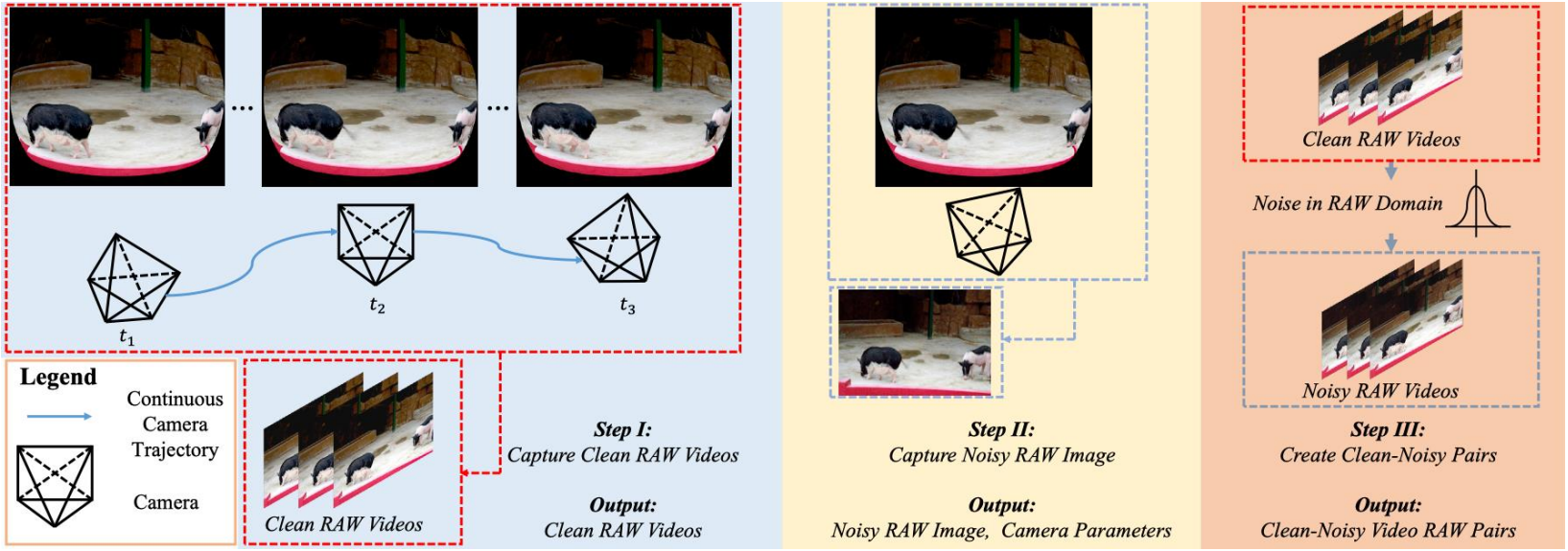
# PVDD: A Practical Benchmark Dataset and Network for Video Denoising

**Xiaogang Xu, Yitong Yu, Nianjuan Jiang, Jiafei Wu, Bei Yu, Jiangbo Lu, Jiaya Jia**

Frontiers of Computer Science, DOI: 10.1007/s11704-025-50966-0

# Problems & Ideas

- Problems of conventional video denoising dataset:
  - Lack of complex natural motion.
  - Unrealistic synthetic noise.
- Ideas: collecting clean videos with ***complicated natural motion***, followed by the corruption of ***realistic noise*** in RAW format to form RAW video pairs.



# Main Contributions

- Contributions:
  - An information-rich dataset, named PVDD, for video denoising in RAW and sRGB domains, which incorporates complex natural motion and realistic noise;
  - A practical benchmark dataset to evaluate video denoising networks and has the potential to further promote research along this line;
  - A novel video denoising framework RVDT with newly designed bi-directional transformer blocks.

**Table 1** Quantitative comparison for training on PVDD or CRVD/DAVIS dataset, while evaluating on DAVIS/CRVD dataset.

| | eval. DAVIS | | eval. CRVD | |
|---|---|---|---|---|
| | train. PVDD | train. CRVD | train. PVDD | train. DAVIS |
| VNLnet | 32.83/0.912 | 18.19/0.580 | 29.61/0.855 | 26.20/0.850 |
| FastDVDnet | 35.96/0.935 | 21.08/0.726 | 32.33/0.807 | 30.12/0.801 |
| RViDeNet | 37.06/0.950 | 33.85/0.891 | 32.34/0.810 | 33.63/0.819 |
| EDVR | 36.89/0.943 | 31.84/0.863 | 34.89/0.870 | 32.75/0.796 |
| RVDT | 37.30/0.950 | 33.11/0.870 | 34.99/0.870 | 32.59/0.789 |