MULTICORE
Video Processing

Abstract

- To perform video processing using parallel processing methods. A code will be developed which will assign different tasks to each core of the main processor. A comparison between two parallel processing methods will be done to determine which method is better for the following categories: small, medium, high resolution and of small, medium large length

Motivation

- With the growth of IoT devices, the implementation of microcontrollers and peripheral sensors and networking modular devices is increasing.
- One major segment of such projects and products is achieved via processing live streaming videos through cameras present as data receiving modules.
- Such microcontrollers have computing and power constraints, this proves the difficulty of processing images on such constrained devices.
- The proposed methodologies and techniques aim at resolving this problem by implementing parallel processing architecture on a small scale for video processing.

Method 1: SFST

- SFST: Single Frame Single Thread Method
- Frames of the video are received in a loop.
- **Each frame will be processed by one thread**.
  - All calculations for processing the frame will be done by one thread only.
  - Frames will be sent to threads which are idle
  - If no threads are idle then retrieval of frames will be paused till one thread is idle.

Method 2: SFMT

- SFMT: Single Frame Multi Thread
- Frames of the video are received in a loop.
- **Each frame will be divided into equal sections.**
  - Number of sections in which the frame will be divided will be equal to the number of threads in the main processor.
  - Each thread will execute the calculation assigned.
  - If other threads haven't finished calculation then thread will remain idle till all the other threads are done with the frame.

