Personalized Caching Model for Sustainable Content Delivery Networks

1. Objective (研究の目的)

- To create a caching model that can provide best caching strategies based on user data type.

2. BACKGROUND OF THE RESEARCH (研究の背景)

- In video streaming, around 40 % bandwidth is wasted during every data transmission. And in web content based CDN around 20 % bandwidth is wasted.
- The purpose behind this model is to reduce the wastage of bandwidth that takes place due to standardized model for all data types.
- This means no matter what the data type is ,the traditional CDNs have a static and standardized model for all caching .
- Our model will bring changes dynamically and make sure the user gets the best caching method with low latency, High bandwidth which will also result in more sustainable usage of CDN technology as all these factor contribute to the environmental impact

3. Methodology (研究の方法論)

- The model is built in such a way that when the python code is run , it asks the user for the details of the data and choice of topologies.
- Currently the model is working on 3 real world topologies:

1. Allegiance Telecom (US Telecom Network)
2. At Home Network (Residential ISP)
3. CAIS Internet (Research Network)

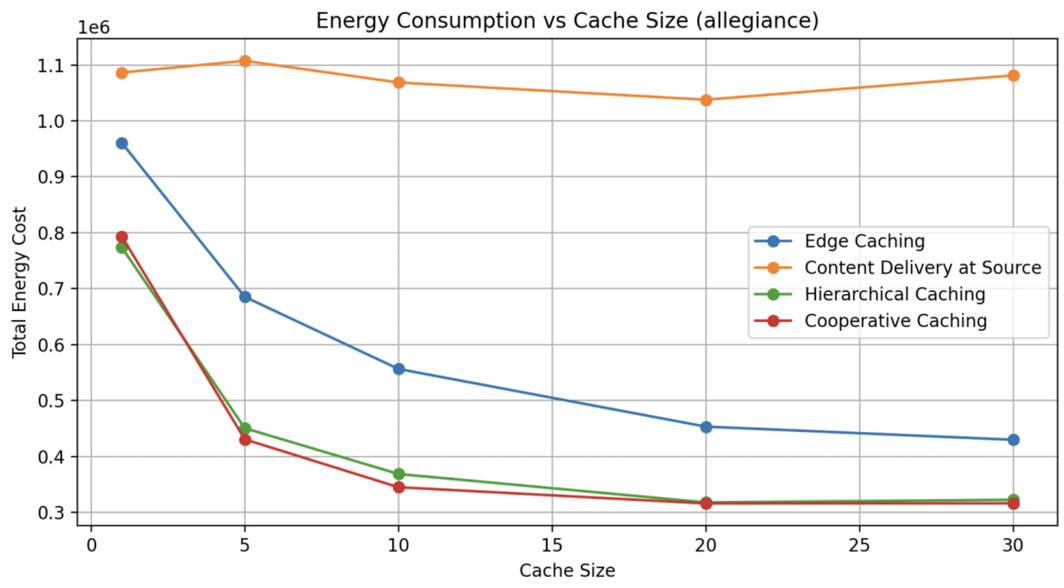
- After the user inputs the choice , the models analyzes the data input and choice of topology and suggests the best suitable caching method for the transmission of data .
- The model is equipped with Zipf's distribution that selects the in-demand requests.
- The model also uses cache replacement policies like LRU , LFU and FIFO.

4.Major Formula

$$P(i) = \frac{1}{i^{\alpha}} \Big/ \sum_{j=1}^{N} \frac{1}{j^{\alpha}}$$

Zipf's distribution formula:
Where,
N = total number of available data units(1 to N)
J = normalization factor.
(α) : skewness parameter
P(i) :Probability of content requested

5. GRAPHICAL OUTPUT



6. BAR CHART COMPARISON