Intermediate Presentation – Classification of Text ML-Approach

Master Internship: Approaching Information System Challenges with Natural Language Processing (IN2106, IN2130)

Patrick Ahrend

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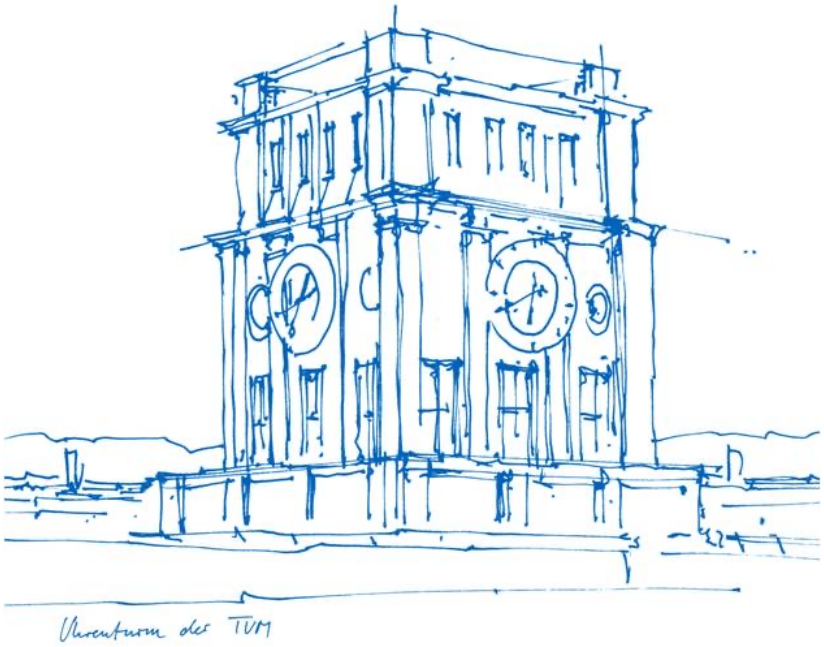
Agenda

1) Project Goal

2) Project Plan

3) Data Gathering

4) Repository Structure



Process Discovery Machine Learning Pipeline

Input

Legal text

Output

{ Relevant: “0”}
{ Not Relevant: ”1”}

Embedding

- GloVe
- Word2Vec
- Word-sense induction
- N-Gram vector
- Count-based token vector

Models

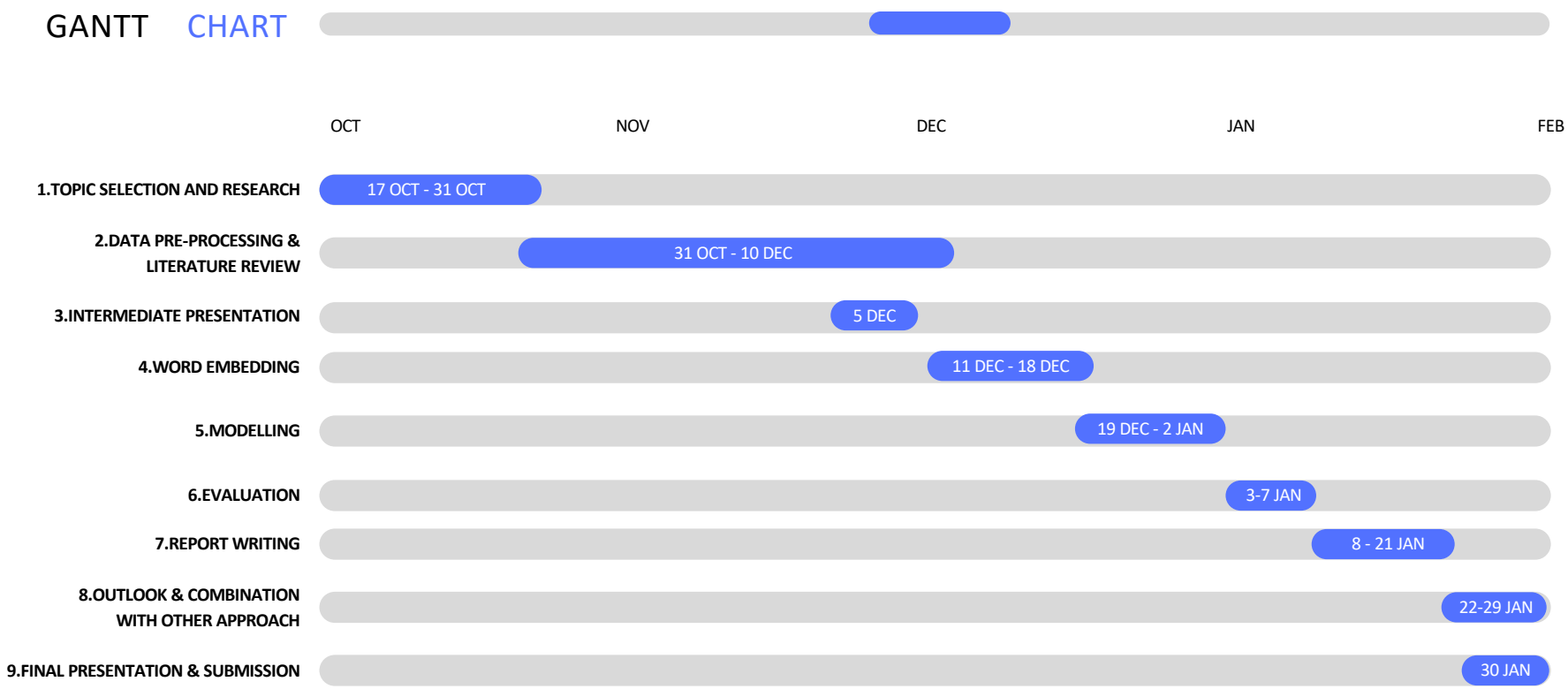
- Multinominal Naïve Bayes
- Support Vector Machine with SGD
- Multi-layer Perceptron
- Recurring Neural Network (RNN)
- Gated Recurrent Unit (GRU)
- Long Short-Term Memory (LSTM)