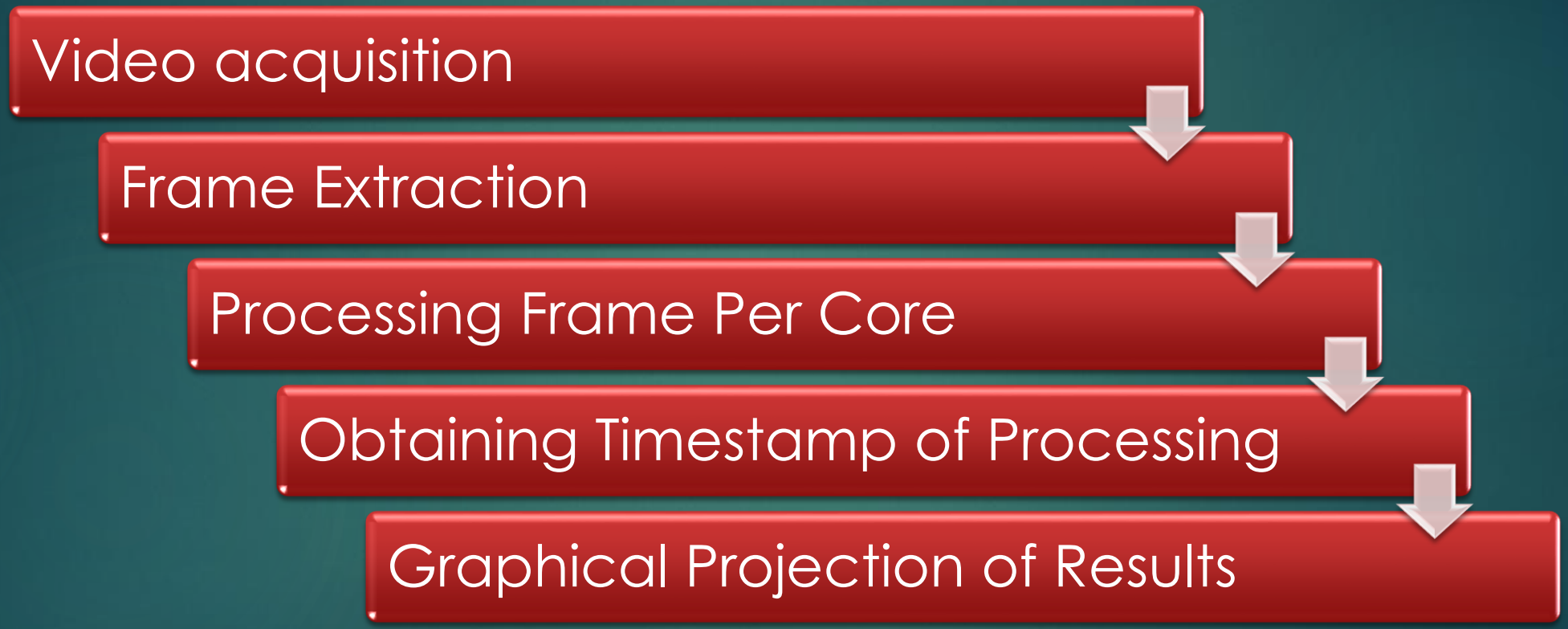
Objective

- **To check the behavior of both the processing methods.**
  - Both methods will process the same set of videos.
  - The videos will be of LOW,MED,HIGH resolution
  - Also of Small, medium and long duration.

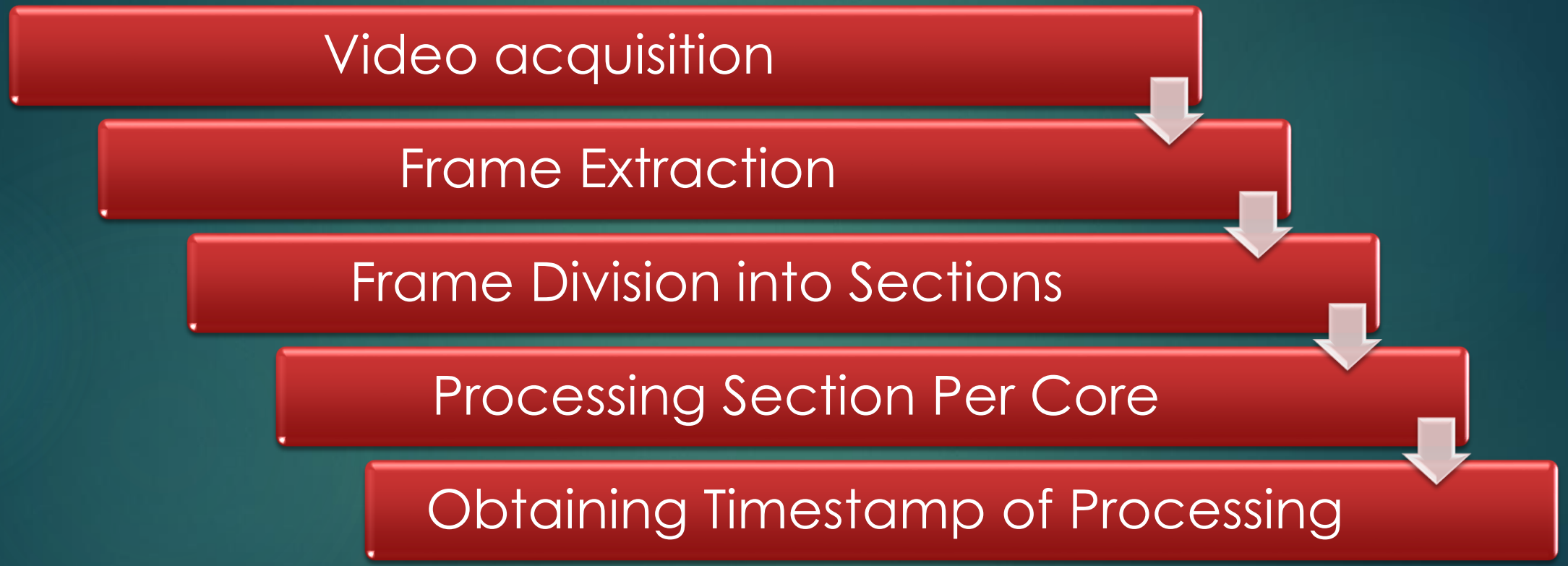
Software & Hardware Requirements

- HARDWARE Requirements:
  - Multicore processing computer system.
  - Cameras
- SOFTWARE Requirements
  - Language : **Python**, **C++**
  - Video Processing : **OpenCV**
  - Parallel Processing : **OpenMP**, **DISPY**
  - RStudio for plotting graphs

