

Chain of Density (For Text Summarization)

Instructor

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Definition

- Chain-of-Density ensures summaries are detailed yet concise, avoiding information overload for clarity and comprehension.
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How Chain of Density Works



Begins with a basic summary, incrementally introducing 1-3 key details without extending length.



Continuously rewrites the summary for precision, adhering to a present length to ensure clarity and readability.



Summaries are assessed based on detail inclusion and ease of reading to ensure quality.

Chain of Density: Example

Chain of Density (COD) Prompt

Article: {{ARTICLE}}

You will generate increasingly concise, entity-dense summaries of the above Article.

Repeat the following 2 steps 5 times.

Step 1. Identify 1-3 informative Entities (";" delimited) from the Article which are missing from the previously generated summary.
Step 2. Write a new, denser summary of identical length which covers every entity and detail from the previous summary plus the Missing Entities.

A Missing Entity is:

- Relevant: to the main story.
- Specific: descriptive yet concise (5 words or fewer).
- Novel: not in the previous summary.
- Faithful: present in the Article.
- Anywhere: located anywhere in the Article.

Guidelines:

- The first summary should be long (4-5 sentences, ~80 words) yet highly non-specific, containing little information beyond the entities marked as missing. Use overly verbose language and fillers (e.g., "this article discusses") to reach ~80 words.
- Make every word count: re-write the previous summary to improve flow and make space for additional entities.
- Make space with fusion, compression, and removal of uninformative phrases like "the article discusses".
- The summaries should become highly dense and concise yet self-contained, e.g., easily understood without the Article.
- Missing entities can appear anywhere in the new summary.
- Never drop entities from the previous summary. If space cannot be made, add fewer new entities.

Remember, use the exact same number of words for each summary.

Answer in JSON. The JSON should be a list (length 5) of dictionaries whose keys are "Missing_Entities" and "Denser_Summary".

COD Outputs (Added Details from previous)

This article discusses an incident that occurred during the Chinese Grand Prix involving two racing drivers, Jenson Button and Pastor Maldonado. The two were competing for the 13th place when Button collided with Maldonado's vehicle, causing damage to both cars. The incident resulted in a penalty for Button, who was demoted to 14th place. Maldonado, on the other hand, had to retire from the race due to the damage his car sustained.

During the Chinese Grand Prix, Jenson Button, driving for McLaren, collided with Pastor Maldonado's Lotus, while they were vying for 13th place. The crash caused Maldonado to retire and Button to receive a penalty, dropping him to 14th. The incident unfolded in front of Fernando Alonso, who managed to avoid the collision and move up two places.

In the Chinese Grand Prix, Jenson Button's McLaren hit Pastor Maldonado's Lotus, causing Maldonado to retire and Button to receive a **five-second** penalty, demoting him to 14th. Button also received **two penalty points** on his superlicence. Fernando Alonso, who witnessed the incident, advanced two places, while Button was lapped by Nico Rosberg's Mercedes.

Jenson Button's McLaren collided with Pastor Maldonado's Lotus during the Chinese Grand Prix, causing **front wing damage** to Button's car and **rear-end damage** to Maldonado's, forcing his retirement. Button received a five-second penalty and two superlicence points, dropping him to 14th. Fernando Alonso advanced two places, while Button was lapped by Nico Rosberg and Alonso by Sebastian Vettel and Kimi Raikkonen.

On **lap 49** of the **incident-packed** Chinese Grand Prix, Jenson Button's McLaren hit Pastor Maldonado's Lotus, causing damage and Maldonado's retirement. Button received a five-second penalty and two superlicence points, falling to 14th. Fernando Alonso, who witnessed the crash, advanced two places, while Button was lapped by Nico Rosberg and Alonso by **Ferrari's** Sebastian Vettel and Kimi Raikkonen.

Chain of Density: Practical Use-case

The chain of Density enhances quick comprehension by generating detailed yet accessible summaries, ideal for news, education, and rapid learning contexts.

Developers can leverage Chain of Density to create advanced text summarization tools, aiding readers in swiftly grasping the essence of extensive documents.

Thank You
