processes such as IT service management but also to industry-specific processes such as doctor's letter preparation or credit allocation.

The as-is analysis and the strategic objectives result in improvement needs and implementation options as underpinning for a business case for the project application.

For optimization in the implementation phase, various solutions from the SVA portfolio are considered.

Julia Stumpenhagen
Solution Architect
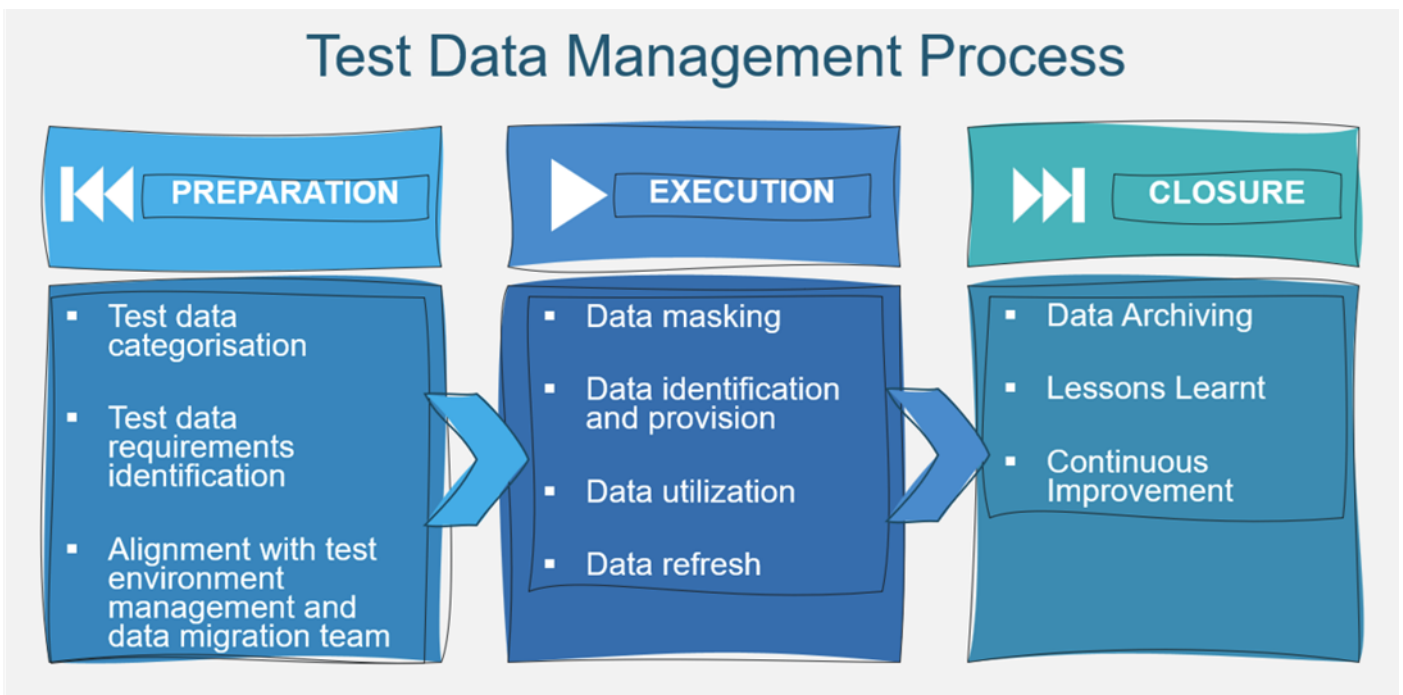Digitalization,
SVA System Vertrieb
Alexander GmbH

Detailed information in the techL profile:
SVA System Vertrieb Alexander GmbH

Join the GFFT consortium project: Transformation to a data-driven enterprise on November 15th 2023, 15:30-17:30.

Test Data Management in SAP: where to start?

Many industry giants have chosen SAP as their core ERP solution to run their business. Expectations for software quality overall have risen a lot through the last decade. Test data always plays a central role in highly integrated systems such as SAP, and proper test data management is one of the key success factors in system quality assurance. But how can test data management for SAP be set up in an efficient way? To answer this question, the article takes a closer look at the test data process, using an SAP rollout project as an example.

An article by Evgeniia Antonova

Test Data Management Process

PREPARATION
- Test data categorisation
- Test data requirements identification
- Alignment with test environment management and data migration team

EXECUTION
- Data masking
- Data identification and provision
- Data utilization
- Data refresh

CLOSURE
- Data Archiving
- Lessons Learnt
- Continuous Improvement

What are the main challenges associated with test data?

Most of the challenges in this area relate to either **quality** or **time to market** aspects of a solution:

- In regard to **quality,** the core challenge which a test data management tries to address is appropriate test coverage and therefore defect leakage to the production.

This can be caused by non-representative or outdated test data constellations (e.g. missing regular data refreshes in a test system, unknown test data requirements for certain test scenarios, neglected data privacy requirements therefore using production extracts, etc.) and a lack of clarity of which combinations of test data need to be present for testing.

- In terms of **time to market,** the key problem

is that test data preparation typically takes a long time and a lot of effort from the team, which influences the overall velocity.

Success story: Definition of the test data management process

To address the test data challenges for one of their clients in the manufacturing industry, the Sixsentix team introduced a 3-phased test data management process for their SAP-template roll-out program – using a simple preparation, execution, and closure flow.

The **Preparation Phase** is dedicated to:

- *Test data categorisation*. The common terminology and used data types are to be defined to ensure that the whole team is talking about the same thing.

- *Test data requirements identification*. When every party is aligned on the scope of test data and which types of test data can be expected, it´s time to check business processes and the required test scenarios to identify requirements on the test data. It´s important to collect all the findings and start with a test data requirements catalogue. It can be set up even with a simple excel list but it´s essential to turn such a catalogue into a living document and establish a practice of proper documentation and collection of data requirements mapped to test scenarios. This will ease the re-use of test data later and supports the test analysts in identifying test data combinations for their tests that they might have overlooked.

- *Alignment with test environment management* and *data migration team.* This is the last step in the preparation phase of test data. Normally test activities are lined up with data migration and try to use migrated data as much as possible. From a test environment perspective it´s also crucial to understand system integration points and data dependencies, to see how data is cascad-

ed into the landscape for the relevant scenarios. Understanding which data is being migrated when into which environment is key to reduce redundancies in test data preparation and testing.

The **Execution Phase** typically takes as much time as the preparation phase and encompasses:

- *Data masking*. With the introduction of GDPR and several examples of data security breaches, data masking has become a necessary activity as part of the test data management process. It involves definition of the methods and rules for data masking, classification of data types to be masked and the masking itself.

- *Data identification and provision*. This is the most challenging part and shows how well the preparation phase was conducted. During this activity, the test data is to either be identified from the migrated set or be created newly based on the collected requirements and handed over for test execution.

- *Data utilisation* implies either automated or manual testing with the provided data. The consumed data should be correspondingly marked and refreshed if required.

- *Data refresh* may imply either the manual replacement of the consumed data with newly identified data sets or several other options which involve test automation tools.

The **Closure Phase** serves for

- *Data Archiving,* which is important for compliance-relevant tests, especially in the industries where auditors can request the results of test executions. Moreover, archived data sets can also be reused (at least any data that was not consumed)

- *Lessons Learned,* which rounds off every process and helps with continuous improvement.

