

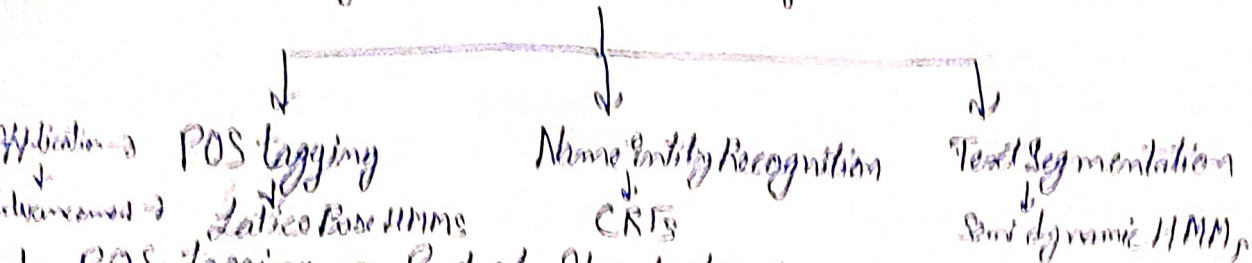
HMM LATEST APPLICATION IN NLP

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Major 3 Applications of HMM



1. POS Tagging or Part of Speech Tagging -

To assign grammatical categories (noun, verb, adjective, etc) to each word in a sentence.

HMM is one of the best to do POS tagging, since, it model the sequential nature of (model) language.

But it only considers the immediate preceding word when predicting POS tag, which is surely not sufficient.

Solⁿ/Advancement :-

Introduce a concept called Lattice: a complex network representing various possible word seq. paths.

In Lattice Based HMM - It captures long range dependencies b/w words, improving accuracy.

These consider various possible word seq paths to account for the influence of words beyond immediate neighbours

Each path a potential sentence structure, allowing model to analyze a broader context beyond just neighbouring words.

When predicting a POS tag, model consider all possible path.

2. Name Entity Recognition (NER)

To identify and classify named entities say people, organization, location, etc within text.

HMMs leverage the sequential nature of language to recognize entities.

The model predicts the likelihood of a word belonging to a specific entity category based on previous words & their tags.

We bring in picture a powerful discriminative model that directly optimizes for most probable seq of hidden states (entity tags) in a sentence, CRF or Conditional Random Fields

HMM, with combination with CRF, enhance performance by incorporating additional features that directly address the task of optimizing for the most likely sequence of hidden states (entity tags.)

It captures complex relationships between words and their entity labels.

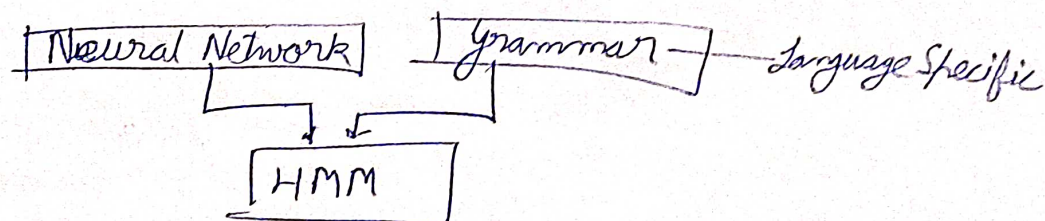
3. Text Segmentation -

To divide text into meaningful units, like sentence or paragraphs. HMM the transition probabilities between different text segments. The model can be trained on data specific to a particular language, capturing unique characteristics the sentence structure and punctuation usage, leading to more accurate segmentation.

Solⁿ/Advancements: Semi Dynamic HMMs:

It is to incorporate knowledge syntactical to capture structural relationships b/w words in sentence, potentially improving the accuracy of tasks like parsing and dependency parsing.

Current Trend



To take the benefit of grammar based HMM and neural network and remove the losses. To reduce complexity, with increased speed, potentially improving accuracy of tasks like parsing and dependency parsing. Combining these strength, while neural network can learn complex non linear relation. b/w words.