YouTube Video Analytics

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A. Introduction  
- In this project, we will build a real-time tracking system and perform in-depth analysis of the following metrics:

* Views (Number of views)
* Likes (Number of likes)
* Comments (Number of comments)

- The data source is collected through the yt\_dlp library.  
The goals of the system are to:

* Display real-time fluctuations.
* Analyze the performance of the video.
* Predict future trends based on actual data.

B. Data Exploitation Capabilities

1. Comprehensive Analysis

* Statistics on the total number of Views, Likes, and Comments at each point in time.
* General assessment of the video’s popularity and engagement.

1. Relative Performance Analysis

* Calculate the Like Rate (the ratio of likes to views).
* Calculate the Comment Rate (the ratio of comments to views).  
  This helps evaluate the average engagement per view.

1. Growth Rate Analysis

* Identify changes in the number of Views, Likes, and Comments over time.
* Evaluate the growth rate to recognize times when the video is experiencing significant growth.

1. Future Trend Prediction

* Based on continuously collected data, use simple prediction techniques to estimate future Views, Likes, and Comments.

C. Data Visualization System

1. Types of Charts

| Metric | Chart | Meaning |
| --- | --- | --- |
| Views | Line Chart | Track view fluctuations |
| Likes | Line Chart | Track like fluctuations |
| Comments | Line Chart | Track comment fluctuations |
| Like Rate | Bar Chart hoặc Line Chart | Track like rate |
| Comment Rate | Bar Chart hoặc Line Chart | Track comment rate |
| Growth Rate | Line Chart | Analyze growth rate |
| Prediction | Dotted Line | Display prediction trend |

2. Dashboard Interface

* Sidebar:
  + Enter YouTube video URL.
  + Choose the update interval (5s, 10s, 30s, 60s).
  + Start/Stop Tracking button.
* Main Area:
  + Display real-time updated data for Views, Likes, and Comments.
  + Data visualization charts.
  + Notifications when Like Rate or Comment Rate spike significantly.

D. Data Storage

* Data will be automatically saved as a .csv file.
* The fields include: timestamp, Views, Likes, Comments, Like Rate, Comment Rate.
* Users can download the file.

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