CTC

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CTC

ctc is an algorithm employed in the training of deep neural networks for tasks like: speech recognition, handwriting recognition ...
CTC serves as a neural network output method specifically designed for addressing sequence related challenges.
The goal is to find the most likely correspondence between the input(x) and output (x)

CTC Algorithm

1. Alignment algorithm
   - Merge all repeating characters to a single character.
   - If a character repeates, then a special token called a blank symbol is placed between the character and output text.

   important because, we say 'hello' but the system will only hear 'helo'.

2. loss calculation

   the algorithm known as forward-backward algorithm is used to calculate loss. The algorithm calculates the probability of generating the required output at each step.

   ~ I didn't really understand this.

3. Inference

   Beam search:
   maintains a set of candidate sequences and explores the possible paths through the out put space.
   - It keeps track of the most likely candidates at each step and prunes less likely paths.

Applications of CTC:

- speech recognition
- music transcription
- Gesture recognition
- processing sensor data for robotic systems.

Advantages of CTC

- facilitates end to end training of neural networks for sequence to sequence tasks without the need for explicit alignment annotations.
- demonstrates resilience to labelling errors or inconsistencies within training data by implicitly learning sequence alignments.
- applicable across diverse array of use cases.

Challenges of CTC

- decoding phase can require significant computational recources
- In speech recognition applications characterised by fluctuating acoustic environments it may encounter challenges in generalising across diverse conditions.