Build a Customized NLP Service

Interim Presentation

Friday, July 9, 2021

Presented by: Yongchao Zhou

VECTOR INSTITUTE

Motivation

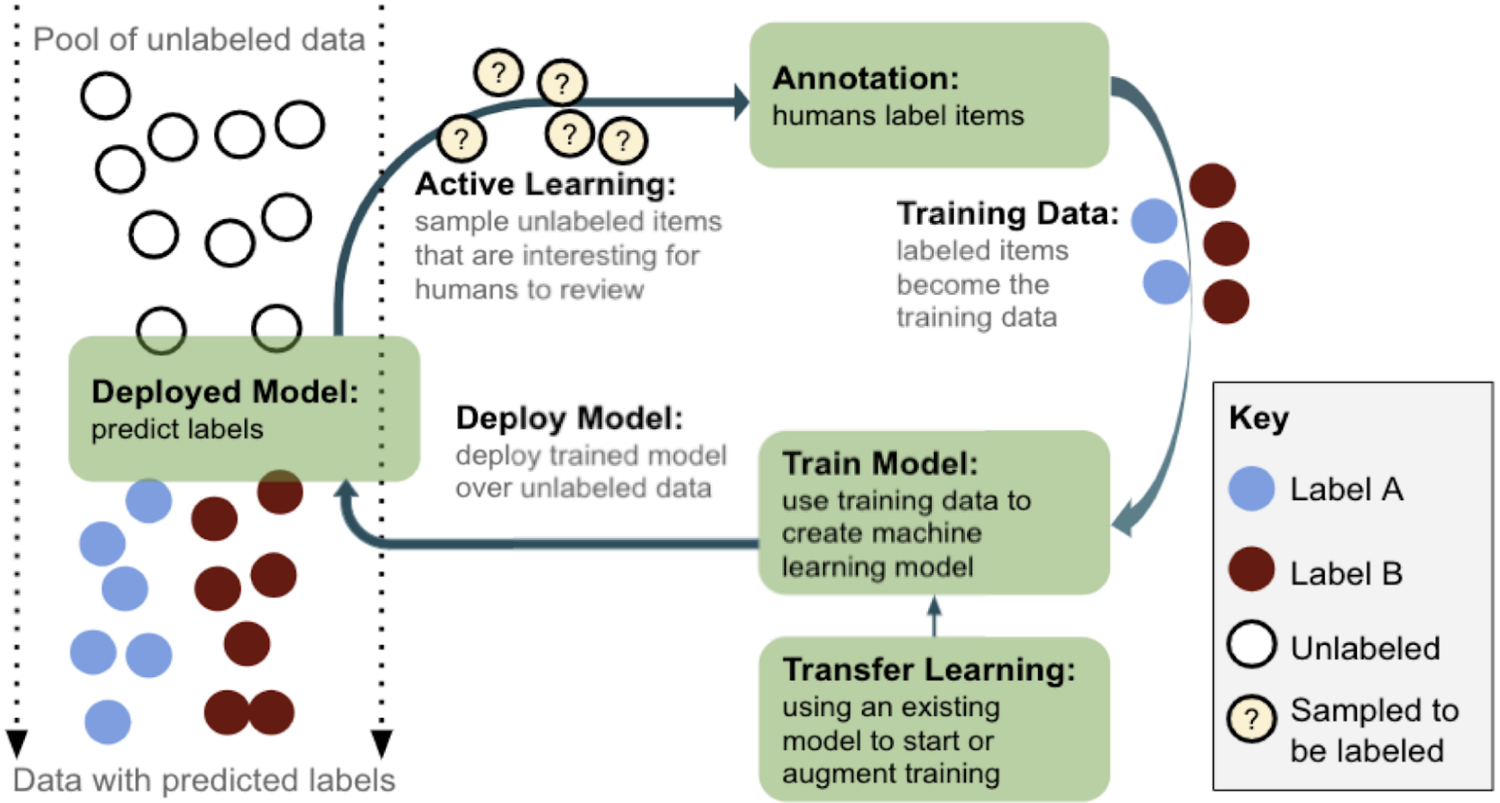

Figure 1: Machine Learning Life Cycle

- ML Application Life Cycle
  - Data Collection
  - Data Annotation
  - Model Training & Evaluation
  - Model Deployment
- ML Tools
  - Active Learning
  - Transfer Learning

