New Trends in Digital Audits

Innovative application of CAATs

In addition to the digitalization of auditing processes, the focus of current discussions on innovations is on automated evaluations of mass data using artificial intelligence. In particular, larger accounting firms advertise the use of appropriate techniques and state in accompanying studies that in the near future more than half of the available audit capacity can be transferred to associated software processes. The scenarios presented are usually accompanied by keywords, that often remain undetermined. Experience has shown that this complicates access to a complex subject, so that we briefly deal with conceptual delimitations and the positioning of testing software in the first parts of this article. In a second part, we will focus on practical and application-related questions about the use of CAATs.

1. Approaches and terms concerning digital audits

The following summary primarily refers to digital techniques and developments that accompany the auditing process:

- **Objects of auditing: mass business data versus big data**

  Both terms are often used synonymously. However, they characterize different circumstances. Mass data are simply extensive amounts of data, which supposedly represent an unrecognized high volume of information. In fact, experience (and mathematical models) show that it is not the mass but the homogeneity of the data set to be examined that essentially determines the content of information. The organisational compilation of mass data (e.g. postings on different accounts) or temporal (e.g. postings from different posting periods) is always accompanied by an information entropy. If, for example, outliers in vendor payments have to be determined, a look at the account of a small vendor provides a realistic average value that is typical for that vendor, from which unusual amounts can be derived. The same applies to the separate examination of a vendor who only processes large projects. If both (and many more) accounts are merged, the actual conditions in a test field are increasingly distanced and the analysis results become increasingly meaningless. Within most "intelligent" analysis methods, the first step - data preparation - is therefore to reduce data in order to better identify important information in a small, more homogeneous data set. Mass data, on the other hand, often tend to be distributed in a meaningless way.

  On the other hand, large amounts of data are useful when searching for relationships between data (search by rules) as "training data". For this purpose, they are broken down into numerous homogeneous clusters, whose correlations are determined and evaluated using a wide variety of methods in order to derive previously unknown rules (patterns) from them. These diverse correlations (in large or small datasets) are the characteristic of BIG DATA. Mass data and BIG DATA are by no means a harmonious pair, as the frequent (random) occurrence of meaningless apparent patterns (hallucinations) and correlations in extensive data sets shows.

- **Actors in digital analysis: employees, developers, data scientists, auditors**

  A wide range of different parties are involved in the creation and processing of operational data. Employees create the operational data together with digitally supported operational processes. Developers of intelligent analysis systems program algorithms that are available as "evaluation functions" within analysis programs. DataScientists deal with operational data models and design analysis models based on available evaluation functions and algorithms. Based on their auditing experience, auditors use appropriate analysis models and assess the relevance of the results.

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In the listed overview (theory) the responsibilities are theoretically clearly defined. In practice, however, there are numerous hybrid forms in which booking robots generate operational data, algorithms are combined in modular form and without statistical background knowledge, DataScientists without audit experience generate analysis results and auditors without digital expertise assess such analysis results.

- **Traditional testing software (CAATs)**

  These are analysis programs that have been accompanying the audit work for decades with a virtually unchanged scope of functions. The auditor as a user of this software determines the evaluation rules. With the software help, the auditor maps his experience and expertise to the operational data in an interactive dialogue in order to develop approaches for the further review of individual business transactions. Recently, such programs have been provided with "standardized" evaluation steps on the basis of known rules, which should automatically (e.g. as Journal Entry Test or Continuous Auditing) lead to interesting results for auditors.

- **The next step: Data mining software – searching rule-based**

  In the case of unstructured audit problems, the associated data patterns and rules are often not known or there is a lack of audit experience to identify them. In these cases, traditional auditing software (CAATs) does not offer any meaningful support in reaching a conclusion. There are analysis programs that search for rules without predisposition to a large extent, in order to list deviations that are matched to these rules as a finding to be investigated. A typical established representative of such programs is ***WizRule***.

  WizRule shows rules and deviations based on association rules technology, and interesting results can be derived from this aproach, which cannot be achieved in a comparable way with traditional CAATs.

- **In the near future: computer intelligence, AI and machine learning**

  Testing means evaluating and deciding. When these cognitive activities are transferred to computers, we are dealing colloquially with "artificial" intelligence. Today it is often encountered within determined processes, e.g. credit decisions, the assessment of default risks or translations. A special feature is the successive improvement of decision rules based on statistical algorithms. Since human intelligent behaviour is based on numerous other factors, it is better to speak of *learning digital CAATs*. Here, numerous practicable procedures with different learning techniques can already be expected in the near future. Self-referential systems with independent step-by-step result optimizations are just as much a part of this as procedures whose result quality is improved step-by-step with human feedback.

  Neuromorphic computing, which imitates human cognitive processes based on synaptic pattern recognition by means of complex digital networking structures and adapting action potentials, is considered the supreme discipline. Typical problem areas must not be concealed here either. On the one hand, the machines and algorithms will produce erroneous results, in the case of neuromorphic processing one may probably also speak of errors, and on the other hand, the fundamentals of the determination of results here are so complex that they will not be comprehensible by auditors or other experts. Only a combination of auditing experience, sound statistical knowledge and digital expertise will allow constructive dialogue on such results.