Stakeholders' involvement in test data management is crucial across all three phases, including test management (both central and country-focused for larger SAP-rollouts), release management, test environment and infrastructure teams, data migration team, SAP functional teams, business process experts, nominated data stewards, test automation architecture and experts, and tool experts for third-party solutions.

Besides involvement of right stakeholders, a test management process should be supported by a variety of tools which is a separate topic for a discussion.

Summary

Concluding our short journey to test data management, the key take-aways are the following:

> Fresh and production-like data is key for a reliable E2E testing

> The understanding of data structure and test data requirements is crucial for test data provisioning

> the test data management process should be aligned with the test data refresh strategy

> An efficient test data management process involves diverse stakeholders and covers three classical phases

Evgeniia Antonova
Sr. QA Consultant
Sixsentix Deutschland GmbH

Detailed information in the techL profile:
Sixsentix Deutschland GmbH

Join the GFFT consortium project: Strategies for future-proof Test Data on October 4th 2023, 15:30-17:30.

Calendar

4

Applicable Use Cases & Success Stories

Often, progress is generated by using new technologies and/or adopting the experiences of others.

The task of the leading technology providers and new startups is to simplify cost-intensive processes or solve upcoming challenges with new tools. They usually invest a lot of money analyzing the problem areas and thinking about feasible solutions with initial customers.

The task of consulting companies is to look at the companies' current processes and introduce helpful changes. The use of appropriate tools can accompany this task.

In both cases, a lot of know-how can be used to make rapid progress. This chapter presents several use cases and success stories that may serve as an impetus. The contact persons named in each case are happy to discuss your challenges. Just get in touch with them!

All projects can be found in the

Software Lab

www.software-innovations.eu

Make the move: AI's transformative role in reshaping medical software

How can medtech incorporate AI amid regulatory uncertainties and patient risks? This vital question affects developers, regulators, and patients alike, requiring a collaborative, data-centric strategy to navigate the AI-integration process.

An article from Dr. Till Dettmering

Artificial Intelligence (AI) based systems are prominently reshaping our society: technologies such as ChatGPT have wide implications on our daily lives. For medical technology companies, the ability to incorporate AI into their products will be essential, but the practicalities of doing so often appear intransparent. A large part of these uncertainties arise from a lack of regulatory guidance: the novelty of medical AI, combined with regulations such as the Medical Device Regulation (MDR) which do not mention AI, lead to a perceived large grey area. In addition, upcoming regulations such as the EU Artificial Intelligence Act add more rules, but not specifically for medical devices.

But fear not! It *is* possible, and widely accomplished, to bring the benefits of AI to medical software. The medtech community needs a pragmatic, data- and software-centric approach to medical AI—because at the end, AI is just that: a special kind of software that is able to learn statistical features of existing data labeled by human experts ("*training* the AI") and then is able to make predictions on new data, "mimicking" the human experts. Typical medical applications are the detection of tumors in computer tomography images, or detecting atrial fibrillation in electrocardiograms.

In medical technology, including medical AI, our main concern is patient risk. The key step where risk to the patient arises in medical AI occurs during the prediction phase: Here, the AI predicts potential medical outcomes based on the data it has been trained on. However, no AI system is perfectly accurate. Imagine a scenario where a patient has a tumor or displays signs of atrial fibrillation in their ECG, but the AI fails to detect it. The aftermath of these overlooked diagnoses can of course be devastating and the chance of them occuring must be reduced. To this end, the AI's *sensitivity* must be increased—it's the key to enhancing the safety and effectiveness of our medical AI.

The key to a safe and effective medical AI—and the hardest and most expensive part of a medical AI development—is to acquire appropriate data to train, test and validate on. This is no easy feat even for non-medical AIs, and many development projects fail at this point: if the data is not abundant enough or does not properly reflect the AI's use case, the AI will never meet its user's expectations. For medical AI, the requirements are even harder to accomplish: Next to the ubiquitous topic of patient privacy and consent, the data must reflect the intended patient population across many parameters such as demographics, diagnoses and many others. The data must be properly labeled by experts and properly stratified. The dataset must have an appropriate size to be able to prove that the AI works appropriately, and many more hurdles need to be taken.

But how do we *actually* develop a medical AI? These eight steps summarize the process:

1. Develop and validate your product idea, determine the *intended use* of your product.

2. Determine the quality criteria for your AI: What are acceptable levels for accuracy, sensitivity and specificity? Start with literature, existing products and common sense to find the answer.

3. Develop a data strategy: Which data are needed? How many do you need? Where do obtain the data? Which group of experts can label your data? Which IT systems do you need for all of that? How do you split your data into training, test and validation data?

4. Build a *validated* data pipeline, collect and label your data. Ideally, most of that pipeline should run automatically, including AI training.

5. Start developing your medical AI as soon as the first data are coming in. Make sure to follow the relevant software standards such es IEC 62304 from the very beginning on.

6. Start developing the software system around the AI (such as the user interface and the business logic) as soon as you are certain your AI can reach the quality criteria.

7. Go through software verification and validation to prove the AI and the surrounding software system reach the determined quality requirements.

8. Go through the approval process.

Behind each of these steps lie many considerations we must take into account - some are learned painfully during a medical AI project, some can be made beforehand through existing materials.

The most important step is: Start! Medical AI is doable and very well within the capabilities of every medical technology company.

Dr. Till Dettmering
Senior Manager
adesso SE

5

State of research

Generally speaking, startups are a good measure of the innovative strength of the respective region. The more successful startups are founded, the more dynamic and competitive the innovation location is. Dynamic economic areas tend to attract more highly qualified entrepreneurs and employees, increasing the region's prosperity.

In the subject areas surrounding enterprise IT, startups also strengthen the competitive power of companies.

A high level of dynamism means that potential can be exploited more quickly with new solutions. It would be a great advantage for the local economic area to have its own strong software startup scene. This not only requires funding from the state and venture capitalists but also strong utilization of the solutions developed here among the many companies.

In this chapter you can look forward to 3 exciting contributions. Prof. Dr. Andreas Schmietendorf from the Berlin School of Economics and Law reflects on the opportunities and risks of using cloud-based AI APIs, Prof. Dr. Oliver Hummel from the Mannheim University of Applied Sciences asks how to reconcile flexibility and long-term planning in software development and Dr. Gerhard Runze, Imbus AG, presents an AI glossary to create a common understanding of artificial intelligence.

All information about the

German Startup Cup

www.united-innovations.eu/deutscher-startup-pokal

The AI-Glossary – Towards a common understanding in Artificial Intelligence

How can terms in AI be used in the right context?
How to foster communication on AI between different domains?
How to know the definitions from AI standards and their differences?

