Machine Learning for Finance and Risk
ASUG Annual Conference

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Agenda

Finance and Risk Solutions and Machine Learning

Finance and Risk Scenarios Leveraging Machine Learning

Predictive Scenarios Leveraging Machine Learning

Wrap-Up and Resources
Finance and Risk Solutions and Machine Learning
Intelligent Technologies – drive the next-gen value economy for customers

- Of human tasks will be automated by 2025 (60%)
- Accuracy in voice and video recognition by 2020 (99%)
- Image recognition accuracy today (97%)
- Annual value created in the enterprise (US$3.5 trillion)

Source: SAP Strategy Paper – Delivering the Intelligent Enterprise, April 2018
The Intelligent Finance Function
enabled through SAP S/4HANA and SAP Leonardo

- Agile steering and instant insights
- Automated finance processes
- Embedded compliance
- Smart assistants

Productivity

High-Value Tasks

Repetitive Tasks

Automation

1960s – 1980s
1990s – 2000s
2000s – 2010s
2010s – 2020s

Time
Vision of Finance Transformation
From daily routine to supporting growth and new business models
SAP S/4HANA Finance supports Your Digital Transformation
End-to-end innovation of all your processes across your entire value-chain

- **Better decisions**
  with instant, real-time insight and prediction

- **Increased performance**
  through end-to-end reinvented processes

- **Higher productivity**
  with Digital Age UX and intelligent assistance

- **Lower TCO**
  with simplified architecture and cloud deployment
Digital Technology is transforming how Business gets done
Intelligent technologies will enable finance to define its value across the enterprise

- **Cloud**
  - Fast deployment

- **Business networks**
  - Connecting with partners

- **Blockchain**
  - Business transactions of the future

- **Big data**
  - Real-time insights with in-memory

- **User experience**
  - Adapting to the modern workstyle

- **Predictive and cognitive**
  - Simulating business outcomes

- **Robotics and machine learning**
  - Increased efficiency

**Transforming finance organizations**
Technical Pre-requisites for Machine Learning

Requires SAP S/4HANA Finance
- On-premise SAP S/4HANA Finance
- Cloud: both multi-tenant and single-tenant Cloud offerings from SAP are already based on SAP S/4HANA

Additional Option: SAP Cloud Platform (SCP) has Cloud Extensions for SAP S/4HANA Finance
- Growing number of specialized apps
- Quickly complement new capabilities
- Quick start, easy to use, subscription-based
- Flexible scalability according to changing needs
- Seamless integration to your existing system landscape, including on-premise, Central Finance, and Cloud deployments with replication-free, real-time integration

SAP ERP or S/4HANA or central finance foundation*

*prerequisites dependent on solution
Comparing approaches to automation

Rule engines

Engines preloaded with highly specific process knowledge enable **rule-based automation**

Machine-learning

Machine-learning identifies hidden patterns in knowledge-intensive processes and learns from the data **without being explicitly programmed**

Robotic process automation

Robotics process automation helps run repetitive, **rule-based**, and user interface–focused tasks and bridges temporary gaps
What is Machine Learning?

Sheepdog or Mop?
How does Machine Learning work?
From data to insights

- **Data**
  - Text
  - Video
  - Speech
  - Image
  - … and more

- **Training**
  - Prepare data
  - Train model
  - Capture feedback
  - Apply model

- **Inference**
  - Applications
    - (such as cash application)
  - Services
    - (such as invoice processing, profile matching)
  - ...and more
From manual to automated processing

The quality of the recommendations of the ML service depends on the size of the training set. With the availability of more and more historic data of user actions, the ML service gets better over time and the recommendations of the machine can be translated in automated actions.

- The system logs the actions of the end users. Thereby a set of training data for the ML service is created.
- The training data is used to train the ML service.
- The recommendations of the ML service support the end user for taking faster and better decisions.
- The ML service gets better with the number of processed items.
- As soon as the ML service is considered to be trained well enough with the available historic data, the recommendations of the ML service can be taken over automatically. So more and more manual steps can be replaced by automated actions of the machine.
Machine Learning Development Steps

- **Data Exploration**: Iterative experiments to identify ML approach, select algorithms, determine input parameter based application data
- **Training Execution**: Regular execution of training runs, pre-defined model and data input, based on individual customer data
- **Model Publishing**: Validation of model quality after training and activation of trained model instances into productive landscapes
- **Model Inference**: Exposure of model as APIs providing inference based on data inputs for productive use
- **Integrated Consumption**: Provisioning of ML enabled features for end users, integrated in products and solutions
Finance and Risk Scenarios
Leveraging Machine Learning
SAP Leonardo delivers Breakthrough Technologies
Intelligent finance applications increase efficiency and reduce cost

- **Automating the End-to-End processes**
  Increase efficiency and reduce costs with SAP’s Finance Portfolio

- **Detect and prevent fraud**
  Identify and rank information that positively correlates with fraud

- **Proactive context sensitive support**
  The digital assistant boost productivity of your financial experts

- **Prediction of future values**
  More insights into the future to facilitate taking the right decisions
Example: SAP Cash Application
Next-generation intelligent invoice matching powered by machine learning

SAP Cash Application intelligently learns matching criteria from your history, reads and processes payment advice documents, and automatically clears payments with minimal intervention.

