Fixing the “Last Frame” Crash in SLEAP on B3&B4 Videos

What happened
When we ran SLEAP inference on some B3&B4 videos, it crashed near the very end of the file with an error like:

```
KeyError: Unable to load frame 457000 from ... 2025-07-18 Boxes
B3&B4.mkv
```

So SLEAP could read almost the whole video, but failed on the final frames.

Why this happens

- The last few frames of certain recordings are corrupted or oddly timestamped.
- SLEAP asks for those exact frames by number, and the video backend can’t decode them.
- Result: it crashes right at the end (the “tail” of the video is a little broken).

Two potential fixes

Option A - Make a clean 30 fps copy and cut the final ~2 seconds (didn’t work)
This converts the video to a stable format (constant frame rate) and stops slightly before the end.

```
$src = "C:\Users\campeau-ailab\sleap-work\videos\B3&B4\2025-07-18 Boxes
B3&B4.mkv"
$dst = "C:\Users\campeau-ailab\sleap-work\videos\B3&B4\2025-07-18 Boxes
B3&B4_cfr30_trim2s.mp4"

# Get duration and subtract 2 seconds
$dur = ffprobe -v error -show_entries format=duration -of
default=nw=1:nk=1 "$src"
$newdur = [math]::Round([double]$dur - 2, 3)

# Re-encode to constant 30 fps and stop at new end time
ffmpeg -y -i "$src" -to $newdur -r 30 -vsync 1 -pix_fmt yuv420p -c:v
```

```
libx264 -crf 18 -preset veryfast -an "$dst"
```

Why it helps: it standardizes timing to 30 fps and skips the risky tail.

Option B - Drop the bad tail by frame count (e.g., last ~50 frames) (didn't work)
This keeps all frames **before** a chosen index and discards the fragile end.

```
C:\Users\campeau-ailab\ffmpeg\bin\ffmpeg.exe -y -loglevel info ^
  -i "C:/Users/campeau-ailab/sleap-work/videos/B3&B4/2025-07-15 Boxes
B3&B4.mkv" ^
  -vf "select='lt(n\,459095)',setpts=PTS-STARTPTS" ^
  -af "aselect='lt(n\,459095)',asetpts=PTS-STARTPTS" ^
  -c:v libx264 -preset fast -crf 20 -c:a aac -movflags +faststart ^
  "C:/Users/campeau-ailab/sleap-work/videos/B3&B4/2025-07-15 Boxes
B3&B4_trimmed.mp4"
```

Notes:

- Replacing `459095` with the last **good** frame index (or we do basicc subtraction which is "total frames - 50").
- Yes, Audio is trimmed too to keep audio/video in sync

How we pick where to cut

- Quick and safe: remove the last **1–2 seconds** (Option A).
- Or remove the last **30–60 frames** (Option B). If it still crashes, trim a few more.

If you want the exact frame count first, then run:

```
ffprobe -v error -select_streams v:0 -count_frames 1 `
  -show_entries stream=nb_read_frames -of default=nw=1:nk=1
"C:\path\to\video.mkv"
```

Then set `lt(n\,N)` to a little less than that number.

Prevention for future recordings behavioural!?

- Record or export to **MP4 (H.264, yuv420p) at constant 30 fps** when possible.