An article by Gerhard Runze (imbus AG)
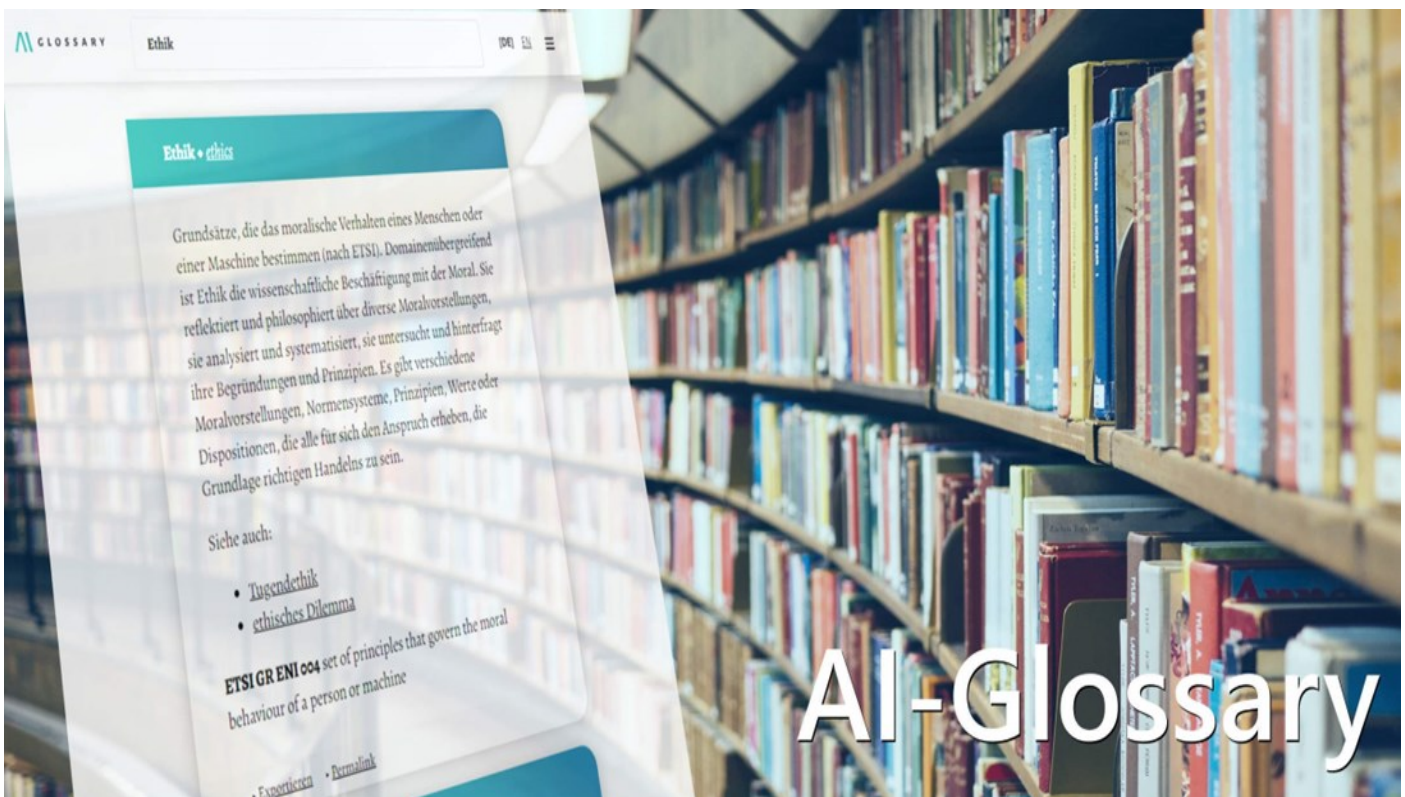
On 9th of December 2022, the German Institute for Standardization (DIN) released the second edition of the "German Standardization Roadmap on Artificial Intelligence" (Deutsche Normungsroadmap KI – NRM KI). One of the central chapters - an AI-specific glossary - has been compiled by group of contributing authors. Although it sounds like an easy task, it turned out that quite some terms throughout the document had been used in different contexts with differing definitions. As the authors of the glossary solved this issue, they decided to carve out the created glossary to also make it easily available to public on the web at https://ai-glossary.org.

One of the first questions the reader may ask, is: "Why should there be yet another glossary for terms in artificial intelligence?" The article will point out the arguments for it.

When the NRM KI [1] was created a strong need came up to compile a common glossary for the whole 452-pages document. A group of contributing authors (Prof. Dr. Martin Haimerl, Marc P. Hauer, Taras Holoyad, Otto Obert, Dr. Henrich C. Pöhls, Dr. Rustam Tagiew, Jens Ziehn and me) took the task and compiled this glossary. For this we looked at the definitions given by all the authors of the NRM KI, but also scanned external

inputs like established standardization documents like [2], [3], and some other definitions e.g. in (proposed) regulatory documents like the EU AI Act.

It turned out soon that that the glossary had to be used in different technical, political, or socio-logical contexts, and thus had to serve several aspects:

- give a short and concise definition,
- give the context whenever needed,
- refer to corresponding standards,
- in case of ambiguities discuss diverging defi-nitions from multiple sources or different aspects.

Especially the last point is one of the main differ-ences to most other glossaries. We do not decide to a (yet another) "single truth" but give the ref-erence to standards and contexts. This allows everyone to understand the own and other per-spectives. With this knowledge we can communi-cate much clearer later.

To illustrate the importance of the context, we can look at the simple term "validation". In the context of system testing validation means the "Confirmation, through the provision of objective evidence, that the requirements for a specific in-tended use or application have been fulfilled." In contrast, the term is also used in the context of machine learning and "refers to the testing of trained ML models using validation data" (see Fig. 1). So, the solution was not to change the term but to point out the context and refer to each other. Additionally, we decided to make the term publicly available so that everyone can look them up, refer to them with perma-Links and give feed-back for new glossary-releases we have in mind.

For those which are more interested in this dis-cussion can find in [4] more information. So please be invited to look up this free online glos-sary on the internet.

❯ I terms at the ai-glossary.org
❯ DIN/DKE German Standardization Roadmap AI
❯ AI at imbus.de
❯ Das AI Glossary als Weg aus Babylon (german)

Fig. 1: https://ai-glossary.org showing results for the search term "validation".

[1] DIN und DKE, Deutsche Normungsroadmap KI, Version 2, 2022-12-09, https://www.dke.de/de / arbeitsfelder/core-safety/normungsroadmap-ki
[2] ISO/IEC 22989 Artificial intelligence concepts and terminology, 2022
[3] ISO/IEC TR 29119-11 Software and systems engineering - Software testing - Part 11: Guide-lines on the testing of AI-based systems, 2020
[4] G. Runze, M. Haimerl, M. Hauer, T. Holoyad, O. Obert, H. Pöhls, R. Tagiew, J. Ziehn, "Das AI-Glossary als Weg aus Babylon", JavaSPEKTRUM 3/2023, pp. 42-46.
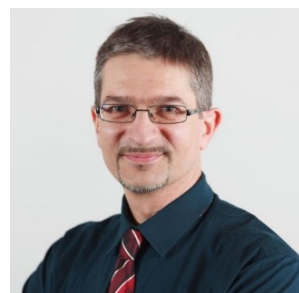
Dr. Gerhard Runze
Senior Consultant AI Test, Agile and Embedded SW
imbus AG

Detailed information in the techL profile:

imbus AG

Possibilities and risks when using cloud based AI APIs

Cloud based AI APIs provide an interesting approach for integration AI algorithm in own software applications. Currently we can observe diverse offerings from well-known hyperscalers as well as from innovative start-ups. Corresponding offers promise to simplify the use of AI in the context of domain specific application scenarios. However, there are also risks and disadvantages associated with their use.