### Automation
- Increase efficiency
- Reduce errors
- Enable finance to focus on strategic tasks

### Speed
- Faster payment matching
- Reduce DSO
- Increase liquidity
- Improve customer service

### Reduce TCO
- Learns from historical data
- Learns from accountant behavior
- Does not require ongoing maintenance

### Integrated with S/4HANA
- Integrated with SAP S/4HANA Cloud and On-premise
- Compliments standard rules
- Maintain current processing workflow
Payment Advice Extraction
Automated payment advice processing seamlessly integrated with SAP Cash Application

Drastically lower manual efforts by automatically extracting remittance information from unstructured advices (email, PDF, paper, etc.) to enhance payment matching
SAP S/4HANA Cloud for goods and invoice receipt reconciliation
Efficiently clear your open balances on the GR/IR accounts

Enables intelligent processing of the reconciliation of your invoice and goods receipts

- Increases accuracy of your financial statement
- Accelerate period-end closing with less manual intervention, while ensuring compliance with your corporate rules
- Enables real-time insights into open goods and invoice receipts for accounting and procurement organizations
- Higher efficiency through intelligent recommendations with Machine Learning
SAP Shared Service Framework

Deeply integrated out-of-the-box into SAP’s Finance Solution Portfolio

Integrated out-of-the-box with SAP end-to-end automation engines

For example:

- Optimized **Accounts Receivable** Process with Integrated collection and dispute worklists with SSF and the SAP Receivables Management solutions
- Simplified communication and automated execution of the **Closing Process** with SSF and SAP Closing Cockpit
- Enhanced issue resolution capabilities in **Accounts Payable** with SSF and SAP Invoice Management by Open Text

..and many more…
Predictive Scenarios

Leveraging Machine Learning
Different types of predictive logic
adding intelligence to finance applications

TOP-DOWN Prediction

Time series algorithm on historic data in order to predict future values considering trend, cycles and/or fluctuation

BOTTOM-UP Prediction

Predictive Accounting on the basis of predicted documents being part of an individual business process and its document flow

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SAP RealSpend
Gain better insight into your budget and spending information

Provides visibility and access to up-to-the-minute budget and spending information enabling line-of-business managers perform ad hoc spend analysis and other calculations for live business processing.

- Integrated, real-time, and accurate view of enterprise spend
- Spend performance visibility
- Active Spend Management
- Machine Learning for predictive spend analysis
SAP S/4HANA Cloud for cash management
Gain real-time insight into your current cash and liquidity

Streamlines capital management and liquidity accounting processes by integrating data from multiple sources onto a single platform.

- Stay on top of your company’s finances with centralized, real-time data
- Streamlined Payments and Bank Communication
- In-house cash control reducing the need to transfer cash and dependency on banks
- Real-time insights into balances & liquidity forecast predictive analytics
Creating forward looking margin insights using predictive accounting

Accounting for incoming sales orders
- New concept for handling of predictive data
- Financial line item details for incoming orders reporting
- Review incoming sales order report
- Provides a comprehensive overview of all orders and their values for the time period regardless of billing status

First commitment scenarios
Commitments:
- Are stored in the same basic structure as in the universal journal
- Include cost assignments to work breakdown structure (WBS) element, order, cost center, and so on but also link to the supplier
- Can be shown for derived characteristics, such as profit center and functional area
SAP Business Integrity Screening
Anomaly, fraud, third-party risk detection, and investigation to protect your business

Analyze performance
Monitor key performance indicators and create management reports

Design
Determine screening lists, analyze patterns, and define detection rules and models

Investigate
Manage alert workload with efficient evaluation, qualification, and remediation of issues

Setup
Define detection strategy through simulation and calibration

Detect
Execute mass and real-time detection and stop anomalies or irregular transactions
SAP Tax Compliance
Smart Automation on Compliance Issue Processing

With every new decision the company’s Tax Knowledge Base grows and SAP Tax Compliance leverage this by continually classifying compliance issues and trigger automated correction measures or close them as false positives. In rare cases human interaction is requested to make the decision.

SAP Tax Compliance allows your Tax Managers to

• Transparently apply HANA’s Automated Classification
• Benefit from the company’s memory of its tax managers past decisions
• Automate compliance issue processing and limit human interaction to exceptional cases
• Choose level of automation on compliance check basis

Business Benefits

• Automatically learn from new decisions
• Increase efficiency by smart compliance issue processing automation
• Seamless integration of ML algorithms into the SAP Tax Compliance

Illustration
Automated Completion
Automated Processing
User Interaction
Wrap-Up and SAP S/4HANA Resources
Customer Success – Live Customers on SAP Cash Application

**Utrecht University**
- Public University
- Established 26 March 1636
- Utrecht, Netherlands
- 30,374 students, 5,568 faculty and staff
- 13th best university in Europe

Increase of 24% to **95% overall automation**

**DÖHLER**
- Food and Beverages
- Established 1838
- Darmstadt, Germany
- 6,000 employees
- €1.5bn revenue

Increase of 41% to **92% overall automation**
The purpose of leveraging technology in Finance is not technology for technology’s sake, but to make finance more efficient, to allow finance and risk teams to focus on more strategic topics to provide value to their organizations.

SAP Leonardo natively integrates machine learning, which also powers predictive capabilities.

The pre-requisite for machine learning capabilities is a SAP S/4HANA system; that being said, SAP S/4HANA is already the basis the default for both single and multi-tenant Cloud deployments.

Out-of-the-box applications already exist that leverage machine learning; those built on the SAP Cloud Platform can work with both on-premise and Cloud deployments.

Machine learning apps include:

- Transactional apps that allow finance and risk teams to focus only on transactional exceptions
- Predictive apps that analyze trends and provide simulation for forward-looking scenarios

Key Take-Aways
Where to Find More Information – Finance

- Take a look at www.sap.com/Finance
- Machine Learning www.sap.com/ml
- SAP S/4HANA Cloud www.sap.com/cloud
- SAP HANA Cloud Platform Apps https://www.sapappcenter.com/
- CFO Knowledge www.digitalistmag.com/finance
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Q&A

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