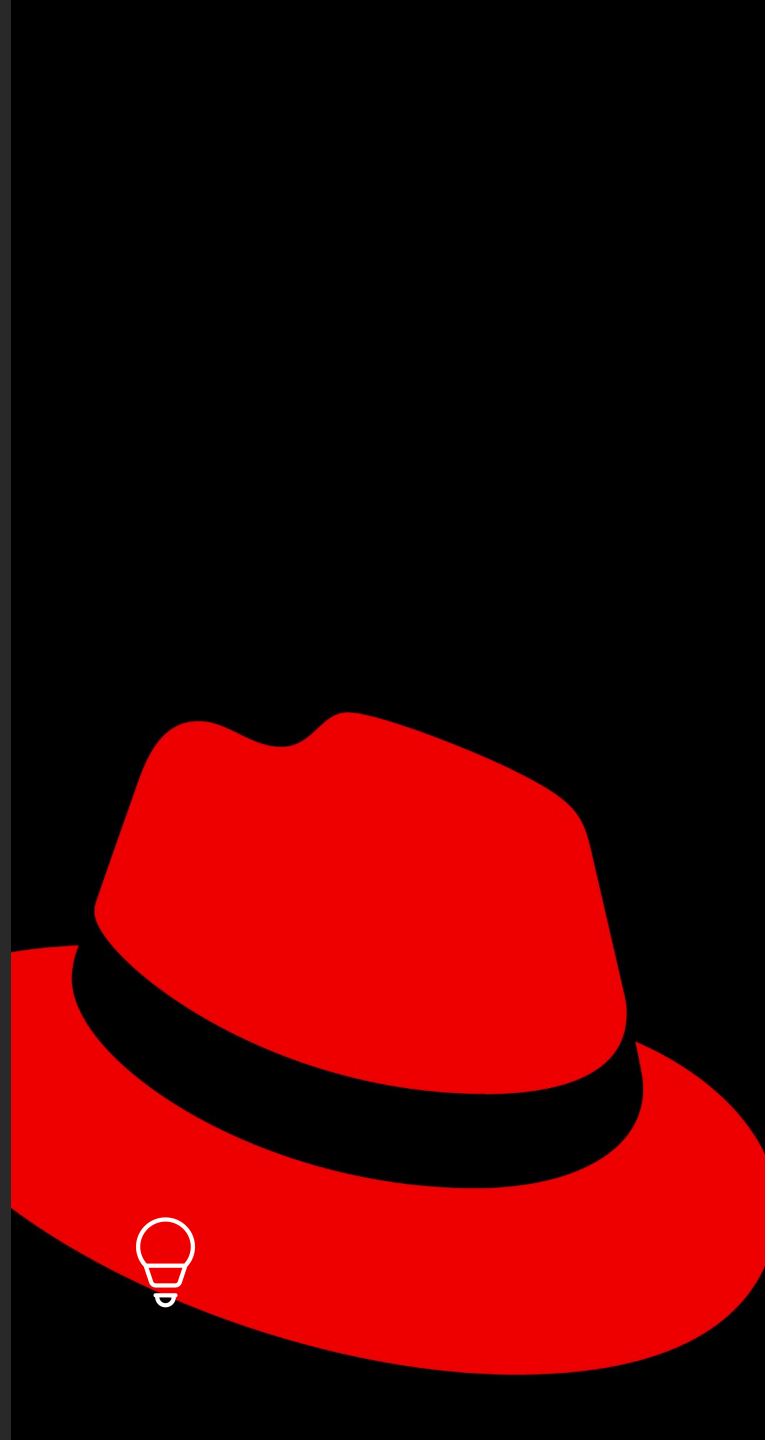


History of Language Models

Evolution, Frameworks, Deployment

Shrey Anand
Senior Data Scientist

Red Hat

What we'll discuss today

- Introduction
- Early Language Models (1950 - 1990s)
- Statistical Language Models (1990s)
- Machine Learning in NLP (2000s)
- Neural Networks (2010s)
- Transformers (2018+)
- LLMs (2022+)
- Libraries & Frameworks

What we will not discuss today

- Ethical, Environmental, Economical, Societal Impact
- Security, Privacy, Legal aspects
- Image, Audio, Video, Multi-modal models

Introduction

Natural language processing (NLP) is the discipline of building machines that can manipulate human language — or data that resembles human language — in the way that it is written, spoken, and organized. It has two subfields: NLG and NLU.

NLP includes:

- Syntax parsing, coreference resolution, semantic role labeling
- Information retrieval, Named entity recognition
- Sentiment analysis, text classification & clustering
- Machine translation, Comprehension, QA systems, Summarization

https://www.deeplearning.ai/resources/natural-language-processing/

Rule based systems

Concept

- Text processors based on rules, *If this then that*
- An example of that would be closed system chat bots, if you wanna return amazon order, then a set of rules are enough.