An article by Prof. Dr. Andreas Schmietendorf
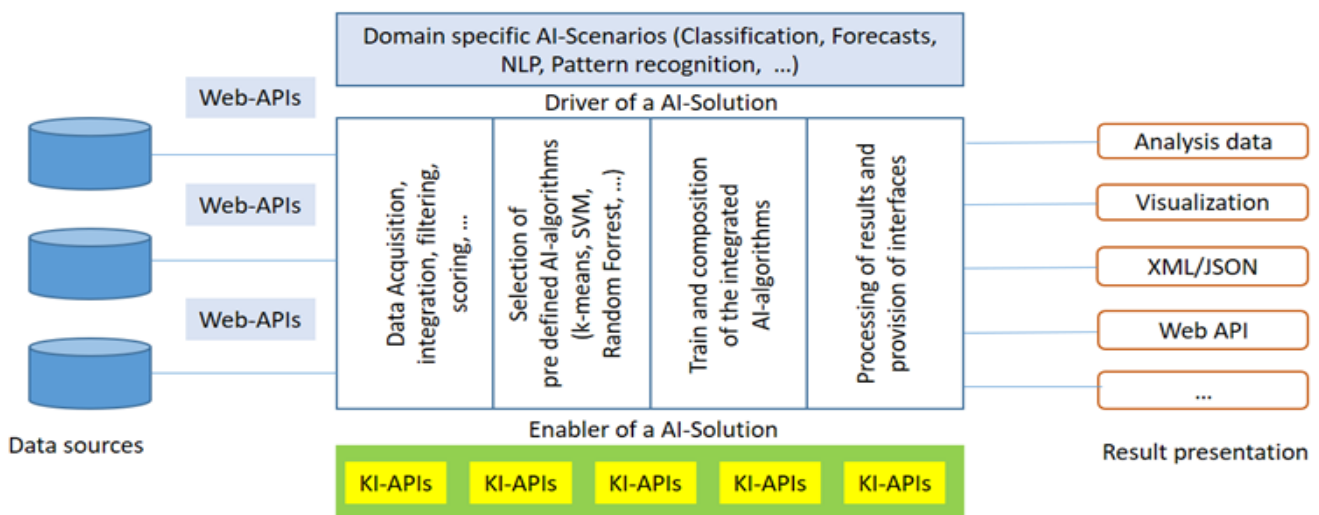
Algorithms of artificial intelligence (short: AI) are considered to be the key for innovative software solutions in more and more application domains. However, it is not always possible to grap back on the expertise of relevant AI experts. In addition, there is a need to make the required AI solutions available with the help of agile procedures or experimentally inside low code development approaches. Cloud-based AI algorithms (SaaS or PaaS) promise simplified access and integration here. Furthermore, Web APIs enable the utilization of AI algorithms that may require significant computational resources.

Different types of AI APIs

Although the term AI is basically defined, there are wide varieties of mathematically based algorithm approaches. A distinction is often made between so-called deep learning (e.g. Reinforcement Learning, Long Short-Term Memory, Artificial Neural Network) and machine learning (e.g. Support Vector Machines, Random Forest, Rule-based Machine Learning). The classic way to integrate the mentioned AI algorithms is to use programming language-specific libraries (e.g. TensorFlow, PyTorch).

- Pattern and image recognition.
- Natural Language Processing (NLP) e.g. speech recognition.
- Generative AI e.g. text or images.
- Classification e.g. documents or images.
- Forecasts e.g. sales development, resource consumption.

Apart from an experimental use of cloud-based AI APIs in scientific discourse, a rather restrained use in industrial discourse can be observed.

Composite AI-solutions

The cloud paradigm has also massively changed the way software is developed and deployed. With the help of the cloud, virtualized tools can be used for modelling, implementation, testing, and integration but also for project management.

The figure on the previous page shows a generic composite AI-application. Web APIs can be used for raw data acquisition as well as AI algorithm integration. Furthermore, the can be used to provide the results by the use of a new Web-API.

Selection of AI Web-APIs

The selection process is crucial for the successful use of required AI Web API. In addition to the application-specific requirements, the following aspects should be taken into account:

- Quality properties (ISO 25.000)
- Security and Safety issues (ISO27.000)
- Compliance laws (EU AI act)
- Ethical issues
- Trustworthiness
- Kind and quality of required training data

The degree of consideration depends on the associated risks of specific AI solutions.

Risks associated with cloud-based AI-solutions

AI web APIs that can be used "ad hoc" promise pragmatic and agile implementations of required AI solutions. For the solutions, a well-founded examination of aspects of trust, compliance or quality is required as well. It is particularly important to avoid discriminatory and incorrect results.

Common risks:

- Poor data quality: Success criterion for AI, faulty or incomplete training data can lead to inaccurate or wrong results.
- Discrimination: AI models can adopt bias or discrimination based on the way they are trained.
- Lack of transparency: AI models (black box) require explainable and trustworthy solutions (certifications if necessary).
- Ethical and social consequences: e.g. automating jobs or decisions affecting people.
- Security and Safety risks: reliable AI systems must deal appropriately with certain situations (risk consequences).

Latest applied research

Current AI Web APIs offer an experimental playground with many pitfalls. Nevertheless, there are many positive implications, as the discussion about the use of AI can be expanded (e.g. crowd-driven innovations). In addition, experience can be gained in the discourse of concrete application scenarios in industrial and scientific areas. In the TAHAI (TrustAdHocAI) project, we are currently investigating the possibilities and limits of AI web API-based solutions. Among other things, the following goals are pursued:

- Requirements for selecting and using AI web APIs.
- Requirements for possible data sources and data management.
- Automated testing for robustness and prediction quality.
- Implications of legal and ethical aspects.
- Implications of required engineering processes.
- Evaluation and explanation possibilities of specific AI solutions.

Prof. Dr.-Ing. habil. Andreas Schmietendorf
Business Information Systems
System Development
Projekt Lead TAHAI
HWR Berlin

Detailed information in the techL profile:
Research Group: System Development

Allgäu 4 Production

Using innovative technology within an SME always is a big leap for the corresponding company. Providing access to these technologies via the learning platform "Allgäu 4 Production" at the University of Applied Sciences in Kempten, allows to take a big step towards the usage of innovations without the necessity to invest huge amounts of money or work.

