HOW NATURAL LANGUAGE PROCESSING (NLP) IS TRANSFORMING FINANCE

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WHAT IS CHANGING IN FINANCE
TECHNOLOGY IMPACT ON FINANCE

Today

PLAN
- Strategic planning
- Target setting
- Financial planning
- Forecasting
- Tax/treasury planning

TRANSACT
- Supplier payments
- Employee payments
- Customer receipts
- Cash management

ACCOUNT
- Transaction accounting
- Asset accounting
- Tax accounting

CONTROL
- Accounting close/consolidation
- Account reconciliation
- Error processing
- Internal audit

COMPLY
- Statutory reporting
- Tax filing
- Statutory compliance
- Policy compliance
- Regulatory compliance

REPORT
- Enterprise performance reporting
- Financial reporting
- Management reporting

ANALYZE
- Portfolio analysis
- Performance analysis
- Investment analysis

ADVISE
- Business advisor
- Strategy execution support
- M&A Support
- Board of Directors engagement

Tomorrow

PLAN

TRANSACT

ACCOUNT

CONTROL

COMPLY

REPORT

ANALYZE

ADVISE

Focus of professional staff time
Largely digitized (>80%)
EXAMPLE: CONTROLLER WILL BECOME DATA MODEL AND MACHINE LEARNING EXPERTS

Illustrative: Typical tasks & time distribution of Controllers
HUMAN + MACHINES COMPLEMENT EACH OTHER

IMPORTANT: ACTIVITIES ARE BEING REPLACED NOT JOBS PER SE

<table>
<thead>
<tr>
<th>Lead</th>
<th>Empathize</th>
<th>Create</th>
<th>Judge</th>
<th>Train</th>
<th>Explain</th>
<th>Sustain</th>
<th>Amplify</th>
<th>Interact</th>
<th>Embody</th>
<th>Transact</th>
<th>Iterate</th>
<th>Predict</th>
<th>Adapt</th>
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</thead>
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Human-only activity

Humans complement machines

AI gives humans superpowers

Human and machine hybrid activities

Machine-only activity

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### HOW A FUTURE WORKFORCE COULD LOOK LIKE

<table>
<thead>
<tr>
<th>ROLE</th>
<th>TECHNOLOGY (AI/Robots)</th>
<th>HUMAN</th>
<th>FUTURE EXPERTISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCOUNTANTS</td>
<td>80%</td>
<td></td>
<td>20% RPA MANAGERS</td>
</tr>
<tr>
<td>BUDGET ANALYSTS</td>
<td>80%</td>
<td></td>
<td>20% SCENARIO MODELLERS</td>
</tr>
<tr>
<td>FINANCIAL ANALYSTS</td>
<td>30%</td>
<td></td>
<td>70% DATA SCIENTISTS</td>
</tr>
<tr>
<td>TAX EXAMINERS &amp; PREPARERS</td>
<td>60%</td>
<td></td>
<td>40% ADVANCED ANALYTICS</td>
</tr>
<tr>
<td>AUDITORS</td>
<td>80%</td>
<td></td>
<td>20% EXCEPTION HANDLERS</td>
</tr>
<tr>
<td>TREASURERS</td>
<td>40%</td>
<td></td>
<td>60% CASH FLOW OPTIMIZERS</td>
</tr>
</tbody>
</table>

![Image showing the breakdown of future workforce expertise with percentages and role categories.]
Fact: Finance in practice are not only numbers, algorithms and models but an immense amount of administration, documents, reports, information gathering, …
MARKET EXAMPLES
**EXAMPLE: (E)-MAIL RESPONSE AUTOMATION**

Companies are suffering from a waste amount of e-mails from customers, compliance requests, employees and so on.

**ENTITY/FEATURE EXTRACTION FROM EMAILS**

1. **Email/Ticket**
   
   Hello,
   
   I have a problem with the latest invoice for PO30087361. The invoice has been sent on 20.05.2018 and was supposed to be paid after 30 days. Can you call or email me? Phone: +49 711 540 8767. Email: john.doe@email.com
   
   Thanks!

