



**Applications in scientific research**

- As the pre/post processing module
  - Automatic Speech Recognition (ASR), Voice Cloning (VC), Speaker Verification (SV), Speaker Separation, ...

- Assist data preparations

- Data cleaning, Upsampling, ...

• Other cross-discipline fields

**Introductions**

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# Distortion type and corresponding restoration task

Table.1 Four common kinds of distortion, their causes and corresponding restoration task.

Distortion Type	Cause	Restoration Task
Noise	Interference Sound Source (e.g. airplane, keyboard, bubble)	Enhancement
Reveberation	Reflection of sound	Dereveberation
Low Resolution	Compression Low sample rate Low pass filtering Low response in high frequency band ...	Super Resolution
Clipping	Dynamic range overflow	Declipping

Other Distortions: Acoustic echos, Hardware distortions, Energy fluctuation, Periodic or random interruptions, Package Lost, etc.