An article by the University of Applied Sciences Kempten
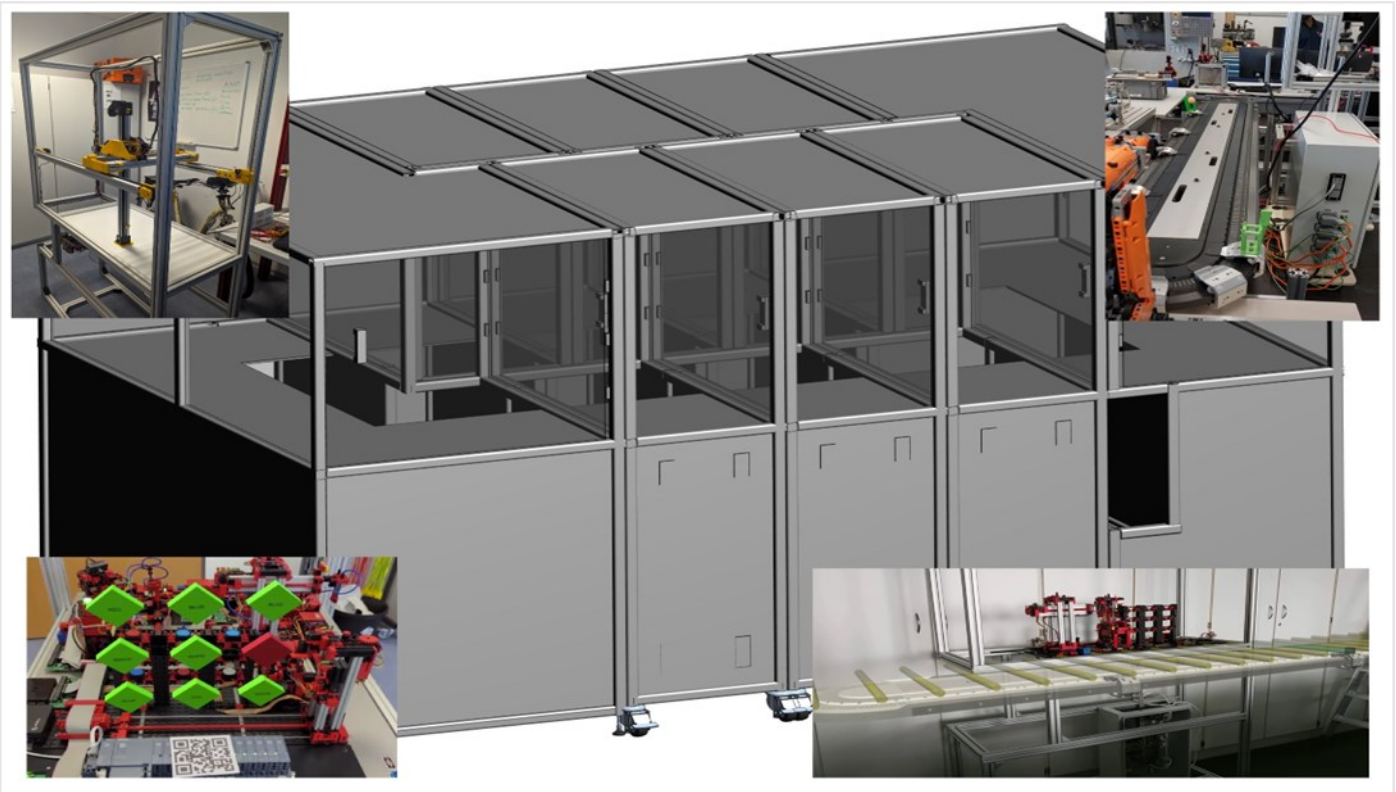
Being loaded with project business being necessary for employment and turnover, makes it hard for an SME to find time and money to investigate new technologies and to innovate. Targeting these companies, the platform "Allgäu 4 Production" provides a better access to university knowledge, new students and future capacity for work.

Starting with the goal to get an innovative learning space for students, the idea of a plattform established: both students and companies should meet in an environment, where both innovation and eduaction can be implemented.

The platform basically consists of modules, for which the participating companies provide the necessary investment and which are precisely aimed to a proper use case of that company. All modules together don't have to aim at a common production process. Any module is allowed to implement any use case in any way. Reason ist, that

by waving together the different modules it is made possible to target for a common goal of modern production: flexibility and compatibility. So for instance one company implementing a vision scenario in its module may be used for vision checks of another companies module aiming for the production of displays. Therefore all modules have to be connected flexible both in transportation and in information. Hence a flexible transport system like the XTS-System by Beckhoff is used, to grant any transport requirement, there might be. Moreover a agent based communication setup is implemented to get the modules to communicate with each other. Combined with the technological know how of a university the resulting solutions are set up with technological innovation and foresight.

Apart from these benefits the companies get access to their future work forces: the students. The latter are integrated into project based degrees. The latter provide projects as party of the students studies, which also benefit from the platform: on the one hand the company gets access to students and to their knowledge and on the other hand the students get access to a multitude of companies and their contents.

The platform is already implemented in its basic form and right now participating companies are among others Beckhoff, Magnet-Schultz, Mayr and GROB. Planning to grow even further, future partners will be integrated even faster based on the already established platform. All together both students and SMEs get huge benefits from our platform "Allgäu 4 Production".
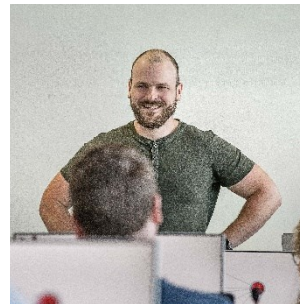
Dr. Josef Griesbauer
Professor at
University of Applied
Sciences Kempten

Detailed information in the techL profile:
Allgäu 4 Production

Reconciling agility and long-term planning in Software Development

A recent article on 20 years of Agile Software Development labeled agile practices primarily as act of self-defense used by software developers to protect themselves against "dilbertesque" management practices that treat software development like schedulable production lines in factories. This raises the question: can these two perspectives be reconciled for the benefit of software organizations?

An article by Prof. Dr. Oliver Hummel

The relationship between software developers and their management has often been depicted as adversarial, especially when it comes to the long-term planning of software projects. During the so-called "software crisis" of the late 1960s, the idea of rigorously planning software projects according to the phases of the so-called waterfall life-cycle took shape and became a quasi-standard far into the 1990s. At that time, an "agile rebellion" of experienced developers revolted against this practice as it was considered inadequate for successfully executing ever more complex software projects, especially those with unclear goals and requirements.

From then on, "Responding to change over following a plan" [1] became the new mantra. Yet twenty years later, a controversial article [2] dubbed Agile as a "grassroots movement" of developers to reduce the weight of upfront requirements analysis and planning, especially in complex projects with vague and changing requirements. Nevertheless, even agile software development projects and organizations need a certain degree of planning for making informed decisions on budgets, schedules, deliverables, and, not to be forgotten, personnel.

Using the waterfall life-cycle as process model is typically motivated by the very desire for better predictability. As adaptations of the Stacey Matrix for software development (e.g., in [3]) and experi-

ence imply, this is likely to work best for straightforward projects with well-known requirements and technological context. For projects with less understanding in either of these aspects, agile approaches are deemed to be a better choice. Yet, the question about long-term planning of software projects remains unanswered, as agile projects usually have a rather limited planning horizon of just a few weeks or possibly months and even tend to slide into unmanageable chaos when agile techniques are not properly applied so that [2] even calls it a "failed rebellion" for these cases.

Current situation

Agile processes such as Extreme Programming or Scrum and their successors like Kanban, Design Thinking, or Lean Startup have frequently been praised and perceived as a kind of silver bullet for better dealing with vagueness and change in software projects, even though Brooks [4] had stated in the 1980s that there is no such silver bullet (and never will be[1]). Indeed, teams properly executing agile practices today are clearly able to execute their daily implementation routines well and even achieve relatively reliable planning for perhaps three to five iterations, respectively sprints. Planning further into the future, however, inevitably requires significant upfront effort for requirements elicitation and analysis [4] and hence would impose waterfall

---

[1] Recent AI technologies such as ChatGPT may have eventually become a serious candidate after all.

ideas on agile projects. From this perspective, we as software professionals still seem to face similar challenges in the long-term planning of software development activities as in the late 1960s.

Under these circumstances, Agile as a movement of software practitioners to better deal with uncertainty caused by changing and unclear requirements, is as understandable as the desire for accurate planning which is ingrained in most managers that aim to reduce uncertainty in steering large organizations. Nevertheless, the question of how well agile (and all other) development approaches are actually equipped for long-term (i.e., more than about three months) planning of vaguely defined software projects, still remained largely unanswered if not even unexpressed in the past twenty years.

