From School to Industry, Data Science at SEB Analytics

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OUR ROOTS

A heritage of entrepreneurship – in the service of enterprise

Since the Wallenberg family founded SEB in 1856, we have been working in the service of enterprise. The journey continues with the vision to deliver world-class service to our costumers. The Wallenberg family is still the main shareholder via Investor AB.

Our Customers

3,000

400,000

4,000,000

Large Corporations and Financial Institution **SME Customers**

Private Customers

We are well positioned to serve corporate customers from the Nordic countries, United Kingdom and Germany around the globe, e.g., New York, London, Beijing and Singapore.

We want to be where our customers do business.



SEB Analytics

Large Corporations & Financial Institutions

Corporate & Private Customers

Life & Investment Management

Group Staff & Control Functions

SEB Analytics

SEB IT Department Big Data Engineer Team

SEB Analytics Team



SEB Analytics Team



From University to Industry





From Idea to Deployment



Aida: Virtual Assistant at Customer Service

Hem Priv	at Företag Börs och	finans Om SEB	Kundservice	Bli kund		
Indservice privat Kundservice	företag <mark>T</mark> eknikhjälp Juridik	& säkerhet Hitta bankl	ontor Alla produl	kter & tjänster		
	Hem / Kundservice / Kundservice priva	t / Chatta med oss			😴 Dela	
Vanliga frågor & svar	Chatta med oss					
Kontakta oss	I den här chatten får du hjälp a	Bemanning av chatten				
Bli kund	artificiell intelligens. Genom at på att hjälpa dig.	ir hon bättre	Aida finns på plats dygnet runt. Om			
Boka rådgivning		hon inte kan svara på din fråga kan en kollega ta över chatten vardagar				
Aktuella räntor				9–17. Övriga tider kan bli uppringd.	du välja att	
Aktuella priser	Hej! Jag heter Aida. Jag är fortfara bästa för att svara på dina frågor. J	nde under upplärning, men ska gö ag kan bland annat hjälpa till med	ra mitt mobilt			
bank-id, utlandsbetalningar samt hur man blir kund, men kan också svara på enklare bankfrågor. Ställ en fråga så hjälper du mig att utvecklas och bli bättre på att hjälpa dig!				Tänk på säkerheten		
Privatekonom Jens Magnusson				Skriv aldrig känsliga uppgifter som kontonummer i chatten.		
Om du inte är nöid				Läs om hur vi behandl	ar dina	

Aida: Virtual Assistant

- SEB implemented IPsoft Amelia (Aida) as virtual assistant
- Aida can answer questions in different areas and she escalates conversations that she can not handle
- A neural network decides about conversations
- At SEB there is a team (CoE Aida) responsible for training Aida with new knowledge
- The team studies her performance (customer satisfaction, etc)



Aida: Virtual Assistant

- SEB implemented Aida in 2016
- She was handling 200 conversations daily
- Four people in CoE Aida team had to spend considerable amount of time to manually study conversations:
 - Extract features, e.g., customer utterance
 - Classify conversations, e.g., customer satisfaction
- Is it a scalable solution?



Classification of Customer-Aida Chat

Business need:

Classify conversations between prospect customers and virtual assistant

SEB

- Reduce cost and scale the Aida solution
- Know customers needs asap

Data:

- Manually classified conversations by CoE team
- Data in csv and json

Classification of Customer-Aida Chat

Data engineering:

- Apache Hadoop cluster
- Pyspark, python
- NLP, Scikit Learn, etc





Spark (analytics engine for big data)

YARN (resource management)

HDFS (distributed file system)

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File	Edit	View	Insert	Cell	Kernel	Widgets	Help	Trusted Python 3 O
a +	* 2	6	↑ ↓	N Run	C C	Code	•	

SEB

Aida Conversation Classification

In [1]: # create spark session

sc = launch_spark('Aida_covClass', cores=4, memory=16, master='yarn', dynamic_allocation='true')
df = sc.read.format("csv").load("HDFS/directory/to/Aida")

- In [2]: # import python packages
 import pandas as pd
 import numpy as np
 - import nltk
 - from nltk.stem import SnowballStemmer, WordNetLemmatizer
 stemmer = SnowballStemmer("swedish")
 from sklearn.naive_bayes import MultinomialNB
 from sklearn.linear_model import LogisticRegression, SGDClassifier
 - from sklearn.ensemble import GradientBoostingClassifier

Methodology



Methodology



Deployment



- The developed model is then deployed to the Production Data Lake, by Big Data Engineers
- Every new conversation is fed to the ML model and it generates this new feature
- CoE people can get the results daily through Tableau dashboard



Next Steps



• Swedish conversation classification using neural networks



Master thesis student from KTH royal institute of technology

http://adventuresinmachinelearning.com/recurrent-neural-networks-lstm-tutorial-tensorflow/

Advanced Analysis at SEB

SEB

Education-Research

Innovation–Partnership–Investment

Guidelines-Technology-Infrastructure





Industrial PhD Student at KTH







WASP Industrial Doctoral Student

Generative Models and Reinforcement Learning for Limit Order Books

Hanna Hultin

The WASP AI project has been approved by the Emerging Technologies Committee at SEB, which includes the CIO, CRO and the Head of Trading.

Thank you for your consideration

The Journey Towards...

SEB

...World-Class Service to Our Customers Continues