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人脸活体检测调研



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# 人脸活体检测

人脸活体检测(Face Anti-spoofing)指判断捕捉到的人脸是真实人脸还是人脸攻击。常见的人脸攻击包括彩色打印的人脸图、回放的人脸视频和人脸面具等。

**活体检测的常用数据库**包括：NUAA[1], Replay Attack[2], CASIA[3], MSU-MFSD[4], MSU-USSA[5], OULU-NPU[6], SiW[7]等。

**活体检测算法**大概可以分成三类：基于内容的方法(Texture based methods)、基于时域的方法(Temporal based methods)和rPPG(Remote Photoplethysmography)方法。

基于内容的方法。早期的活体检测都是将其转化为一个二分类问题，即先提取特征，再用分类器来分类。早期常用的hand-craft特征包括LBP[8], HoG[9], SIFT[10]和SURF[11]等。除此之外，有文章将特征转化到其他不同的域，如HSV和YCbCr颜色域[12]、傅里叶频域[13]等。近几年也有很多文章研究基于CNN的特征提取[14]-[18]。文献[19]利用深度信息来进行人脸活体检测。

基于时域的方法。另一类活体检测则是通过时间上的变化来进行的，如眨眼[20]，嘴唇动作[21] [22]等。

rPPG是一种远程测量人体生理特征的技术。文献[23]可以从RGB人脸视频中估计rPPG信号。文献[24]将rPPG技术应用到人脸活体检测中来抵抗3D面具攻击。文献[25]从三处人脸区域和两处非人脸区域中提取rPPG信号，来检测打印和回放攻击。

**活体检测的度量**包括：APCER(Attack Presentation Classification Error Rate) [26]； BPCER(Bona Fide Presention Classification Error Rate) [26]；ACER [26]为APCER和BPCER的均值；HERT(Half Total Error Rate)为FAR(False Acceptance Rate)和FRR(False Rejection Rate)的均值。

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