

SENSOR NETWORK FOR EARLY ILLNESS
DETECTION IN THE ELDERLY

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ABSTRACT

The independent living facilities at TigerPlace allow the elderly to age in place in a homely setting that fosters independence, autonomy, and privacy while providing some level of aid like shared meals, housekeeping, and other services. When elderly residents fall victim to situations that have long-term health implications, e.g. urinary tract infections, even immediate intervention by a nursing care-provider after the fact may not be timely enough. However, if the nursing care-providers know of certain behavior patterns or specifically changes in those patterns that indicate early signs of illness, then they can make an intervention or take preventative measures ahead of time. This research provides a framework and method for using passive in-home sensor networks to collect sensor data, Early Illness Alert Algorithms to model and detect signs of early illness, single-dimensional alerts that notify nursing care-providers, and collect clinical feedback on alerts from a team of clinical researchers with an expertise in gerontology. The feedback collected provides valuable ground truth that is used to analyze and improve the Early Illness Alert Algorithms. Classification accuracy more than doubles through the application of four machine learning methods for classification and include the Fuzzy Pattern Tree, the Fuzzy K-Nearest Neighbor, the Neural Network, and the Support Vector Machine.