

# Liveness Detection Methods

Preventing Presentation Attacks

## Active Liveness

- \* **Challenge-Response:** User performs actions on demand
- \* **Blink detection:** Ask user to blink eyes
- \* **Head movement:** Turn head left/right/up/down
- \* **Smile/expression:** Change facial expression
- \* **Random prompts:** Speak numbers or words

## Passive Liveness

- \* **Texture analysis:** Detect screen/paper patterns
- \* **3D depth mapping:** Verify face dimensionality
- \* **Motion analysis:** Natural micro-movements
- \* **Light reflection:** Eye/skin reflection patterns
- \* **ML/AI detection:** Deep learning classifiers

Aspect	Active	Passive
User friction	Higher	Lower
Time required	5-15 sec	1-3 sec
Spoof resistance	High	Medium-High
Accessibility	Limited	Better
Drop-off rate	10-20%	2-5%

Common Attacks: Photo attacks | Video replay | 3D masks | Deepfakes | Screen replay