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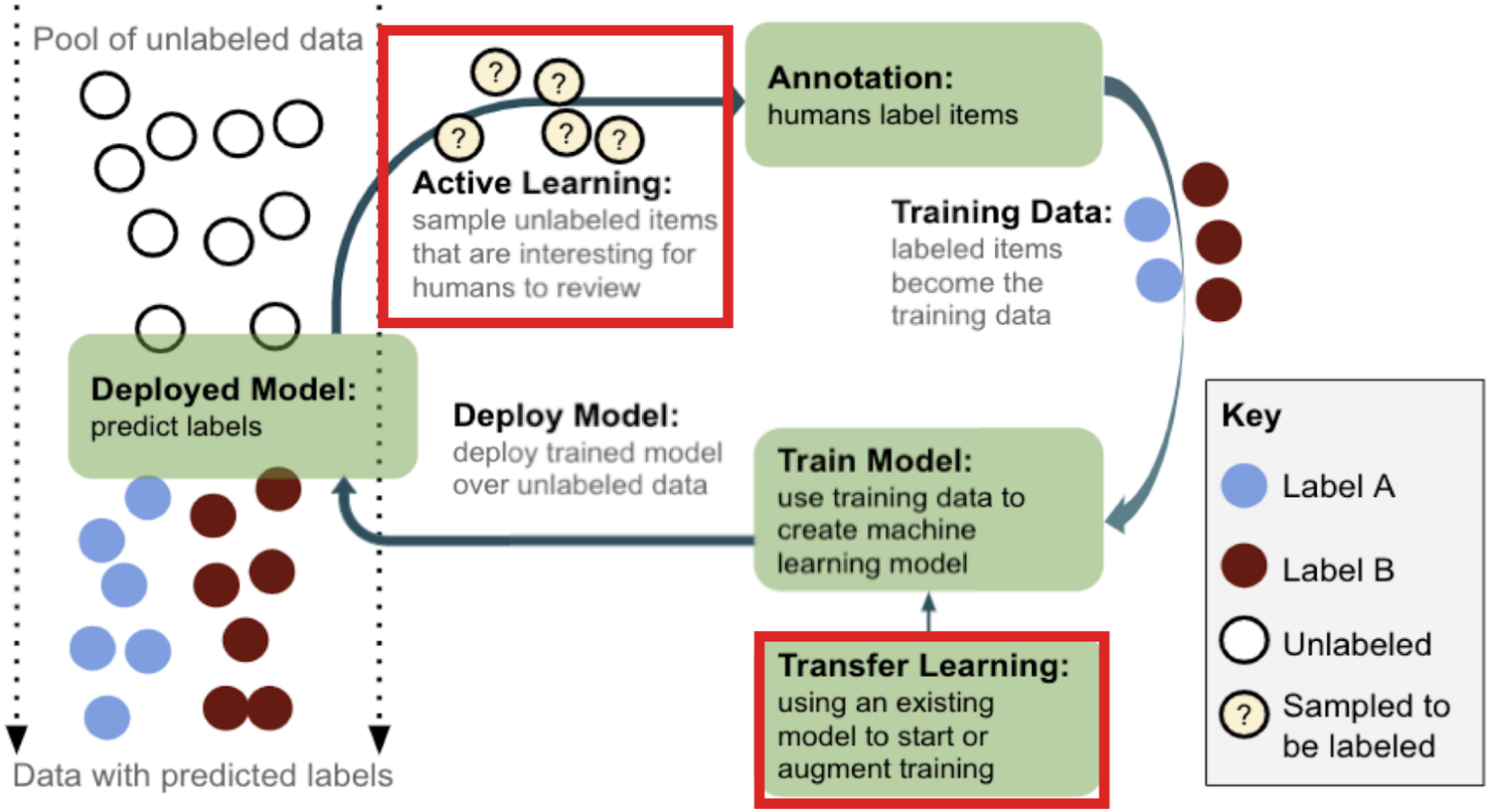

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NER service

- Inference API
- Graphical User Interface

NER service

- Inference API

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>>> import NerModel
>>> model = NerModel(args.model_dir)
>>> model(args.text)