System Architecture: SFST

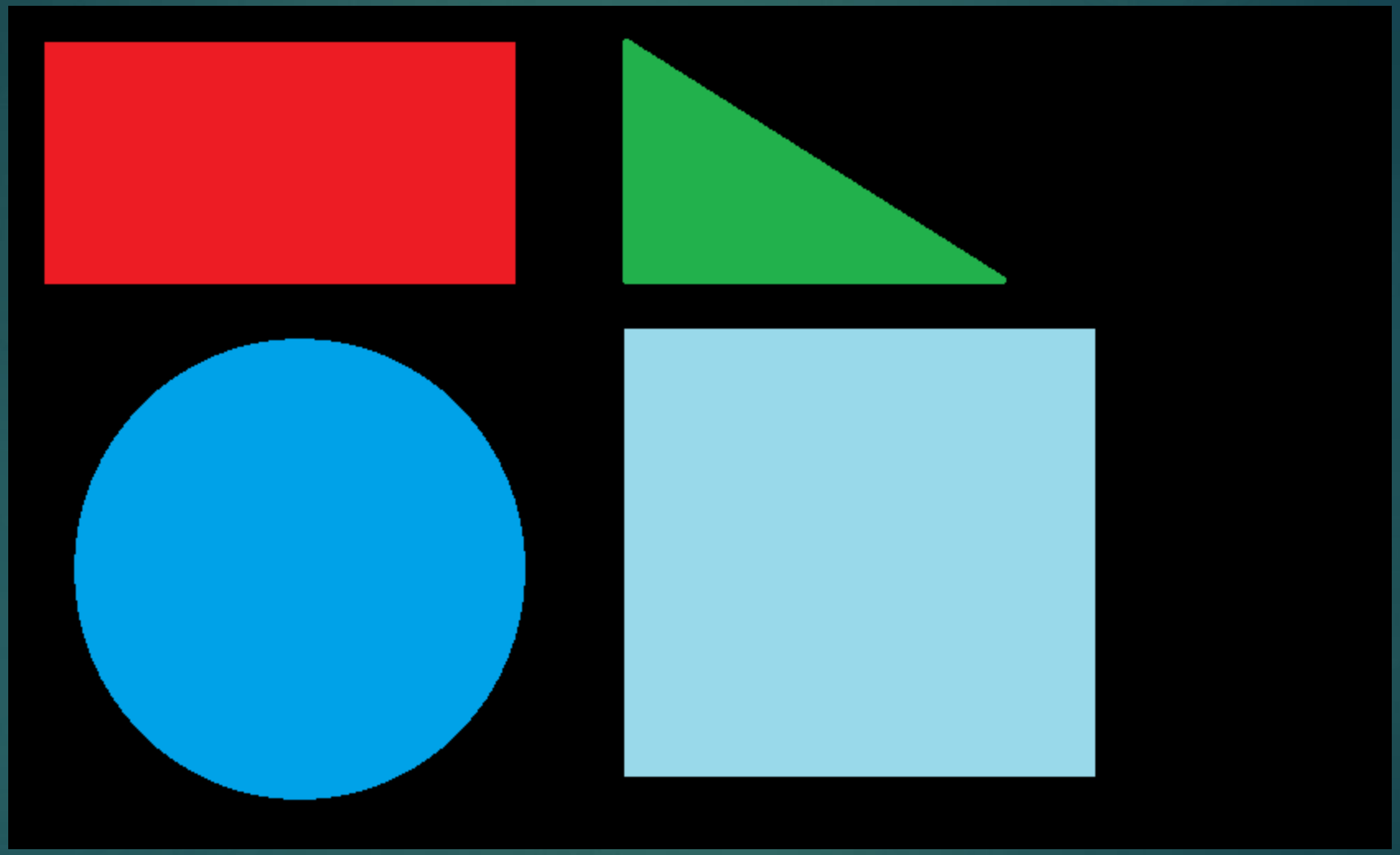


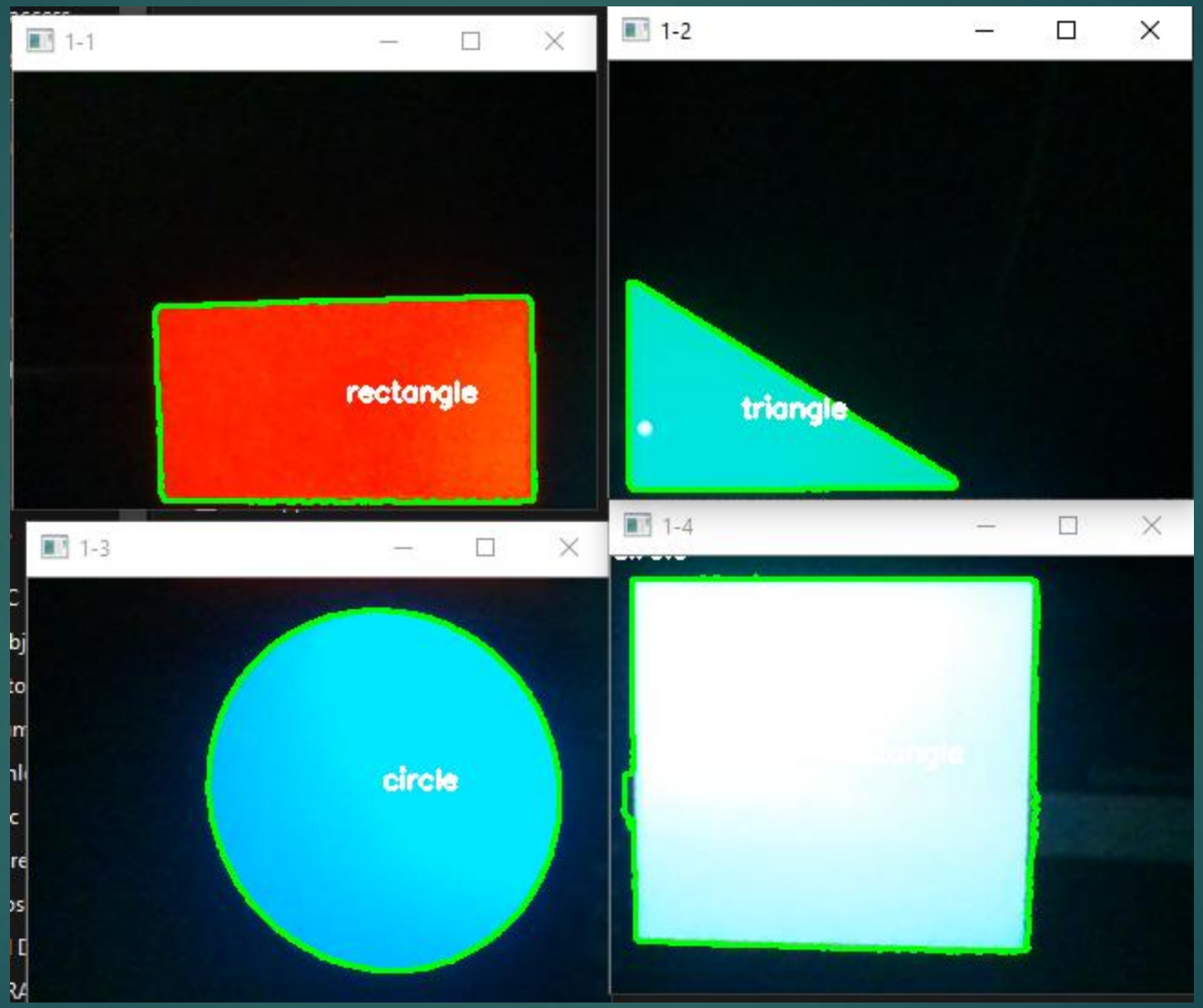
System Architecture: SFMT



Expected Project Outcome

- Respective Timestamp data of SFST and SFMT methods.
- Graphical projection of the acquired data for comparative analysis.