Advanced rule based systems:

- IBM Watson Jeopardy, closed system of categories QA TV show
- Knowledge base, string matching, hypothesis generation and testing to deliver an answer

Statistical Language Models Notebook

Libraries and Frameworks

Libraries*

- **Machine learning:** nltk, spacy, sklearn, stanfordNLP
- **Embeddings:** gensim, sentence-transformer
- **Neural networks:** pytorch, tensorflow
- **Transfomers:** transformers (huggingface)
- **Language model interface:** Langchain, semantic kernel

Frameworks*

- **Development**
  - Data collection: Label Studio
  - Experiments: Jupyter notebooks via ODH/RHOAI
  - Training: InstructLab, Kubeflow TO
- **Deployment**
  - Local: AI Lab Podman desktop
  - Cloud: RHOAI

* Not exhaustive

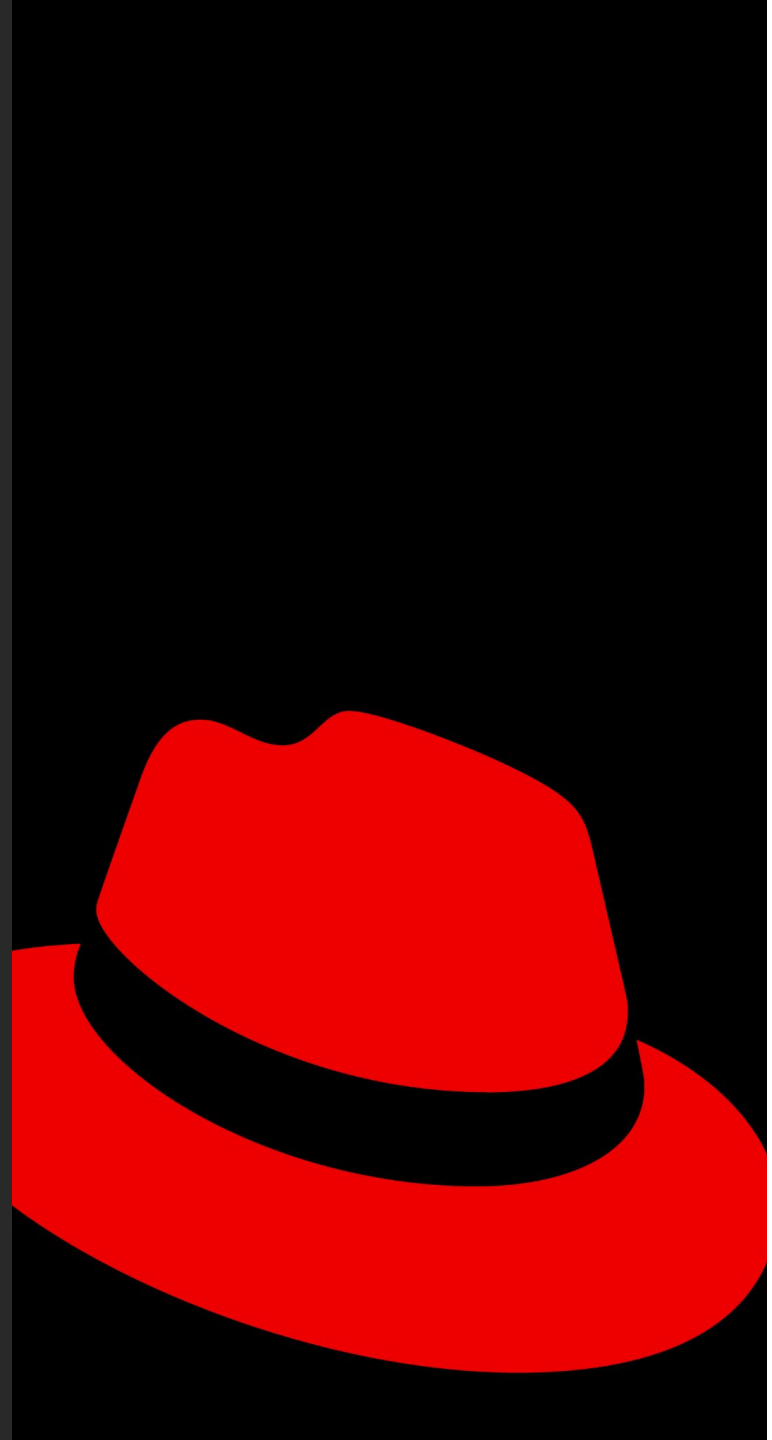
Future direction

Core research and development

- Multimodal Learning
- Continual learning and smaller LLMs
- Domain specific AI models

Use cases and application patterns

- Personalization and Adaptation in applications like virtual assistants and personalized recommendation systems
- Autonomous and End-to-End Task Management with Agents



Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

linkedin.com/company/red-hat

facebook.com/redhatinc

youtube.com/user/RedHatVideos

twitter.com/RedHat

Red Hat