{'text': 'Geoffrey Everest Hinton (born 6 December 1947)
'ents': [{'token': 'Geoffrey Everest Hinton', 'start': 0,
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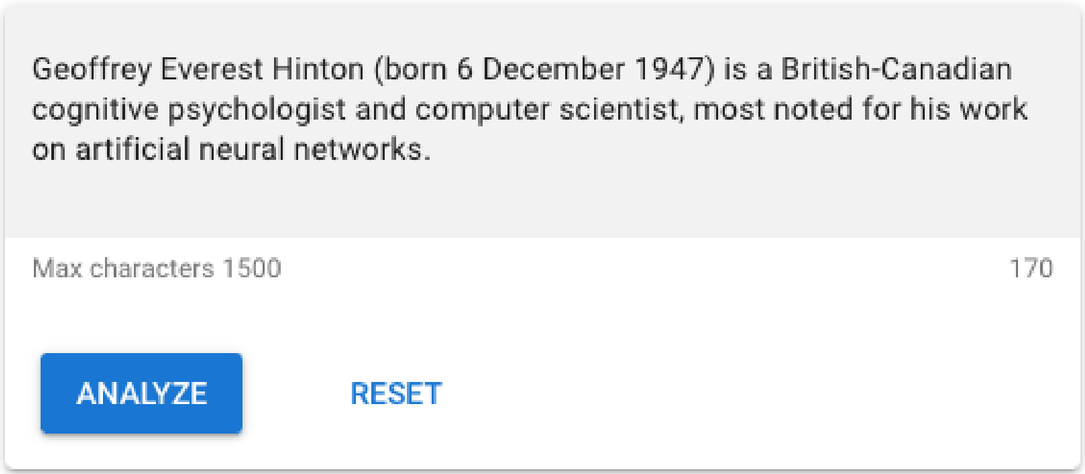

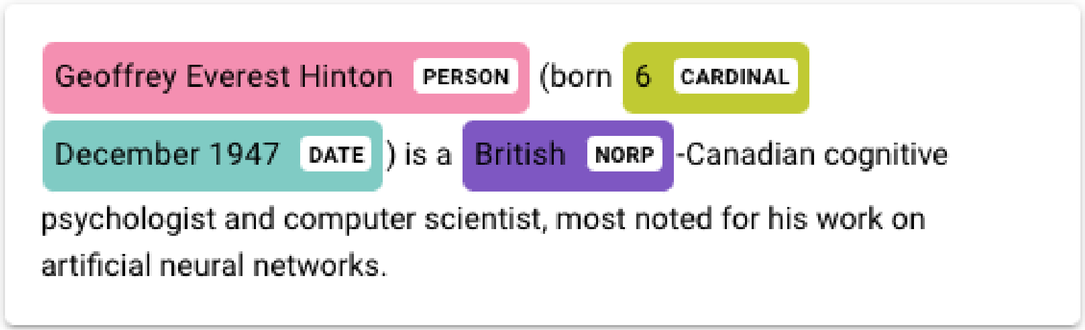

How to build a customized NER service?