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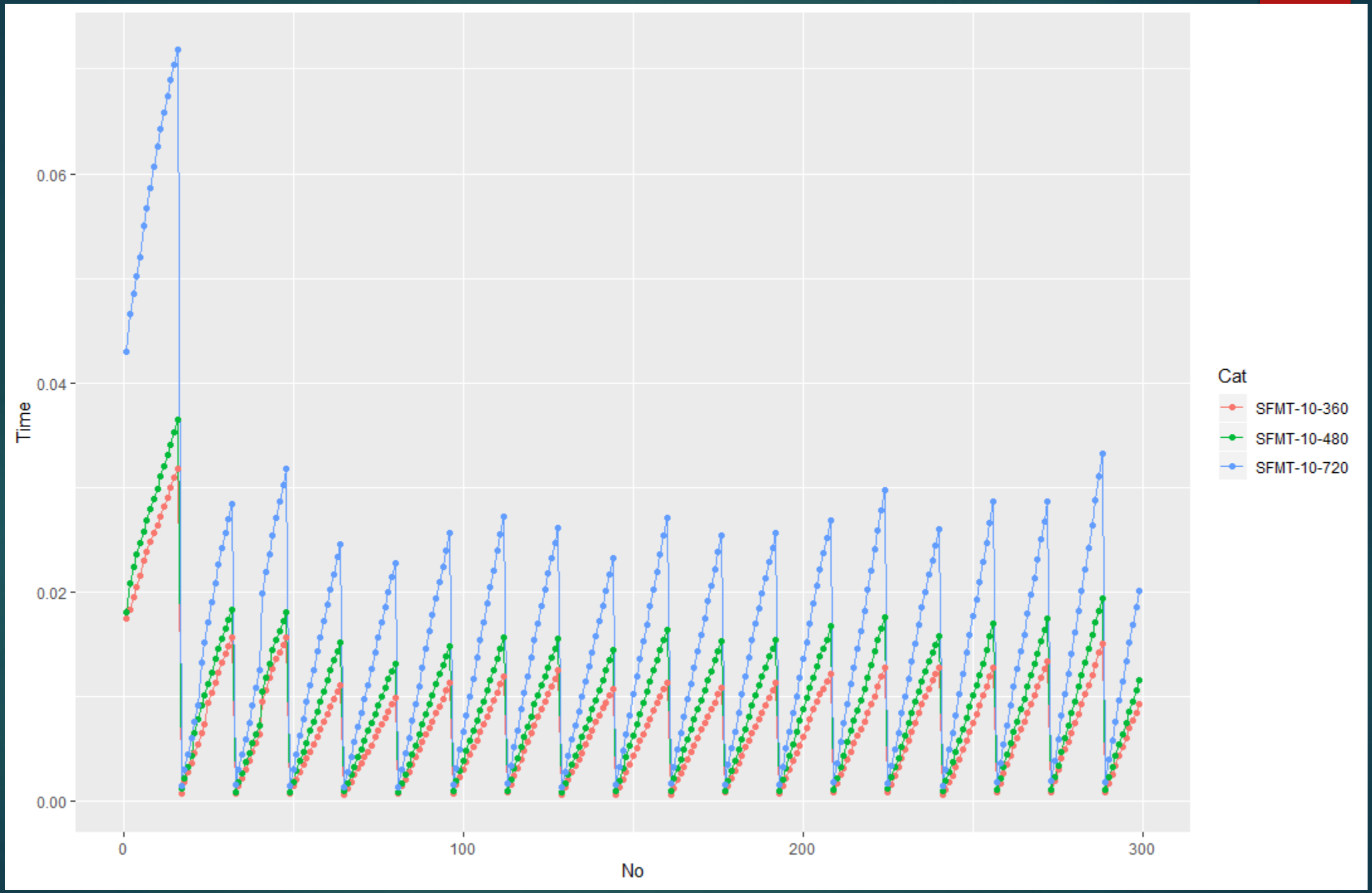
