



kamiCare

Fall Management Solution

Whitepaper

How AI Can Reduce Falls & Improve Care Plans in Senior Living

*Addressing the Growing
Epidemic of Unwitnessed Falls*



Kami Vision



Overview

Falls are the growing epidemic in memory care and senior living facilities today. Existing fall detection solutions like radar sensors, wearables and bed alarms can alert care staff to an incident but fail to prevent future falls.

Thanks to advancements in computer vision technology, AI-based fall management solutions can be used to significantly reduce falls. By capturing pre-fall video footage, care staff can see the cause of the fall, address contributing factors and adjust care plans accordingly. The key to reducing falls in your facility is to implement a technology solution that provides a video review of fall evidence.

This paper further explores how vision AI works to reduce falls and improve care plans in senior living.

THE MAJORITY OF FALLS AMONG SENIORS GO UNWITNESSED

Falls are a significant concern in senior living and memory care facilities. Thirty-six million falls are reported among older adults annually, resulting in 3 million ER visits and 32,000 annual deaths.¹ However, the majority of falls go unwitnessed and are often only discovered when bruising, broken bones or other injuries are found.

Care staff and facility managers may not learn that residents are experiencing falls until a trip to the ER is required to address injuries or even death. Residents may not report falls because they are embarrassed or experiencing cognitive decline.

FACILITIES CAN'T PREVENT FALLS IF THEY DON'T KNOW WHEN OR WHY THEY OCCUR

Various factors can increase a person's risk of falling. Risk factors for falls include balance and gait changes, poor muscle strength, cognitive and visual impairment, medications, home hazards and functional limitations.²

Antiquated fall detection solutions like radar sensors, wearables and bed alarms fail to solve the problem because they do not provide actionable insight into why the fall occurred. Facilities that deploy these solutions, unfortunately, accept an inherently higher fall risk than necessary.



Vision AI Technology Reduces Falls By Providing A Unique View of Falls & Contributing Factors

HOW DOES VISION AI REDUCE SENIOR FALLS IN MEMORY CARE AND SENIOR LIVING FACILITIES?

Smart sensors with AI are installed in a resident's room. If a fall is detected by the AI model on the sensor, care staff are alerted via phone call, text or email to tend to the resident. By capturing a pre-fall video clip before the fall itself, care staff can see clear evidence of the cause of the fall as if they were right there. This unique view of the fall enables staff to address contributing factors and adjust care plans accordingly.

AI models continuously learn to become smarter and more proficient over time. The more data input they have, the more accurate they are. In other words, an AI fall detection technology solution used by many facilities will inevitably be smarter because it is based on the data of all facilities combined.



WHAT IS VISION AI & HOW DOES IT WORK?

Computer vision, or vision artificial intelligence (AI), is an area of AI in which computers are trained to capture and interpret information from video data. AI models (sometimes called machine learning models) are applied to video content to classify objects and movements, like body movements.³

These AI models are trained to detect body poses, for example, that occur with a fall. The models do this by mapping up to 30+ points on the human body, tracking body movements and detecting any abrupt changes in body positioning to identify if a person suddenly falls.



What is Edge-Based AI & How Does it Work?

When considering AI technology solutions that reduce falls, it is important to look for automatic fall detection systems with Edge-based AI. These are fall management solutions in which the AI is on the sensor itself. Edge-based AI makes it possible to run advanced AI models locally on the sensors rather than sending data to the cloud or to a local server for inferencing. This “edge” processing is critical for ensuring data security and privacy, improving latency, and reducing bandwidth, monthly fees and the total cost of service.

FALL MANAGEMENT SOLUTIONS WITH VIDEO FALL REVIEW EVIDENCE

Solution	Video Fall Review Evidence
AI Video-Based Fall Management Systems	Yes
Radar Sensors	No
Wearables	No
Bed Alarms	No





Address Unmet Needs By Understanding Fall Types & Their Root Cause

Vision AI technology visually captures the type of fall a person experiences, including “unintentional self-lowering.” Typically not characterized as a fall or reported to staff, unintentional self-lowering is often a precursor to more dangerous falls. This is when the individual slowly lowers themselves to the ground to avoid injury when tying their shoes, slipping when getting out of bed, or sitting on the ground instead of a wheelchair.

VISION AI TECHNOLOGY IS ABLE TO VISUALLY CAPTURE THE CONTRIBUTING FACTORS THAT LEAD TO FALLS. CONTRIBUTING FACTORS MAY INCLUDE:



TIME OF DAY:

Falls can happen in the middle of the night, during the day, or between caregiver shifts. Understanding when a fall happens is crucial to preventing similar falls in the future.



LOCATION:

Understanding where a fall occurred, whether in a bedroom, the stairs or the living room, is essential to help prevent future falls.



HOME HAZARDS:

If home hazards, like objects in walking paths, are present they can be adjusted.



ACTIVITY:

Falls can occur when getting out of bed, reaching for an item, walking, or exercising. Understanding the activity that caused the fall helps avoid future falls.



PHYSICAL LIMITATIONS:

Impairment in balance, reduced muscle strength, visual problems, dizziness – care staff may be able to identify these limitations in a video review and adjust the resident’s care plan accordingly.



Develop Better Resident Care Plans

When care staff can identify fall precursors such as intentional self-lowering, they can catch contributing factors early on and intervene as needed. By viewing the root cause, care staff can determine residents' unmet needs and make custom care plans with personalized adjustments to their living environment, medication, or care team.

For example, if a resident slips on tile, the resident care plan might be adjusted so they wear socks with rubber grips on the bottom. This is an insight that could only come from witnessing the fall.

AI TECHNOLOGY ON THE EDGE WILL REVOLUTIONIZE SENIOR LIVING FACILITIES

In 2021 alone, the total average insurance claim incurred by falls was \$227,199 across skilled nursing, assisted living and independent living facilities.⁴ Falls can lead to costly lawsuits, decreased occupancy rates, and high staff turnover as falls are one of the biggest challenges for frontline workers.⁵

By adhering to a fall detection process or system that lacks fall context evidence, your facility will be challenged to meaningfully reduce fall risk. Edge-based vision AI can reduce falls by enabling care staff to identify the root cause and providing actionable data to make adjustments that prevent future falls. Ultimately, the information from AI sensors will provide greater peace of mind and revolutionize how we care for older people in senior living communities.



SOURCES:

1. [CDC](#)

2. [PubMed](#)

3. [NetApp](#)

4. [CNA](#)

5. [Walton Law Firm](#)

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