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Annotation Interface

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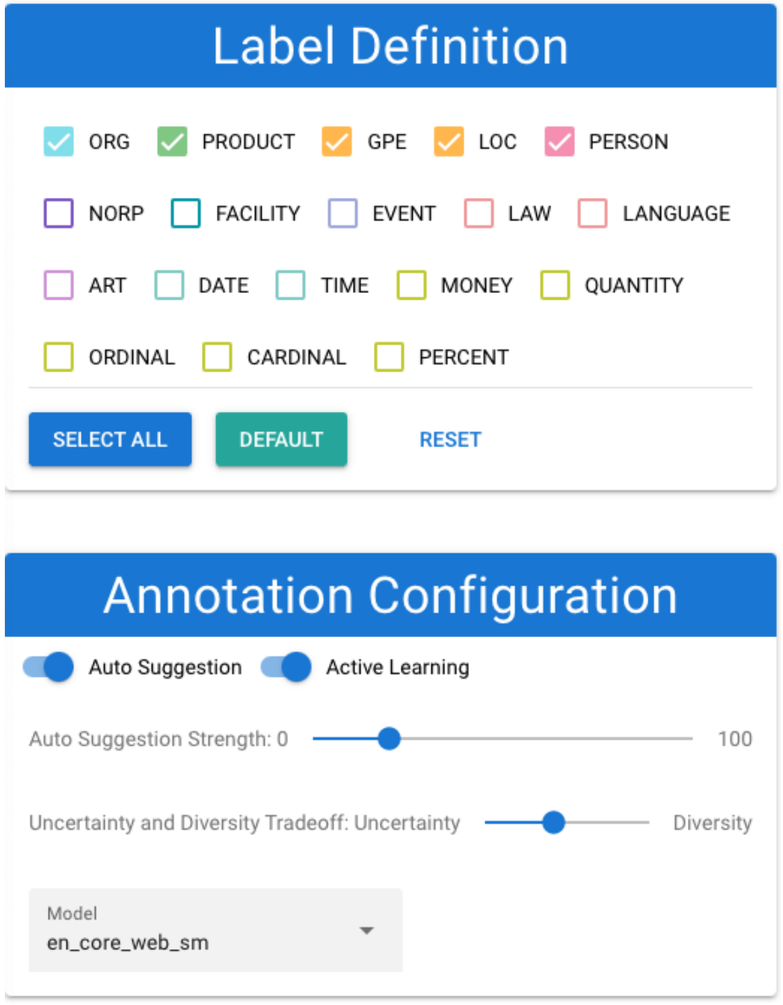

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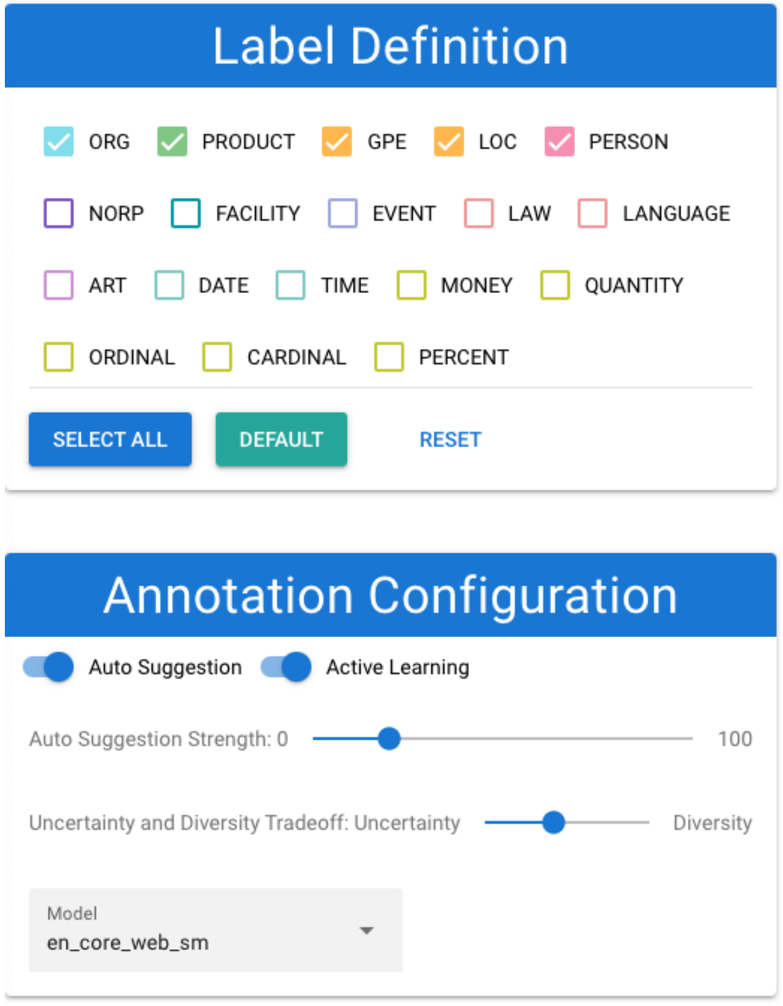