Evaluation

- Precision/Recall
- Micro aggregated F1 score

Source: Automated Business Process Discovery from Unstructured Natural-Language Documents 2020, https://link.springer.com/chapter/10.1007/978-3-030-66498-5_18

Currently still in the Data Pre-Processing Step



Australian Data + GDPR for the Data

	ratio 1:10 - input approaches				
	10% (group A)		45% (group B)	45% (group C)	100%
Processes	compliance relevant text paragraphs	informative relevant text paragraphs	non-relevant text paragraphs from relevant documents	non-relevant text paragraphs from non-relevant documents	total number of text paragraphs
1: travel insurance claim	21	28	220	220	489
2: know your customer	24	7	140	140	311
3: hire employee		9	40	41	90
4: GDPR 1-Data breach		8	36	36	80
5: GDPR 2-Consent to use the data		16	72	72	160
6: GDPR 3-Right to Access		11	50	49	110
7: GDPR 4-Right to Portability		4	18	18	40
8: GDPR 5-Right to Withdraw		4	18	18	40
9: GDPR 6-Right to Rectify		2	9	9	20
10: GDPR 7-Right to be forgotten		13	59	58	130
					1470

Data Labelling with LLM to Gather More Data

- **Davinci Fine-Tuning** : {
  prompt: “Process: <Process_Description>
  /n/n Text: <Legal_Passage> /n/n Relevant:"
  completion: “<0/1>###”}

- **GPT 3.5 Fine-Tuning** :
  { system_message: “Determine if the text is relevant to the process described” ,
  user_message: “Process Description : <Process_Description>/n/n Text to classify: <Legal_Passage>/n”,
  system_message: “<0/1>###” }

Legal Text

GPT3.5 and Davinci (legacy)

{Completion: “0/1”}

Cookie Cutter for the Repository Structure

```
├── Makefile           <- Makefile with commands like `make data` or `make train`
├── README.md          <- The top-level README for documentation and instruction on how to run the code.
├── data
│   ├── external       <- Data generated from the fine-tuned models for labeling.
│   ├── interim        <- Intermediate data that has been transformed.
│   ├── processed      <- The final data sets for modeling.
│   └── raw            <- The original, immutable data from the other repository which I decided to use.
│
│
├── models             <- Trained and serialized models, model predictions, or model summaries
│
├── notebooks          <- Jupyter notebooks. Contains for instance the fine-tuning of GPT for labeling notebooks.
│
├── references         <- Data dictionaries, manuals, and all other explanatory materials to understand the data bet
│
├── requirements.txt   <- The requirements file for reproducing the environment
│
│
├── setup.py           <- makes project pip installable (pip install -e .) so src can be imported
├── src                <- Source code for use in this project.
│   ├── __init__.py    <- Makes src a Python module
│   │
│   ├── data           <- Scripts to download or generate data
│   │   └── make_dataset.py
│   │
│   ├── features       <- Scripts to turn raw data into features for modeling and create word embeddings
│   │   └── build_features.py
│   │   └── build_word_embeddings.py
│   │
│   ├── models         <- Scripts to train models and then use trained models to make
│   │   │                 predictions
│   │   ├── predict_model.py
│   │   └── train_model.py
│   │
│   └── visualization  <- Scripts to create exploratory and results-oriented visualizations as well as word embeddin
│       └── visualize.py
└
```

Source: https://drivendata.github.io/cookiecutter-data-science/

Thanks!
Questions/Feedback?