2. **Apply entity extraction to email/ticket content to identify key information. e.g. product, serial number**

**CLASSIFICATION ACCORDING TO DAIMLER CATEGORIES**

- **Categories**
  - Invoice | Payment | Reminder
  - Invoice | Status | Check
  - Invoice | Status | Dunning
  - ... 

3. **Based on the identified contents classify emails according to Daimler categories**

**FILLING EXTRACTED INFORMATION INTO THE RIGHT TEMPLATE (IF APPLICABLE) TO GENERATE A RESPONSE**

1. **Use Case Template Y**
   
   Use case name: Status Dunning
   Customer name: ...
   Information need: ...
   Action: RPA validate & execute

2. **Use Case Template X**
   
   Use case name: Payment reminder
   Customer name: John Doe
   Customer no.: n/a
   Customer email: john.doe@email.com
   PO no: 30087361
   Invoice no: n/a
   Invoice date: 20.05.2018
   Action: RPA validate & execute

3. **Automatically generated structured template for follow-up processing through RPA**
EXAMPLE: THE (TOO) MANY COMMUNICATION CHANNELS

SPEECH TO TEXT, TEXT TO SPEECH AND STRUCTURED DIALOGUES FOR SALES, CLAIMS, TRADING, RISK MANAGEMENT ETC.

Call Messaging Web Chat Email Form Letter ...

Classification of the requests & AI/NLP based solving. Depending on the channel with today’s methods 30 – 70% can be automated.

Contact Center/CRM

Backend

Chat Frontend

Chatbot Voicebot

Digital Conversion Facility

NLP/AI Platform

Ticket / RPA

Backends

Mid/Back Office

Escalation and hand-back

Chat

Call

IVR

Actions are either directly executed by the AI platform or created as ticket to be processed by RPA or other means e.g. trade bookings, compliance information.

Centralized AI logic and model for chatbot and voice bot.

Flow Integration
EXAMPLE: SIGNALS IN THE MARKET
MINING AND INTERPRETATION OF SIGNALS IN THE MARKET LIKE SPEECHES
OF THE FEDERAL RESERVE OFFICIALS

Sentiment Analysis

Consistency analysis

Consistency analysis with former speeches

Image analysis body language

Conclusion about the future monetary politics
EXAMPLE: FIND THE RIGHT PERSON AND EXPERTISE

FINANCE FUNCTIONS REQUIRE MORE AND MORE SPECIAL SKILLS. LARGE COMPANIES OFTEN SUFFER TO KNOW WHO IS THE RIGHT PERSON FOR A CERTAIN INFORMATION OR TASK WITHIN AN ORGANISATION.

1. Understands skills
2. Understands time, level, languages
3. Understands relative location
Companies have an immense number of contracts for trades. How to act on embedded financial and real options e.g. in changing market environments?

**EXAMPLE: POST-TRADE**

**Identification Of Embedded Options**

- **Main Pricing Terms**
  - Fixed / Indexation
  - Other Pricing Options

- **Main Volumetric Terms**
  - Volume Commitment
  - Tolerance and Take or Pay Penalties
  - Embedded Call/Put Options
  - Additional Volumetric Terms

- **Other Option Terms**
  - Volume Swing / Swap / Diversions
  - Quality Specification
  - Location / Incoterm Options
  - Other Advanced Options

NLP AI algorithms can review physical contract terms and identify embedded financial and / or real options.

**Settlements**

- **Trade Settlement Requests**
  - Operation desk receives many post trade settlement requests via emails.
  - The received emails are mostly written in English and contain important information like SSID etc.
  - Emails can contain the information in the form of plain text or a PDF or an Excel sheet

- **SME Pool**
  - Replace SME pool with an AI routing engine that will assign emails to particular Analyst

- **Analyst**
  - Read emails, identify request type, infer required data, take appropriate actions

- **Gloss**
  - Aid analysts with AI based adjudication application that will read the assigned emails, identify the actions and infer the required data using Natural Language Processing