These techniques will determine the forthcoming development of our audit work.

2. *WizRule* – the next step

As already mentioned, in the foreseeable future, largely *autonomous, artificial analysis procedures* will determine the digital audit environment. Dealing with such procedures and especially with their results requires experience, which must be acquired gradually. The range of auditors is wide - those who for the first time deal more intensively with digital analysis procedures, to audit-related specialized DataScientists. What is needed, are practicable strategies that pave the way for as many auditors as possible to enter the digital future.

An important and proven tool for *applying rule-seeking audit techniques* is WizRule. The special feature is working in two steps, in which the program first autonomously discovers all rules (patterns) in business data and then uses them in the sense of "reverse engineering" to mark significant deviations from these rules for audit-relevant processes.

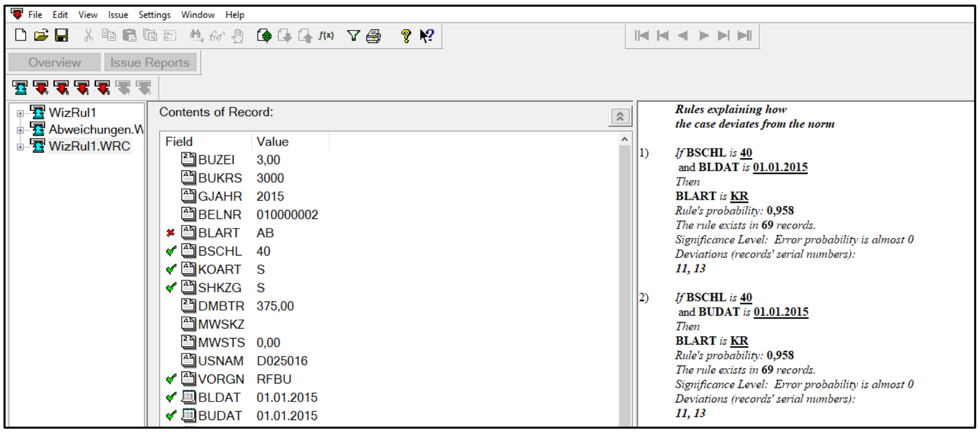

Image: Result of the new function for an application in a calculation field

The program uses different techniques for searching rules automatically:

- Formulas and arithmetical relations

  A simple formula rule could be:

  > *A = B * C   where*
  > ------------------------
  > *A = Tax amount*
  > *B = Net amount*
  > *C = Tax code and corresponding percentage rate*
  > --
  > *Rule's Accuracy Level: 0,99*
  > *The rule exists in 5.726 records.*
  > *The following deviations can be found: xyz*

  Arithmetic formulas with up to 5 variables included in the data are revealed.

- Characteristics and coherences: IF-THEN-Rules

  A simple IF-THEN rule could be:

  > *IF account number "16000" was posted to and*
  > *the tax code is "A1" and*
  > *the country code shows "DE",*
  > ---
  > *THEN Tax rate between 7 and 19 percent*
  > ---
  > *Rule's probability: 0,998*
  > *The rule exists in 1.745 records.*
  > *Significance level: error probability < 0,001*

The following deviations can be found: xyz

All if-then rules with any number of conditions are revealed. Here, too, deviations from a highly valid rule can indicate processing errors or fraud.

- Correct contents: Spelling Rules

  A simple Spelling rule could be:

  IF the term "charge-off" appears in the field "Description" (322 times)
  THEN in the field "Account number" the entry "245100" is found
  --
  There are 11 case(s) containing similar value(s).

  Deviations are detected in the most diverse contexts and directions. Addresses can be validated as well as entries in master data.

- IF-THEN formula rules:

  An example for IF-THEN formula rules could be:

  IF Customer is Summit
  *THEN Total = Unit Price * 0.8 + 50*
  --
  Accuracy Level: 0.95
  The rule exists in 502 records

  The “Accuracy Level” indicates the rate of cases that fit the formula (plus or minus a pre-determined limits) relative to the total number of cases where the condition holds.

  Once again, a deviation from a highly valid rule might point to a fraud.

- Outstanding Rules:

  An example for Outstanding rules could be:

  IF Customer is Summit
  THEN % Discount = 20

  The rule is unexpected since:

  There are 100 values in the Customer field, each having no less than the minimum number of cases in a rule. Found no similar rules that relate between the other values in the customer field and the values in the % Discount field.

  In other words, the rule is outstanding since it is the only rule that relates between a certain customer and a certain % discount (while all the customers have various discounts).

  If the % discount of all the other customers were 10% for example, the above-mentioned rule would still be outstanding (since the discount of this customer deviates from the discount of all the other customers).

The possibilities shown are manifold. ***WizRule*** can be used as a stand-alone and *future-oriented auditing tool.* The experience gained in fine-tuning the parameters‘ analysis is extremely valuble. In addittion, the view of unknown correlations in business data, and the view of deviations (cases to be audited) are very helpful. Finally, the newly discovered rules can be taken over into the application of traditional CAATs to support a further developing automated *Continuos Aditing.*

In this respect, the implemented procedures *search, find, broaden the auditor's horizon and improve our conventional analysis techniques*.

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