

AI Deep Learning: Recurrent Neural Networks

Fundamentals of Sequence Data

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AI Deep Learning: Fundamentals of Sequence Data



AI Deep learning (Source: mindovermachines.com)

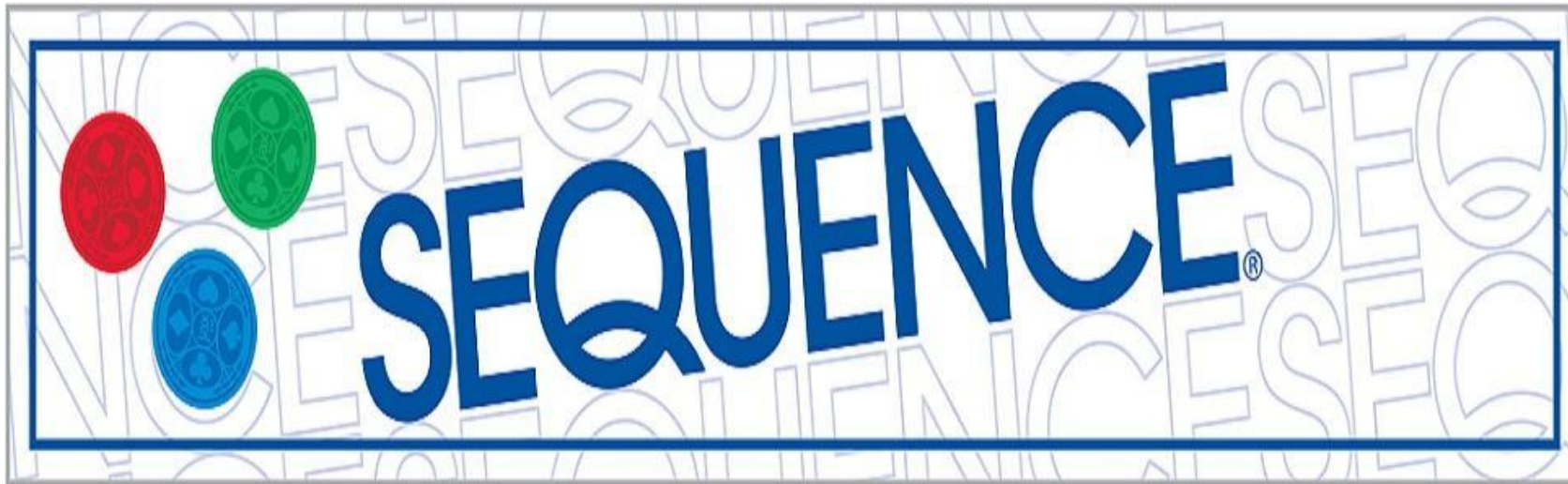
AI Deep Learning: Fundamentals of Sequence Data

1. Sequence Data: What is a Sequence?
2. Sequence Data: Examples
3. Sequence Data: Prediction Problems: Overview
4. Sequence Data: Prediction Problems: Sequence Prediction

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What is a Sequence?

- A **sequence** is an ordered list of symbols, things, events, or values.
- The **order** can be determined by **positions** in **space** or **time**.
 - If the elements of a sequence are ordered in time, the sequence is a time series.



Sequence (Source: m.trinitrolley.com)

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Examples of Sequence

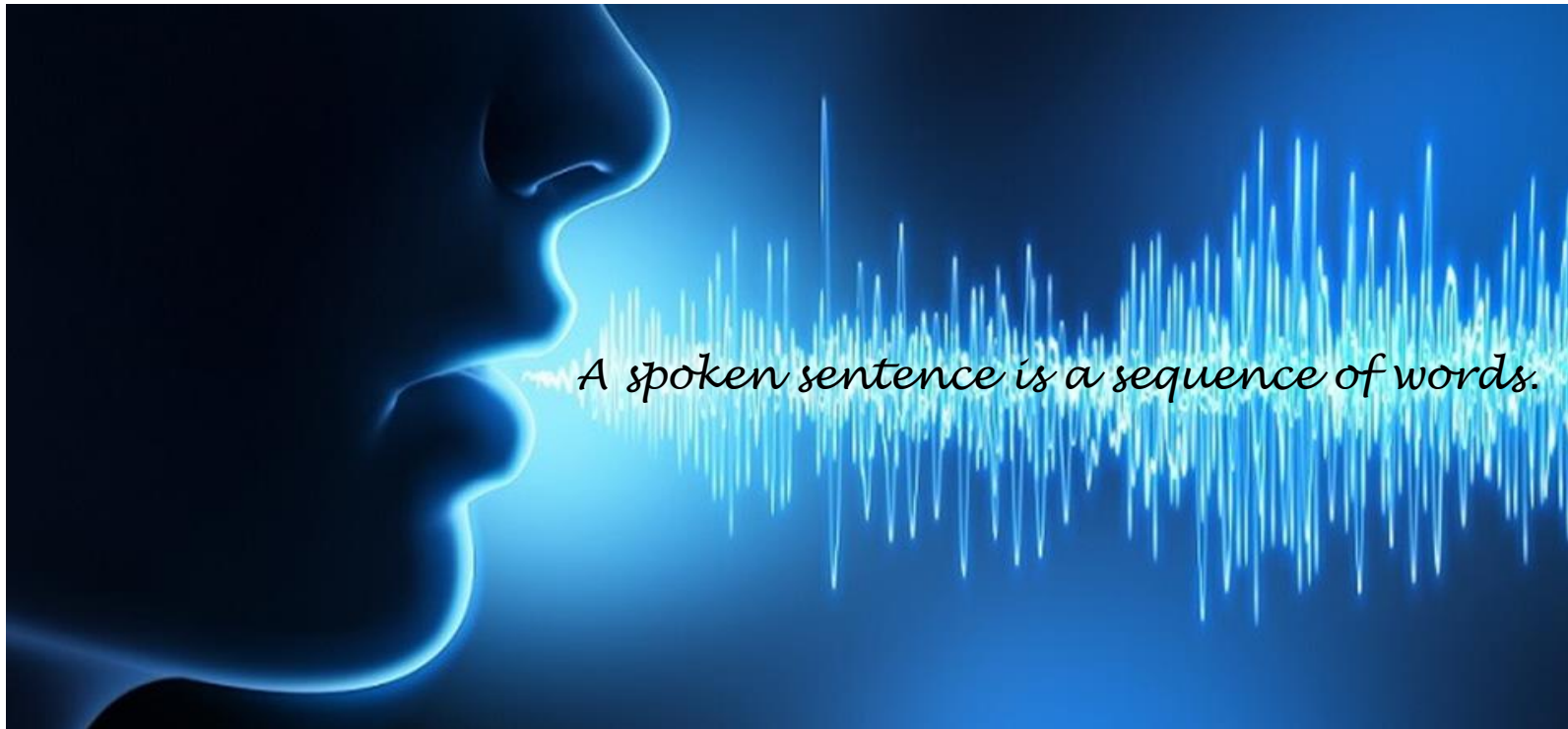
- 1, 2, 3, 4, 5, 6, 7, 8, 9
 - Each data point is a number or value.
 - **NOTES**: *Each element can also be considered as a character or a symbol.*
 - Sequence data points are **ordered** by their **values** or **positions**.