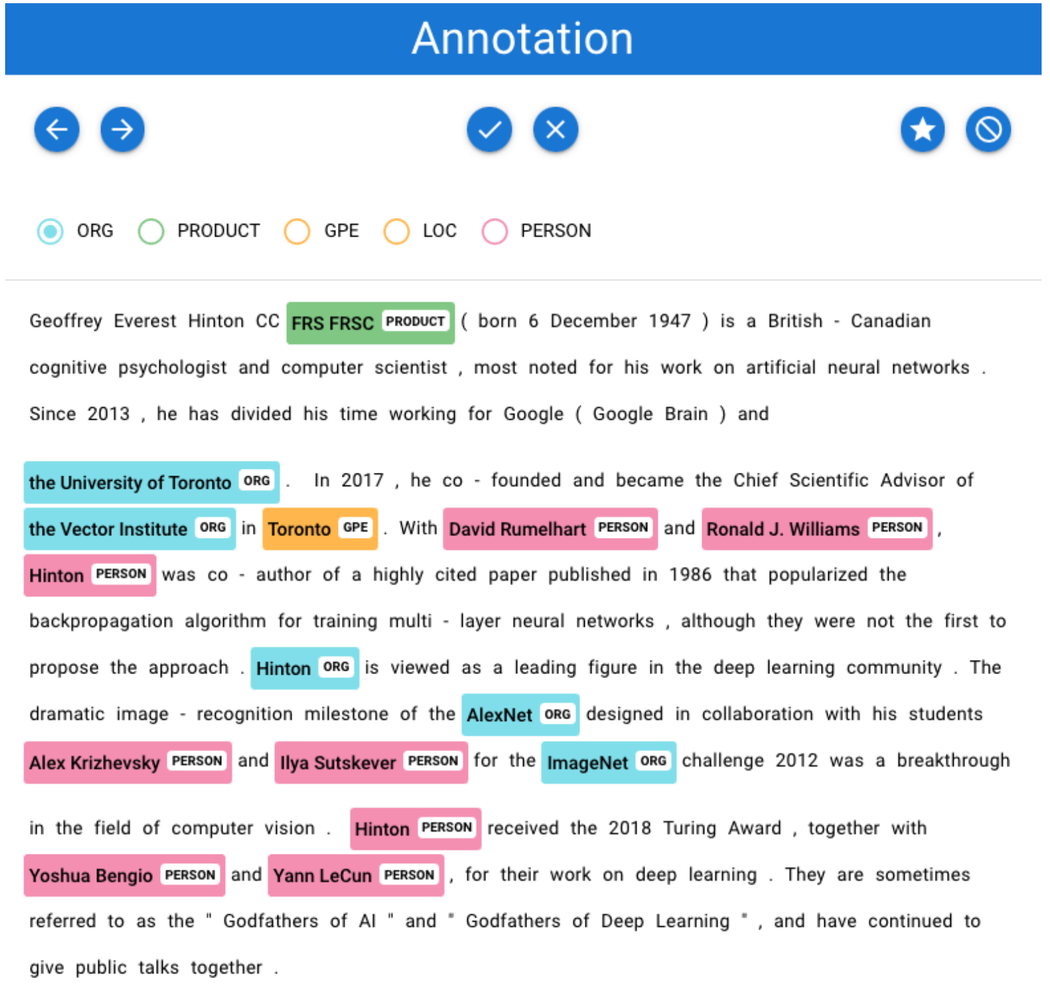

Data Quality Control (In Progress)

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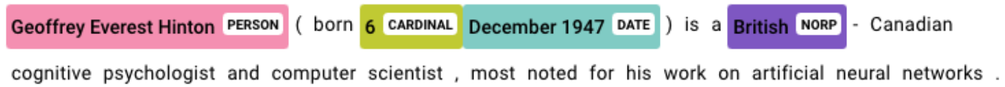

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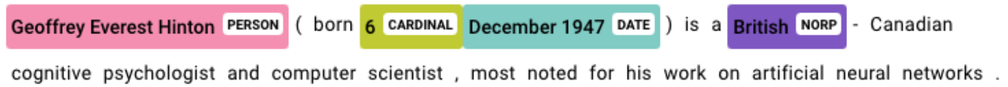

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- Disagreement Visualization
  - Help needed

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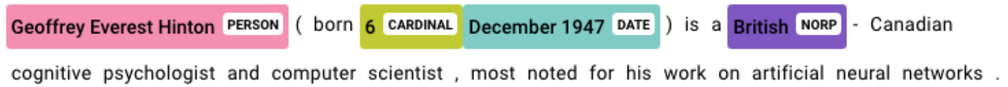