It should be common sense by now, however, that software development usually bears a lot more inherent complexity [4] than, for example, the rather predictable manufacturing of commodities on a production line. Consequently, for self-organizing agile development teams there cannot be anything like a machine allocation plan as sometimes envisaged by managers from a classic production planning background.

Once we accept inherent complexity and resulting uncertainty in complicated software projects, we also have to accept a lack of detailed long-term predictability. One might compare the challenge of planning large software projects in detail years in advance with the challenge of creating a weather forecast for the same period of time. In other words, the software industry eventually needs to accept repeated exploration costs, as they are common, for instance, in the oil industry for the exploration of drilling sites, for its complex development projects: We simply cannot expect to be able to plan multi-year development efforts to the dime, merely based on a superficial catalog of requirements, often mostly collected by business experts with little or no experience in software development.

Reconciliation ideas

In order to help appreciate and overcome this situation, in the following we present a collection of nine practical, not necessarily novel insights that can help avoid the biggest mistakes in large-scale software projects as well as in making such projects more predictable:

1. Know and accept the limitations of process models and do not fall for promises to overcome them with proclaimed silver bullets.

2. Unclear requirements imply fuzzy estimates, which result in significant uncertainty in planning, especially for complicated projects.

3.   Accept growing uncertainty as development plans extend further into the future and communicate this clearly, e.g., with best, worst, and most likely scenarios.

4.   Reducing this so-called "Cone of Uncertainty" in complex projects requires regular monitoring of requirements and their evolution [5].

5.   Always stick to agile principles in environments with unclear and changing requirements.

6.   Experience-based estimates [5] can help reducing planning uncertainty. (As can purchasing suitable components.)

7.   Time- or money-boxed prototyping and direct user feedback help to better understand the circumstances when no past experience is available.

8.   Prioritize your requirements and start with implementing the most important features.

9.   Do not mistake planning for goal-setting [6].

Summary

We have argued that – even more than 20 years after the Agile Manifesto [1] – developers and management in software organizations are often still struggling to combine day to day work on a project with long-term planning of projects for better management of the overall organization.

As users and customers of software products are frequently not able to express their needs and desires clearly and coherently upfront, the long-term planning of software projects obviously remains a challenge that interrupts the daily agile exploration and implementation work of developers. To better overcome this unpleasant situation, in this article, we have presented nine observations that can be seen as helpful remedies to mitigate the worst consequences of this perceived contradiction.

From our experience, the insight with probably the highest impact, is that the software industry eventually has to say good-bye to the expectation of being able to handle large and complex development projects in changing environments at a predetermined fixed price. Consequently, it also has to accept significant upfront and even repeated requirements exploration and prototyping efforts to reduce planning uncertainty continuously over a project's duration, without analyzing and planning low-priority requirements too far in advance as they can always change in the further course of the project.

References

[1] Beck, K., et al. (2001): The Agile Manifesto. Agile Alliance. http://agilemanifesto.org (accessed 07/23).

[2] Tenhundfeld, A. (2021): Agile at 20: The Failed Rebellion. https://www.simplethread.com/agile-at-20-the-failed-rebellion (accessed 07/23).

[3] Uludağ, Ö., Harders, N. M., & Matthes, F. (2019): Documenting recurring concerns and patterns in large-scale agile development. Proceedings of the 24th European Conference on Pattern Languages of Programs.

[4] Brooks, F.P. (1987): No Silver Bullet — Essence and Accident in Software Engineering. IEEE Software, Vol. 20, Iss. 4.

[5] Hummel, O. (2011): Aufwandsschätzungen in der Software- und Systementwicklung kompakt. Springer Spektrum.

[6] DeMarco, T. (2001): Slack: Getting Past Burnout, Busywork, and the Myth of Total Efficiency. Broadway Books.
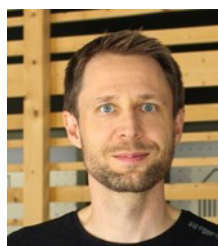
Prof. Dr. Oliver Hummel
Professor in Computer Science & Director of MARS Center for Entrepreneurship
at Mannheim University of Applied Sciences

Detailed information in the techL profile:
MARS Center for Entrepreneurship

6

New technologies

Generally speaking, startups are a good measure of the innovative strength of the respective region. The more successful startups are founded, the more dynamic and competitive the innovation location is. Dynamic economic areas tend to attract more highly qualified entrepreneurs and employees, increasing the region's prosperity.

In the subject areas surrounding enterprise IT, startups also strengthen the competitive power of companies.

A high level of dynamism means that potential can be exploited more quickly with new solutions. It would be a great advantage for the local economic area to have its own strong software startup scene. This not only requires funding from the state and venture capitalists but also strong utilization of the solutions developed here among the many companies.

All information about the

German Startup Cup

www.united-innovations.eu/deutscher-startup-pokal

Where creativity meets productivity

Is AI ready to revolutionize professional spheres? While ChatGPT has transformed our perception of Generative AI, significant issues must be addressed before its broad professional use. Luckily, there are ways to tackle these challenges.

An article by Dr. Theo Steininger
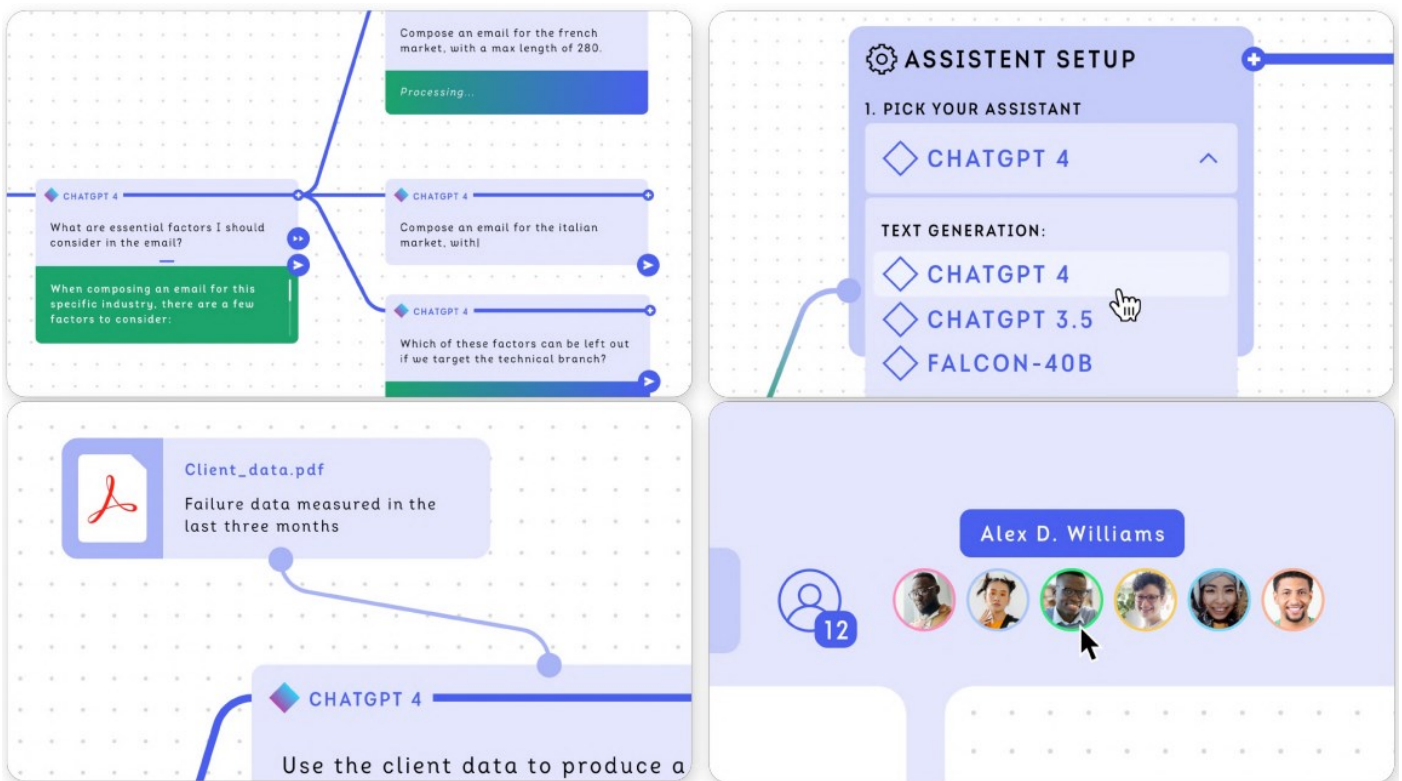
In a world where technological advances are charging forward, one must question: is Generative AI ready for the professional sphere? Catalysts like OpenAI's ChatGPT have made strides, redrafting our understanding of generative AI. But, the efficiency, precision, and coherence that professional environments demand are not fully met yet. We need a platform that can direct Generative AI towards worthwhile causes.