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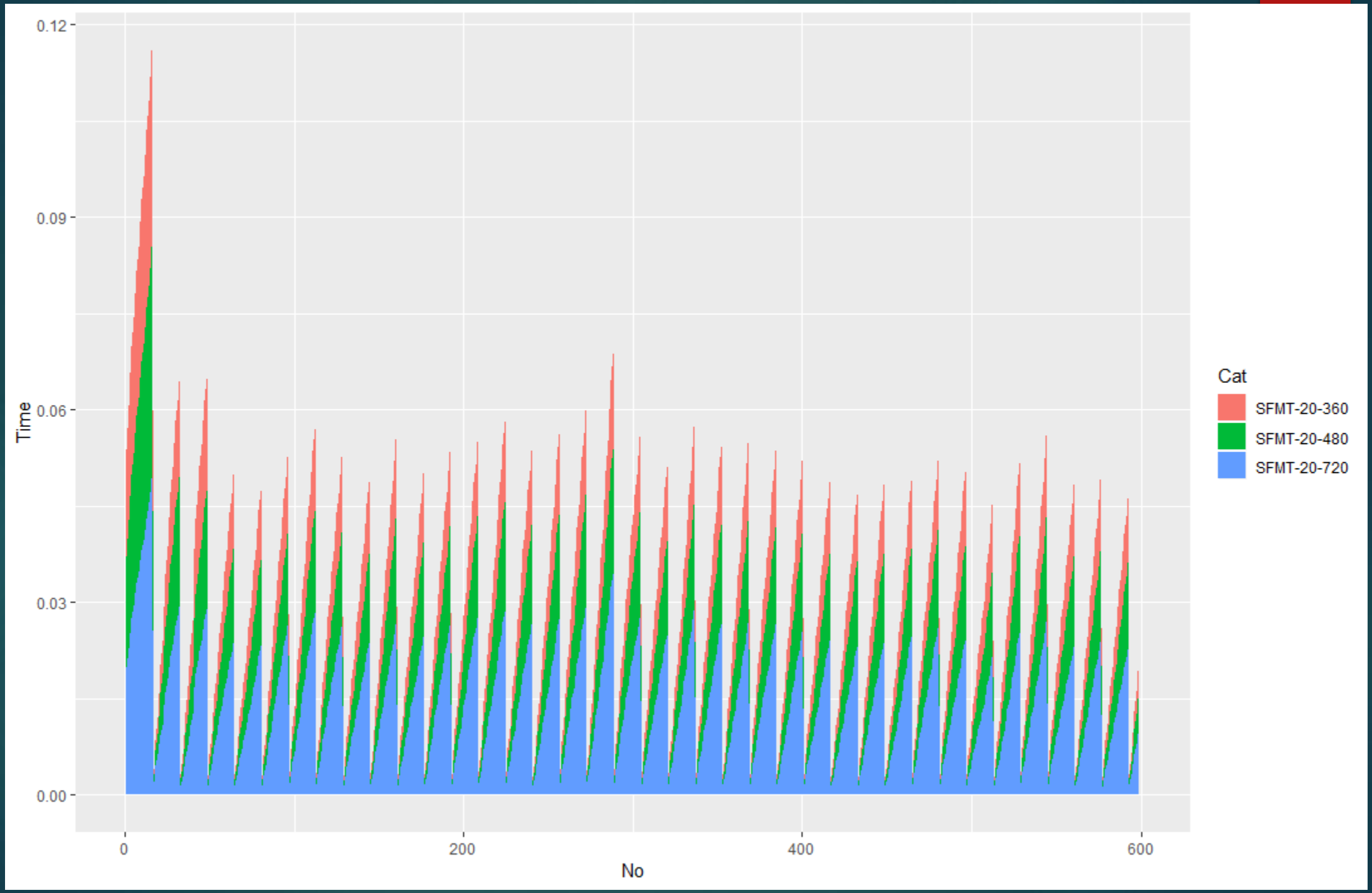
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