This document summarize our work for the data analysis approach related to **Focus on User Groups:** Based on our tagging for target groups (children, etc.), we will count patents per group. For example, X% of the patents explicitly or implicitly target **youth online safety**, while fewer address **elderly or disabled users’ cybersecurity**. We will present these statistics, which directly inform how well each marginalized community is represented in current cyber safety innovations. This addresses the “broader impacts” aspect: Are certain vulnerable populations underserved by current software solutions? (If our search found virtually no patents for some groups, that is a significant finding which we will highlight.)

We search the abstracts for keywords that would identify the target to certain user groups:

**GROUP 1: Children and Youths**

**Searched the abstracts for the keywords:**

Children & Youth - "child" OR "children" OR "teen" OR "teenager" OR "youth" OR "minor" OR "young user" OR "underage" OR "juvenile" OR "student" OR "school safety" OR "child safety" OR "cyberbullying" OR "online bullying" OR "parental control" OR "kid"

Results: 18 patents:

**Summaries of Patents Related to Children & Youth Cyber Safety**

| **#** | **Title / Theme** | **Summary** |
| --- | --- | --- |
| 1–2 | **Parental Monitoring System** (duplicate entry) | Monitors children’s smartphones by analyzing apps (social, texting, web) and detecting harmful content, which is reported to a parental portal. |
| 3 | **Metaverse Therapy for Children with Disabilities** | AI-driven metaverse platform provides cognitive and social therapy to children with developmental disabilities based on real-time state estimation. |
| 4 | **AI Classroom with Safety Features** | Virtual classroom with AI monitors hate speech, performance, and learning behaviors; alerts educators to risks and supports student profiling. |
| 5 | **Security via Reaction Monitoring** | Uses wearable or smart devices to compare a child's expected vs. actual reactions to digital interactions, triggering safety actions. |
| 6 | **Sentiment-Based Message Filtering** | Detects and blocks negative social media messages using ML-based sentiment analysis (e.g., Naive Bayes), with admin escalation. |
| 7 | **Multi-Modal Cyberbullying Detector** | Unsupervised ML model analyzes social media text, timing, and interaction networks to detect bullying events. |
| 8 | **Text & Image Threat Detection** | Analyzes messaging conversations (text and images) to flag threats like grooming or bullying, and alerts guardians. |
| 9 | **ML for Cyberbullying Detection** | Compares ML classifiers (SVM best) to detect cyberbullying on various platforms; emphasizes societal need for proactive detection. |
| 10 | **Device-Based Bullying Identifier** | Analyzes data from a user’s device to detect bullying and sends anonymized insights to another user (e.g., guardian). |
| 11 | **Human ‘Nanny’ Surveillance System** | Real-time monitoring of children’s screens by human operators using optimized review allocation and time compression. |
| 12 | **AI + Blockchain for Cyberbullying** | Uses specialized AI modules for thematic detection and logs events to blockchain; hides harmful content from user. |
| 13 | **Multilingual Message Filter with Suggestions** | Detects harmful messages, suggests alternative wording to the sender, and scores sender behavior for feedback. |
| 14 | **Risk Scoring for Outgoing Messages** | Assigns cyberbullying risk score to messages based on content, sender history, and policies; suggests safe alternatives. |
| 15 | **Semantic Detection + Blockchain Logging** | Uses semantic/contextual analysis to detect bullying and records events on blockchain; hides harmful content. |
| 16 | **Smart Device-Based Psychological Feedback** | Links biometric and usage data from smart devices to diagnose cyberbullying effects and deliver corrective interventions. |
| 17 | **Bi-RNN Based Text Classifier** | Uses attention mechanisms and RNNs to classify bullying content at the sentence/user level with high accuracy. |
| 18 | **Conversation Restriction for Safety** | Limits social media comments to two-person exchanges to prevent dogpiling and reduce public bullying opportunities. |

**Insights for the Analysis**

* **Most-used Technologies**: AI/ML (esp. for sentiment and text analysis), blockchain (logging), and smart wearables (reaction tracking).
* **Common Themes**:
  + Prevention over reaction
  + Parental and institutional involvement
  + Multimodal data sources (text, image, physiological)
* **User Group**: Strong focus on children/youth; several also address disabilities (especially developmental), but almost none explicitly mention elderly, LGBTQ+, or refugees.
* **Broader Impact**: These patents demonstrate strong representation of youth protection, with technology increasingly tailored for real-time, adaptive, and explainable interventions.

**GROUP 2: Senior and Elderly citizens**

Searched the abstrcts with the keywords:

"elderly" OR "senior" OR "older adult" OR "aging" OR "pensioner" OR "geriatric" OR "senior citizen" OR "retirement age" OR "older person"

Results: ZERO patents found

**GROUP 3: People with Disabilities**

Searched the abstracts for the keywords : "disabled" OR "disability" OR "visually impaired" OR "blind" OR "hearing impaired" OR "deaf" OR "wheelchair" OR "motor impairment" OR "accessibility" OR "assistive technology" OR "cognitive disability" OR "inclusive interface" OR "speech impairment"

Results: Zero patents found

Group 4: LGBTQ+ Community

Searched the abstracts for the keywords: "LGBT" OR "LGBTQ" OR "LGBTQIA" OR "queer" OR "nonbinary" OR "non-binary" OR "gender identity" OR "sexual orientation" OR "gay" OR "lesbian" OR "transgender" OR "bisexual" OR "intersex" OR "trans youth" OR "gender diverse"

Results: ZERO Patents found

Group 5 : Women & Gender Minorities

Searched for the keywords: "women" OR "woman" OR "female" OR "gender-based" OR "gender safety" OR "gender violence" OR "gender identity" OR "gender-specific" OR "violence against women" OR "femicide" OR "sexual harassment" OR "gender-sensitive"

Results: ZERO Patents found

Group 6: Refugees, Migrants, Displaced Populations

Searched for the kwywords: "refugee" OR "asylum seeker" OR "migrant" OR "displaced person" OR "immigrant" OR "transit population" OR "stateless" OR "undocumented" OR "border crossing" OR "resettlement"

Results: Zero Patents found

Group 7: Ethnic/Racial Minorities

Searched for the keywords: "minority" OR "ethnic minority" OR "indigenous" OR "native population" OR "aboriginal" OR "tribal" OR "African " OR "Latino" OR "marginalized group" OR "racial" OR "people of color" OR "BIPOC" OR "marginalized community" OR "race" OR "Asian"

Results: ZERO Patents found

GROUP 8: Socioeconomically Disadvantaged / Underserved Users

Searched for the keywrods: "low-income" OR "underserved" OR "unbanked" OR "unconnected" OR "rural user" OR "remote area" OR "offline population" OR "digital divide" OR "limited access" OR "poor" OR "infrastructure gap" OR "developing country" OR "digital literacy"

Results : Zero Patents found

A screenshot of a computer program

AI-generated content may be incorrect.