Optimizing Information Acquisition and Decision Making Processes with Natural Language Processing, Machine Learning & Visual Analytics

Albert Weichselbraun, Philipp Kuntschik, Norman Süsstrunk, Fabian Odoni, Sandro Hörler, Adrian Brasoveanu
Agenda

Introduction
• Challenges
• Technology stack

Visual analytics

Industry use cases
• Digital Asset Management (IMAGINE)
• Company Valuation (DISCOVER)
• Recruiting (Job Cockpit)

Conclusions
Introduction

Technical challenges (Text & Data Mining)
• Application of statistics, natural language processing and machine learning
• Knowledge poor, but predictable, well described methods
• Data quality, reliability

Economic & domain-specific challenges
• “Enabling sciences”
  ✔ support domain experts in creating more efficient processes and new innovative products
  ✔ visual analytics can aid decision makers in identifying potential applications of these methods
• Create value
  ✔ optimize business processes
  ✔ new product and services
Introduction

User interface components

Visual analytics
Dashboard & user interface
Data enrichment

Date enrichment components

Classification
Clustering
Named Entity Recognition
Geo-Tagging

Sentiment Analysis

Named Entity Linking
Opinion Mining
Privacy aware knowledge extraction
Locality sensitive hashing

Phrase extraction

Content retrieval components

Data Acquisition
Text pre-processing
Deep Web Mirroring

Content processing and analytics components
Visual Analytics
Use Case 1
Digital Asset Management

Process optimization
In this image taken from video a camera drone crashes into the snow narrowly missing Austria's Marcel Hirscher during an alpine ski, men's World Cup slalom, in Madonna Di Campiglio, Italy, Tuesday, Dec. 22, 2015.
Use Case 2
Company Valuation

Product innovations
Knowledge discovery, extraction and fusion for improved decision making

Study ID: NCT03164772
Title: mRNA Vaccine in ...
Condition: Metastatic Lung Cancer
Phase: Phase 1; 2

Company: Lantern Pharam
Address: 211 N Ervay St, Dallas, TX 75201, USA
Phone: +1 515-231-2065
CEO: Arunk K. Asaithambi, PH.D.
CSO: Peter Narad, D.V.M., PH.D.
Use Case 3
Recruiting

Product Innovations
Web analytics, data enrichment and predictive analysis for improved recruitment and career management processes

We are an independent engineering, planning and consulting company.

We develop pioneering solutions for extensively used spaces. Specialists from over 30 disciplines work together to achieve this goal. Our joined-up thinking and our competency to see the big picture characterize our work.

Knowledge Extraction

Privacy aware knowledge extraction

Job Cockpit API

Semantic search

Anonymized job profiles + context

MATCHIX domain ontology

Branche: Engineering
Education: ETH Zurich
Certificates: Project manager: 2a, Lead: 5a...

Construction engineer
15 km from Zurich
Specialization: ...

Eric Jaquier
Mitglied der Geschäftsleitung, Leiter Niederlassung Murten
Murten
+41 26 672 99 77

Sylvia Jaus
Projektleiterin
Esslingen
+41 44 387 12 69
E-Mail

Peter Jost
Leiter Sicherheit
Zürich
+41 44 387 13 91
E-Mail
Conclusions

● Natural language processing, machine learning and visual analytics are “enabling technologies”

● Application poses (i) technological and (ii) economic challenges which require close collaboration between data scientists and domain experts

● Requires a clear understanding of the available data as well as the potential and limitations of the methods applied to these data
  → data sources that contain relevant data
    (would a human with unlimited time resources be able to extract the required information)
  → identify suitable methods
Thank you for your attention!

Contact

University of Applied Sciences Chur (HTW)
Pulvermühlestrasse 57, 7000 Chur

Platform Description
www.weblyzard.com

Web Intelligence
http://htwchur.ch/?id=web_intelligence

Contact
Albert.Weichselbraun@htwchur.ch