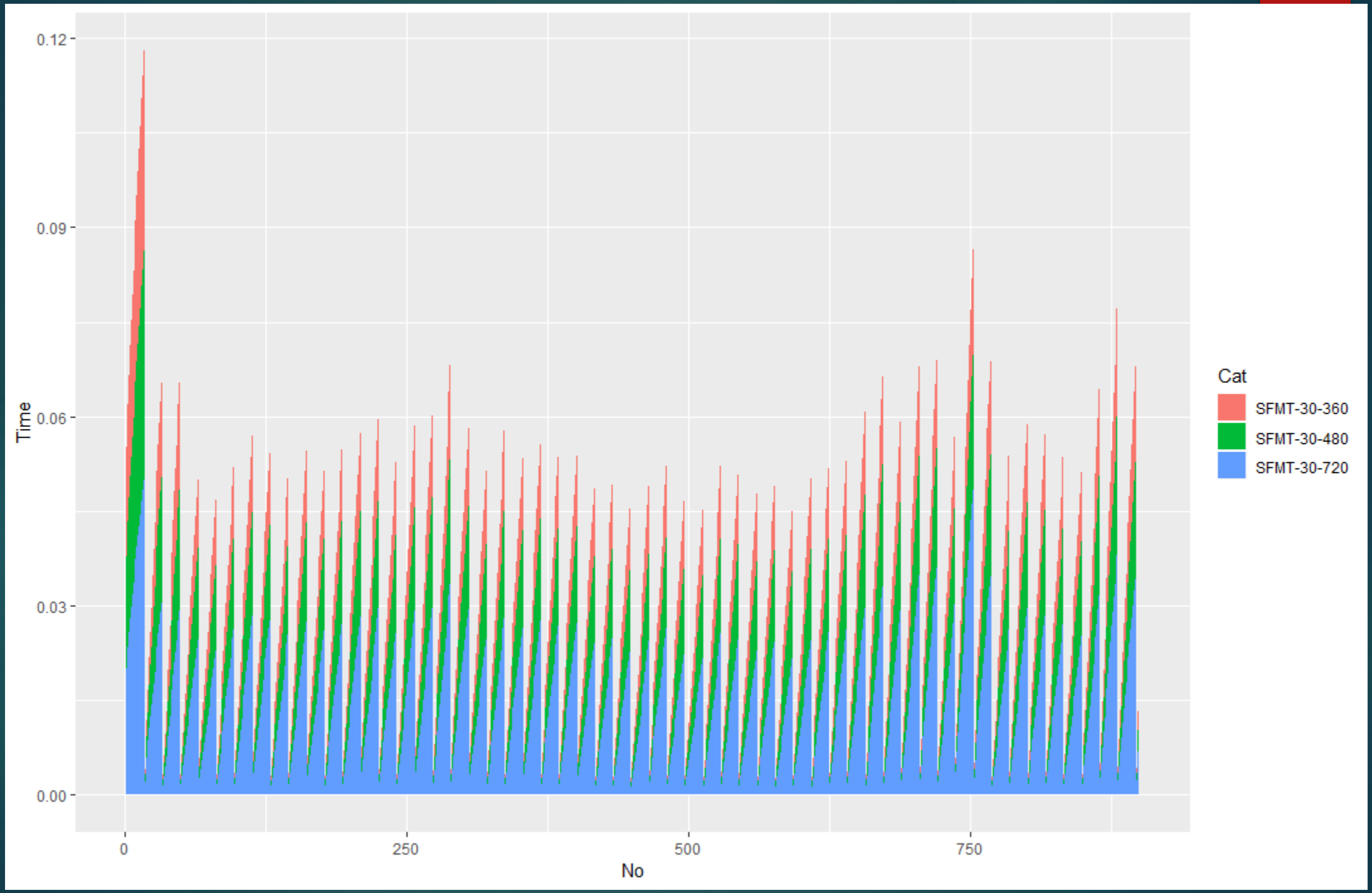
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