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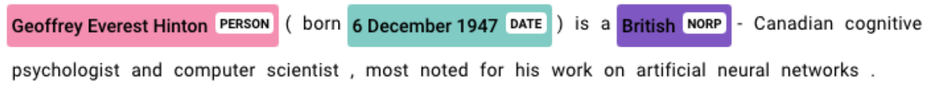

Model Training

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from transformers import DistilBertForTokenClassification, Trainer, TrainingArguments
training_args = TrainingArguments(
    num_train_epochs=3,              # total number of training epochs
    per_device_train_batch_size=16,  # batch size per device during training
    per_device_eval_batch_size=64,   # batch size for evaluation
    warmup_steps=500,                # number of warmup steps for learning rate scheduler
    weight_decay=0.01,               # strength of weight decay
)

model = DistilBertForTokenClassification.from_pretrained('distilbert-base-cased', num_labels=len(unique_tags))

trainer = Trainer(
    model=model,                         # the instantiated 🤗 Transformers model to be trained
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Model Selection using A/B Test (In progress)

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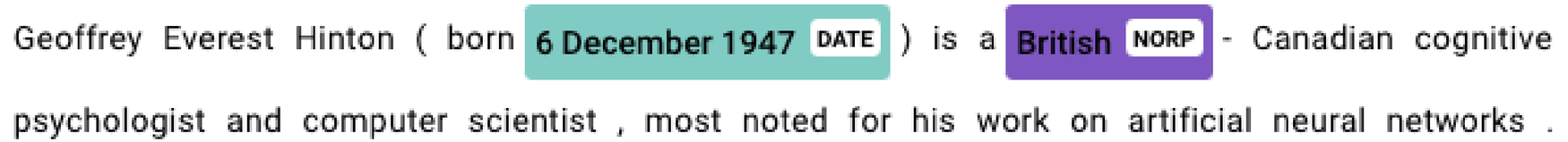
- Prediction from Trained Model 2



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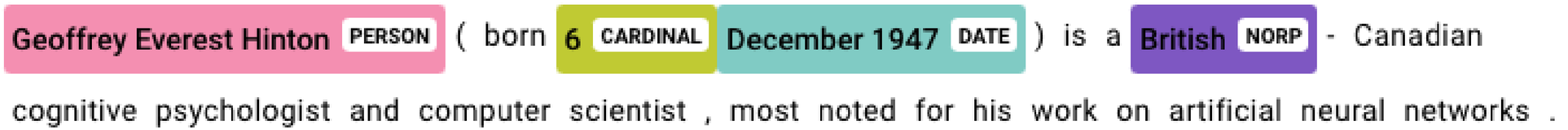
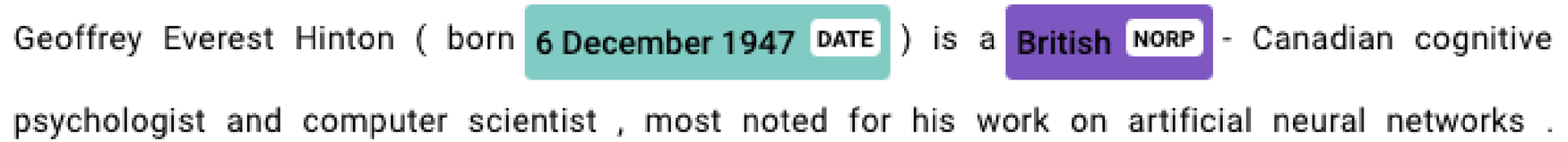


- Prediction from Trained Model 2



- They both make one mistake and have the same accuracy. Which model to choose?
  - Let user make the decision.
  - E.g. A/B Test with 100 examples.
    - Model 1 has 68/100 "likes" and Model 2 has 55/100 "likes" -> Deploy model 1

Next Steps

- Functionality
  - Complete the data quality control interface
  - Model Selection with A/B testing
  - Data annotation with active learning
- Experiement
  - Benchmark the performance of different active learning algorithm on NER task
- Demo
  - Build a customized NER service for a specific domain (Medical Data)