But before discussing potential solutions, it's essential to dissect the challenges standing in the way of professional application of Generative AI. The first roadblock is the unfamiliar terrain of prompt writing. Converting language models into functional bots demands understanding and expertise. Employees in companies lack both the experience and intuitive cognizance to accomplish this task seamlessly.

Then, second, there's the challenge of data: Data Privacy & Governance, and the question of how to incorporate company-specific data. In Germany's regulated business landscape, using tools without consideration raises the risk of business secrets leaking out. At the same time, language models like ChatGPT fall short when devoid of industry-specific data. Companies face the uphill battle of infusing their unique insights into these models.

Third, ensuring quality of work and process efficiency is decisive. The ability to reuse established patterns like templates is significant to avoid reinventing the wheel. The output generated by AI must be subjected to stringent monitoring for accuracy and relevance, with provisions for timely corrections. A structure is needed that can streamline and uphold the process quality while mitigating potential risks.

Understanding the challenges is only half the battle; finding a comprehensive solution is crucial. The data science startup Erium has created the robust SaaS platform Halerium to conquer these challenges.

1. Halerium allows employees to navigate complicated decisions by breaking down challenging questions. They can reassess and edit past chat questions and answers generated by AI. This feature saves time and minimizes error in chat histories. The ability to manipulate the flow of chatbot thoughts, through dedicated information cards, renders one-time chatflows into reusable templates.

2. Halerium enables real-time board editing and efficient user-management control for different teams. It also facilitates work results sharing through precise links that guide directly to selected cards.

3. Halerium is a hub for numerous, powerful bots. Users can avail ChatGPT 3.5 & 4 for chats and text generation, or create exceptional images with Dall·E2 and Stable Diffusion. Your data is well-protected with Halerium's open-source models like Llama or Falcon.

4. Dealing with copious amounts of data is a breeze with Halerium. Companies can upload their PDFs, Word, and Excel files into Halerium's knowledge repository, allowing them to work concurrently with abundant data. Halerium's ready-to-use templates apply proven structures to recurring issues, automating routine tasks and enhancing productivity.

5. Halerium surpasses the domain of specialized tools, unlocking wide-ranging applications, making it a truly versatile platform ready for any challenge that Generative AI might throw at us. With its comprehensive solutions, Halerium is poised to revolutionize the professional application of Generative AI, making it an indispensable tool in the modern business landscape.

In conclusion, the professional application of Generative AI is not merely a speculative pipe-dream. Instead, it is a feasible reality, thanks to revolutionary platforms like Halerium. This robust tool overcomes the challenges and makes the complex world of artificial intelligence accessible to all, while ensuring your trade secrets remain protected. Halerium signifies a new era where AI works with you hand-in-hand, revamping productivity and enabling ease of decision-making.

Dr. Theo Steininger
CEO
Erium GmbH

Detailed information in the techL profile:
Erium GmbH

How does AI become a decisive competitive advantage for companies?

The importance of artificial intelligence for companies is constantly increasing. From automating processes to optimizing decisions through data-driven insights, AI enables companies to be more efficient, more innovative and more competitive. Those who recognize and use the potential of AI early on will successfully shape the future of entrepreneurship. How does AI make sense for companies to use to increase efficiency?

An article by AI-UI GmbH

We are AI-UI. We are changing the business world by using artificial intelligence (AI) in many areas of the company. Our NoCode solutions enable customers and partners to profitably use the enormous possibilities of AI in the area of Industry 4.0, digitization of manual and complex work steps and automation.

AI modular system

So far, the creation of AI solutions always required extensive knowledge and a lot of programming effort. This always led to a high expenditure of time and money when implement projects.

With our software, this process is greatly simplified. We offer unique "all-in-one" software solutions for building, testing and deploying AI systems, whose greatest strength is its simplicity.

Our solutions are not new in the sense of the underlying technology. They are new because they can also be used by people without Knowledge of software development gives the opportunity to work with AI systems.

The AI solutions become more comparable, reproducible and much more comprehensible.

Document Automation

The high volume of documents in administration and offices often consumes time and harbors high sources of error due to the tiring work. Here, too, AI becomes a game changer.

We have the innovative solution that implements document automation and thus makes administration and offices considerably easier. By using multiple deep learning algorithms, dealing with your mountains of documents becomes child's play. You send documents and ask questions that interest you in this document. The AI algorithms provide the answers.

Even the recognition and processing of handwritten documents is possible. In this way, a significant reduction in processing time, error rate and costs can be achieved.

«ChatGPT» on Premise

A decisive competitive advantage of companies is the service. AI also contributes to a significant improvement in this area.

Our AI chatbot works like «Chat GPT» on Premise and is a true all-rounder and serves as a versatile assistant for companies. As an enterprise-level Q&A specialist, he speaks a wide range of 20 languages, enabling seamless communication with global customers and employees. As an enterprise-level Q&A specialist, he speaks a wide range of 20 languages, enabling seamless communication with global customers and employees.

Thanks to its AI technology, the chatbot can answer complex questions, solve problems and provide information about products and services. With a fast response time and precise answers, it supports customer service and relieves employees so that they can concentrate on more demanding tasks.

From sales support to the internal knowledge base for employees, it offers a wide range of functions that increase efficiency and productivity throughout the company. Its versatility makes it an indispensable tool for modern companies that want to operate successfully in a globalized world.

Data security

Internal data is of central importance for the success and efficiency of a company. They serve as the basis for decision-making, planning and control of business processes. As a result, the extensive protection of sensitive company data is essential and must also be guaranteed when using AI solutions.

By offering our AI solutions on-premise, we enable companies to maintain full control of their data while reaping the benefits of artificial intelligence. Our solutions guarantee the highest data protection standards and ensures that sensitive information is not transferred outside the company's borders.

This unique on-premise AI solutions offer companies a secure and trusted alternative to cloud-based offerings. They enable them to implement AI applications directly in their own infrastructures, which leads to increased data sovereignty and improved control over AI processes.