1, 2, 3, 4, 5, 6, 7, 8, 9

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Examples of Sequence

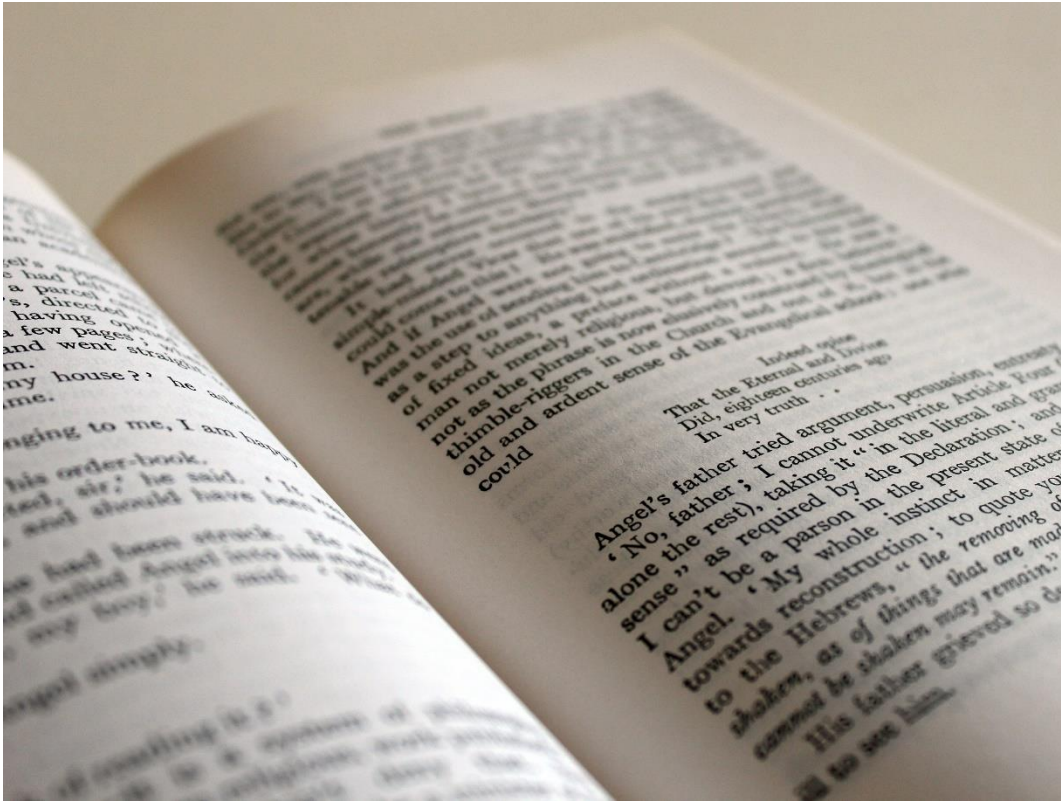
- A sequence of words spoken by a person
 - Each data point is a word, a symbol or thing.
 - Sequence data points are ordered by the time of being spoken.



Language as Sequence Data (Source: epsiloneg.com)

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Examples of Sequence



Text: A Sequence of Words (Source: wikihow.com)

- A sequence of words in a sentence of a book
 - Each data point is a word, a symbol or thing.
 - Sequence data points are ordered by their position in the sentence.

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Examples of Sequence

- A sequence of YouTube video clips watched by a web user.
 - Each data point is a video clip, i.e., a **thing** (a video clip) or an **event** (watching a video)
 - Sequence data points are **ordered** by the **time** of being accessed.



YouTube Clips (Source: pixabay.com)

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Examples of Sequence



Products (Source: qualitynametag.com)

- A sequence of products bought by a consumer in a retail store.
 - Each data point is an item, i.e., a **thing**.
 - Sequence data points are **ordered** by the **time** of purchase.

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Examples of Sequence

- A sequence of protein in bioinformatics
 - Each data point is a thing, i.e., a **protein**.
 - Sequence data points are **ordered** by the **position** of the protein in a sequence.



DNA (Source: drugtargetreview.com)

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Examples of Sequence

Sequence Data:

Any other examples?