

Detecting Elderly Abuse in US Nursing Homes Using Machine Learning and Text Analytics

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Abstract : Machine learning and text analytics have been used to analyze child abuse, cyberbullying, domestic abuse and domestic violence, and hate speech. However, to the authors' knowledge, no research to date has used these methods to study elder abuse in nursing homes or skilled nursing facilities from field inspection reports. We used machine learning and text analytics methods to analyze 356,000 inspection reports, which have been extracted from CMS Form-2567 field inspections of US nursing homes and skilled nursing facilities between 2016 and 2021. Our algorithm detected occurrences of the various types of abuse, including physical abuse, psychological abuse, verbal abuse, sexual abuse, and passive and active neglect. For example, to detect physical abuse, our algorithms search for combinations or phrases and words suggesting willful infliction of damage (hitting, pinching or burning, tethering, tying), or consciously ignoring an emergency. To detect occurrences of elder neglect, our algorithm looks for combinations or phrases and words suggesting both passive neglect (neglecting vital needs, allowing malnutrition and dehydration, allowing decubiti, deprivation of information, limitation of freedom, negligence toward safety precautions) and active neglect (intimidation and name-calling, tying the victim up to prevent falls without consent, consciously ignoring an emergency, not calling a physician in spite of indication, stopping important treatments, failure to provide essential care, deprivation of nourishment, leaving a person alone for an inappropriate amount of time, excessive demands in a situation of care). We further compare the prevalence of abuse before and after Covid-19 related restrictions on nursing home visits. We also identified the facilities with the most number of cases of abuse with no abuse facilities within a 25-mile radius as most likely candidates for additional inspections. We also built an interactive display to visualize the location of these facilities.

Keywords : machine learning, text analytics, elder abuse, elder neglect, nursing home abuse

Conference Title : ICADEC 2022 : International Conference on Aging Diseases and Elderly Care

Conference Location : New York, United States

Conference Dates : December 09-10, 2022