Literature Survey

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1. Out of the 83 downloaded videos, we manually went through each to remove 74 videos and left with 9.

2. Categories of harassment in VR and five factors we can use to identify each category of harassment in VR.

Verbal Harassment:  
Direct Insults: Explicit derogatory language, name-calling, or slurs.

Threats: Verbal intimidation or threats of violence or harm.

Offensive Language: Obscene language, sexually explicit comments, or jokes.

Derogatory Remarks: Comments belittling a person based on their characteristics.

Disruptive Communication: Continual interruption or speaking over someone.

Visual Harassment:

Explicit Imagery: Displaying inappropriate or explicit graphics, symbols, or imagery.

Offensive Avatar Designs: Avatars designed with offensive or derogatory themes.

Non-Consensual Graphic Sharing: Forcing other users to view certain unwanted visuals or graphics.

Offensive Gestures: Inappropriate or rude gestures using VR controllers.

Mimicry: Imitating or mocking another user's avatar or movements to harass or belittle them.

Physical Harassment (Virtual):

Space Invasion: Continually entering another user's personal virtual space.

Unwanted Touch: Using the avatar to mimic non-consensual touching.

Blocking: Interfering with another user's movement or viewpoint in VR.

Chasing: Persistently following another avatar around.

Real-world Threats: Attempting to use physical actions in VR to intimidate or threaten, such as mimicking violent actions.

Stalking or Harassment through Persistence:

Persistent Interaction: Constantly seeking interaction despite clear signals of disinterest.

Unwanted Friendship Requests: Repeatedly sending friend requests or invitations.

Surveillance: Watching or spying on a user's interactions with others.

Persistence across Games/Sessions: Following a user across different VR sessions or games.

Doxing and Real-World Threats:

Personal Information Disclosure: Sharing a user's real-world information without consent.

Attempted Bypass of Privacy Measures: Attempts to trick users into revealing personal information or circumventing privacy settings.

Real-World Threats: Threats of harm that extend beyond the VR environment.

Discriminatory Harassment:

Hate Speech: Offensive language or slurs targeting protected characteristics.

Offensive Symbolism: Displaying symbols associated with hate groups.

Stereotyping: Using stereotypes associated with a certain group in an offensive or derogatory manner.

Discriminatory Exclusion: Excluding users from certain activities or interactions based on protected characteristics.

Bias in Avatar Design: Creating avatars that caricature or mock certain protected characteristics.

We will use these factors as features of our multi-modal model to help it to identify harassment in VR better.

2. We applied Google Cloud Video Intelligence API and Amazon Reckognition.

3. Explanation and Analysis

We chose Google Cloud Video Intelligence API and Amazon Reckognition to know if the existing tools can detect harassment in virtual reality through videos. We did a Google search and discovered that Google Cloud Video Intelligence API and Amazon Reckognition could detect harassment in videos. We found that Google Cloud Video Intelligence API was able to detect only pornography, and Amazon Reckognition was able to detect harassment in only two videos out of the nine videos.

