Temporally Forward Nonlinear Scale Space with Pixel-Level Pre-Adjustment for High Frame Rate and Ultra-Low Delay A-KAZE Matching System

**Background**
- Human-computer interactive applications
  - Projection mapping
  - Automatic driving
  - AR applications

**Target**
- Implement nonlinear scale space of A-KAZE within one frame delay and keep high accuracy

**Challenge**
- Long delay, more than one frame

**Proposals**
- **Proposal 1:** Temporally forward nonlinear scale space
- **Proposal 2:** Pre-adjustment of nonlinear scale space
- **Proposal 3:** Pixel-level pre-adjustment

**Evaluation results**
- Matching accuracy
  - Average F-score: Previous: 89.70%, A-KAZE: 97.39%, Proposal: 95.58%

**Conclusion**
- Process high frame rate input videos with a delay of 0.978ms/frame, keep average matching accuracy 5.88% higher than previous matching system

**Hardware performance**
- Input frame rate: 784fps
- Processing delay: 0.978ms/frame