Implementation and Evaluation of Privacy-Preserving Computer Vision-Based Fall Detection Technology in Residential Care and Assisted Living: A Staff Satisfaction Study L. G. Franciosi, P. Magtibay. *Gerontechnology* 25(s)

Purpose Falls remain a leading cause of injury and mortality among elderly residents in long-term care and assisted living facilities, driving demand for automated fall-detection systems. This quality assurance evaluation examined the implementation of a privacy-preserving, computer vision-based fall-detection system using artificial intelligence–generated stick-figure representations within a residential care and assisted living context, without identifying the specific commercial product. The study assessed staff experiences with the technology, its impact on daily operations, user confidence in system accuracy, and how implementation factors and contextual conditions influenced barriers and facilitators to clinical adoption of this privacy-preserving monitoring approach [1]. **Method** A quality assurance evaluation was conducted at a 102-bed residential care facility and a 50-suite assisted living facility to assess staff experiences with the fall-detection system. Data collection included staff satisfaction surveys (respondents across day, evening, and night shifts with roles including care aides, nurses, and support personnel) utilizing 5-point Likert-scale questions regarding system functionality, ease of use, notification reliability, and perceived impact on care quality. Survey items assessed whether the technology supported daily work, improved efficiency, enhanced care capacity, and provided trustworthy fall-related alerts. Staff were also given open-ended opportunities to comment on technical challenges, false alerts, and suggestions for system improvement. The evaluation period included several weeks of continuous deployment with weekly feedback documentation, allowing exploration of how connectivity, environment, and resident characteristics shaped system performance. **Results and Discussion** Staff survey responses revealed significant implementation challenges. A substantial proportion of respondents disagreed that the system improved care quality or accuracy. A critical technical issue emerged: the system generated frequent false-positive fall alerts, particularly when residents were positioned in wheelchairs with reclined seating positions, and these alerts persisted despite extended trial periods, creating alarm fatigue and undermining staff confidence in system reliability. Technical problems included inconsistent connectivity, Wi-Fi disconnections across multiple facility areas (including locations with typically strong signal strength), and system lag. Staff noted that frequent false positives compelled them to perform additional manual verification checks, negating potential time-saving benefits and reinforcing reliance on existing manual safety protocols. The system's limited adaptability to individual resident positioning preferences and facility-specific environmental conditions represented significant usability barriers, highlighting the importance of environment-aware calibration and customization in future designs. Implementation success for computer vision-based monitoring systems, as noted in privacy-preserving aging-in-place literature [1,2], depends critically on high detection accuracy, minimal false-positive rates, robust connectivity, and sustained staff confidence in alert reliability. These findings suggest that future fall-detection technologies should prioritize algorithms that better distinguish falls from common postures, adaptive configuration to resident variability and room layout, resilient network and power infrastructure, and iterative co-design with frontline staff to address alarm fatigue, verification workflows, and trust-building.

References

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