Summary

In the future, artificial intelligence will be indispensable in the corporate world, as it is essential for increasing efficiency and productivity and gives companies a clear competitive advantage. Contact us now to find your individual AI solutions together with us.

Steve Toepke
B2B Key Account
AI-UI GmbH

Detailed information in the techL profile:
AI-UI GmbH

Join the Symposium on the Future of Data-Driven Software Architecture 2023/2024 on January 17th, 16.00—18.30.

7

Survey of technologies

At regular intervals, we ask the experts for building blocks that they currently need. By far, the most frequent response is the desire for tool research for a specific topic. Our team has therefore been expanded to include young students, for whom tool research is a good additional element of their education. In this chapter, you will find a collection of technologies that we think deserve your interest.

Only a short outline of the product is presented. The attached link leads directly to the product datasheet in our techL-database, where more detailed information and contact persons can be found.

All innovations be found in the technology database

techL

www.techl.eu

aioneers

aioneers, a fast-growing German tech company offers its AI-powered technology, the AIO Supply Chain Command Center (AIO SCCC) to help businesses build a resilient supply chain. The AIO SCCC combines advanced analytics and decision support linked intelligently to execution capabilities and right up to fully automated supply chain workflows. Businesses can enhance multiple aspects of their supply chain and achieve optimized inventory across multiple echelons, improved sales & operations planning, intelligent order fulfilment and end-to-end visibility of their supply chain while prioritizing sustainability through decarbonization initiatives with the AIO SCCC.

techL profile

AI-powered AML/CFT Platform

Hawk AI is a software platform that uses AI to monitor financial transactions in real-time, delivering next generation anti-money laundering compliance for financial institutions. The solution offers classic rule-based models, which are enhanced by auto-closing features based on machine learning models that learn from the investigator's own decisions.

Hawk AI makes use of unsupervised machine learning model, Anomaly Detection in specific, to identify new patterns of crime, deriving insights from the overarching nature of the platform spanning multiple financial institutions.

techL profile

AIUI

We are AIUI - the AI experts from Germany, which developed the kit for the development of individual AI solutions. Our software enables companies to build, test and implement AI solutions quickly and easily. No programming knowledge is required for this. Implementation times are shortened and complexity reduced by providing ready-to-use product decouplings, such as for document automation or as a company-specific chatbot for customer support.

techL profile

Asvin

Asvin
asvin provides a solution to distribute updates safe and secure over the air to IoT devices. asvin is using de-centralized technoligies to provide a resilient and secure update solutions for devices during their lifecycle. By asvin the security state of devices can be monitored and reports on threat landscapes can be generated.

techL profile

Bitahoy Watchdog

We believe that smart home users should no longer be faced with the choice between comfort and security. That's why we at Bitahoy are committed to protecting your privacy where you should feel most secure: in your home. Ready-to-use interfaces to other tools and systems:

The watchdog is accompanied by an easy to use and intuitive App to monitor your home network traffic. The App can be used to get insight into your network and configure additional functiconalities.

[techL profile]

CodeShield

CodeShield empowers software developers to build secure software and integrates seeminglessly into the software development process. Based on new research technologies, CodeShield detects known and yet unknown vulnerabilities. CodeShield does not only scan the application code but also included third-party libraries.

[techL profile]

Delphix Software Limited

Delphix is the industry leader for DevOps test data management. Businesses need to transform application delivery but struggle to balance speed with data security and compliance. Our DevOps Data Platform automates data security, while rapidly deploying test data to accelerate application releases. With Delphix, customers modernize applications, adopt multicloud, achieve CI/CD, and recover from downtime events such as ransomware up to 2x faster. Leading companies, including BNP Paribas, Michelin, Choice Hotels, Banco Carrefour, and Fannie Mae, use Delphix to accelerate digital transformation and enable zero trust data management.

[techL profile]

imbus

Softwarequalität ist die Mission der imbus AG. Seit 1992 steht das erfahrene und hochqualifizierte Team von imbus für Software-Qualitätssicherung und Softwaretest. Die Expertise aus über 9.000 erfolgreichen Projekten bildet die solide Grundlage für die tägliche Arbeit unserer Experten, allesamt mindestens ISTQB® Certified Tester Foundation Level. imbus bietet ein umfangreiches Spektrum an Testing Services und Testautomatisierungs-Technologien an, die auch spezifische Themenbereiche wie z.B. Security-, Last- und Performance-, Embedded-Systeme sowie AI-Testing abdecken, und hat darüberhinaus ein Testmanagement-Tool, die imbus TestBench, entwickelt.

[techL profile]

Lobster DATA

User-friendly software adapts. Both to the specific requirements of its users and to changes in technology, economy and society. Lobster has been translating this expectation into scalable digital solutions since 2002 with three no-code based software products and an innovative logistics platform: (1) Lobster_data as middleware between internal and external systems, cloud applications, and data warehouses, (2) Lobster_pro for seamless automation of business processes, (3) Lobster_pim for fluid product communication and (4) logistics.cloud as a neutral cloud-based platform for logistics. Our goal: to connect people, systems, things - everything to everything. Simple. Secure. Scalable.

techL profile

Microstrategy

MicroStrategy is the largest independent publicly-traded business intelligence company, with the leading enterprise analytics platform. Our vision is to enable Intelligence Everywhere™. MicroStrategy provides modern analytics on an open, comprehensive enterprise platform used by many of the world's most admired brands in the Fortune Global 500. Optimized for cloud and on-premises deployments, the platform features HyperIntelligence, a breakthrough technology that overlays actionable enterprise data on popular business applications to help users make smarter, faster decisions.

techL profile

Rocket Routine

Revolutionize your business strategy! Our software empowers comprehensive strategy creation, clear goal setting, and precise execution. Align teams, enhance transparency, and drive goal-focused communication effortlessly. Track progress, prioritize tasks, and ensure everyone's aligned with our user-friendly interface. No more wasted time or misalignment. Rocket Routine offers transparency for confident data-driven decisions, steering your company to success. From startups to established firms, conquer strategic challenges. Say goodbye to average – elevate with Rocket Routine! Streamline execution, boost productivity, and reach your goals.

techL profile

Sixsentix Deutschland

IT Consulting and services specializing in Software Testing and QA across all industries. Delivering consulting and IT services projects in topics such as Test Strategy and IT Process Improvement, Test Automation, Test Factory/Test Center organisation, Nearshore test services delivery, Test Data and Environment Management and related areas.

techL profile

SPIRIT-TESTING Software & Services

SPIRIT-TESTING and SPIRIT-ONSIDE are agile consulting companies with a specialisation in agile software quality assurance and development. SPIRIT-TESTING is your solution partner for agile test automation and sustainable test management. With the testOFFICE solution, you can optimally manage your test processes on one platform with reusable modules and automate test cases without programming knowledge. Further advantages of testOFFICE are the clear structure from test planning to reporting, an increase in efficiency of the test process as well as possibilities for integration into your IT landscape. SPIRIT-ONSIDE advises on all questions of agile software quality assurance or you can outsource your test process to our SPIRIT teams.

 [techL profile](#)

Summetix

summetix (formerly known as ArgumenText) uses Argument Mining to discover hidden insights in your customer's feedback and to monitor and discover tech and innovation trends. summetix GmbH is a Spin-Off of the Ubiquitous Knowledge Processing (UKP) Lab at the Technische Universität Darmstadt.

 [techL profile](#)