We can possibly create a time-aware version of these pipelines!

Ensure that comment\_utc, raw\_sample\_times, and time\_range fields are **preserved across all pipeline steps**, including the final formatter.

**Event-based anchors** (e.g., pre-/post-pandemic)

Introduce **support bins per time range**, such as:

* [2015–2017], [2018–2020], [2021–2023]

Store and surface these bins in the time\_range column.

**Cultural Drift Detection**

* **Cluster and summarize cultural behaviors separately by time slice (e.g., same cluster\_id, but segmented by year).**
* **Compare summaries across time to detect \*\*shifts in:**
  + **behavior language**
  + **group participation**
  + **normativity\*\***

Purpose: Enables "before vs. after" views and helps flag areas where retraining is necessary.

## **Time-Aware Agreement Scoring**

* **Compute temporal agreement curves:**
  + **Was a norm widely accepted in 2017, but contested in 2023?**
* **Store an agreement trajectory per cluster, not just a static score.**

**Purpose: Helps differentiate long-standing norms from temporary trends or contested shifts.**

## **Temporal Weighting in Fine-Tuning**

* **When fine-tuning language models:**
  + **Down-weight outdated clusters (e.g., very old with low current support)**
  + **Up-weight recent high-agreement clusters**
* **Or, train time-sliced models (e.g., CultureBank-2020, CultureBank-2023) and ensemble or compare them.**

**Purpose: Ensures your model reflects current cultural dynamics without erasing historical data.**

## **Prompt-Time Conditioning**

* **Add an optional time token or tag during generation:**
  + **Prompt format: "As of 2022, what do people from Group X tend to do when..."**
* **Fine-tune models to conditionally generate cultural knowledge by year or event.**

**Purpose: Adds cultural awareness that is temporally contextualized, enabling more accurate and responsible outputs.**

## **Culture Timeline Visualizations or Tools**

* **Build a dashboard or visual interface that:**
  + **Charts the evolution of a cultural practice.**
  + **Shows when it spikes, wanes, or splits into variants.**

**Purpose: Makes cultural temporality accessible for researchers, designers, or product teams.**

## **Model Updating & Periodic Re-Finetuning**

* **Re-run the pipeline on newly scraped comments from TikTok, Reddit, etc., on a scheduled basis (e.g., quarterly).**
* **Track new clusters or changes in existing clusters.**
* **Use continual learning, LoRA updates, or delta training on top of the base model to adapt without full retraining.**

**Purpose: Keeps your model updated with the most recent cultural knowledge.**

## **Cultural Volatility Index**

* **Create a metric per cluster that indicates:**
  + **How often it's changed over time**
  + **Variance in agreement score**
  + **Shifts in normativity language**

**Purpose: Prioritize dynamic or evolving cultural behaviors for monitoring or re-annotation.**