# ACTIVITY RECOGNITION FOR OLDER PEOPLE USING A BATTERYLESS WEARABLE DATASET WITH RFID SENSOR

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## Abstract

*Perching on cot, perching on recliner, obtaining out of cot and step dancing (ambulating standing, walking round the room) somewhere is troublesome for the older folks. Ambulating with facilitate of the folks or oversight is known jointly of the key causes of patient falls in hospitals and rest home thus we tend to use Artificial Intelligent and Machine Learning for top falls risks of older folks. Machine learning is associate algorithmic rule that's used for predicting outcomes accurately. we tend to incontestable 2 datasets that embrace time in seconds, frontal axis of acceleration, vertical axis of acceleration, and Lateral axis of acceleration, label of activity, frequency, phase, received signal strength indicator and Id of antenna reading sensing element. such a big amount of technological solutions area unit foreseen for bed existing detection employing a style of sensors that area unit fastened with older folk body, their cot or around somewhere with context to the older folks orfloor.*

**Keywords:** Artificial Intelligent, Machine Learning, RFID (RadioFrequency Identification) sensor, Decision Tree, SVM tree, Data analytics, K-Means, Naïve Bayes theorem

## I.   Introduction

Artificial Intelligence is additionally called machine intelligence, that is often incontestable by machines and Natural intelligence that is incontestable by humans. Machine Learning is associate degree algorithmic rule creating computers modify or adapt their actions. we'll conjointly introduce K-Means algorithmic rule and spatial property reduction which might be used once labeled knowledge isn't on the market. Machine learning is associate degree algorithmic rule that's used for predicting outcomes accurately. Machine learning algorithmic rule could be a mathematical and applied math models of fed knowledge, referred to as  coaching knowledge, so as to create call (or) prediction for outcomes while not activity a task. the most advantage of machine learning algorithmic rule is conception that idea of creating concept modify/adapt their actions so these actions get additional correct Falls happens largely in hospitals, main road, thundering residential cares and in the dead of night In distinction, a replacement generation of passive (battery less) detectors like detector enabled RFID (Radio Frequency Identification) tags area unit making exciting new prospects for folks wearable sensor based mostly applications and tiny, therefore they will be used for unobtrusive observance. Battery detector area unit light-weight weight for handling them. Passive sensors don't seem to be needed any battery and conjointly free maintenance. Moreover these sensors are attached into dresses and thereby preventing removal of the display, particularly by understanding harmed patients. It's simple to inject and take away for older folks. Therefore, technical result could watch the behavior of except younger based on passive detector is possible to be recognized in habit.

### Inroduction to Domain

Machine learning is associate algorithmic program that's used for predicting outcomes accurately. Machine learning algorithmic program may be a mathematical and applied mathematics models of fed knowledge, referred to as as coaching knowledge, so as to form call (or) prediction for outcomes while not acting a task. Computation process  is additionally called machine intelligence architecture that is often incontestable by humans and also machines ,natural intelligence. The foremost vital advantage of machine learning architecture algorithmic program is idea that idea of creating concept that easily modify/adapt their actions so these actions get additional correct. It's used for predicting the correct values and accuracy. one in all the muse objectives of machine learning is to coach computers to utilize knowledge to resolve a fixed drawback. Application includes weather prediction, forgery detection, email filtering and recognition of network.

### Types of Machine Learning

1.      Unsupervised Learning

2.       Reinforcement Learning

3.       Supervised Learning
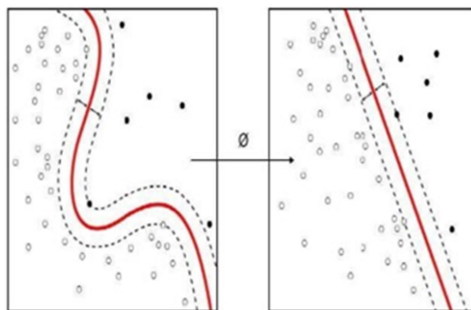
## Supervised Learning

Training dataset includes each input and also the desired results. A coaching set of examples with correct responses (targets/labels) is provided. The linear development of correct coaching, validation and take a look at a set is crucial at the point. This learning relies on the coaching set. The techniques that are used are multivariate analysis, classification analysis. In this, there are a glorious variety of categories. It's accustomed to classify future observations. These technique are quick and correct.

## Unsupervised Learning

The techniques that square measure used square measure learning association, cluster analysis, spatiality reduction, labelling. In this, there square measure unknown variety of categories. It's accustomed perceive and explore the info. It may be accustomed cluster the computer file in categories on the premise of their applied mathematics propertiessolely.

## Reinforcement Learning

The rule sets told once the answer is wrong but does not told the thanks to correct it. It's to explore and take a glance at out whole totally different prospects until it works out the thanks to get the answer right. It's existing to travel wanting home is very large and wish to specify extra rules. It permits the machine or computer code package to search out  itsbehaviour supported feedback from their atmosphere. This behaviour is learnt once and for all, or continue adapting as time goes by. It's learning of consequences of actions, rather than from being expressly schooled and selecting action of its basis of its past experience.

## Task of Machine Learning

Clustering suggests that grouping of objects supported information found within the data describing the objects or their relationship. The goal is that object is one group/cluster ought to be kind of like oneanother
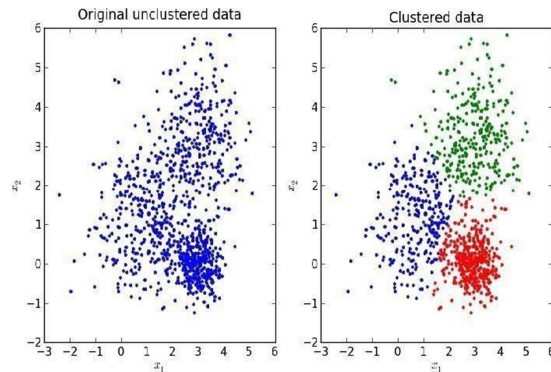
however completely different from objects in another group/cluster. It uses for locating a structure in an exceedingly assortment of unlabeled knowledge. It minimizes the gap between every observation and also the centre of its associated cluster. the info may be unclustered usually. K-Means algorithmic program in all probability used for bunch the info.

## II.   Project Description

Slips often occur in house and health centre, particularly at late evening and in the sitting of the couch. Slips are pricey as patients have an increased length of keep (LOS) at hospitality care centers and it can make to anxiety, mental illness and a loss of liberty similarly attendant and caregiver may additionally infected by psychological trauma. Observing the patients and accepting their endanger falls connected activities give an chance to intervene and stop the fallout or to seek immediate attention from a caregiver falls down detection. However, the server does not perform the fall detection technique as a waterfall reduction technique. Previous studies have focused on detecting bed exits. Methods of this were the case Based on one or several sensors strategically placed in or around the bed. Most of them the result is methods involving pressure sensors that can achieve different performance results many types of sensing units are used. pressure sensors were found improbable with sicker less than forty five kg, a customary weight for frail sicker, however better performance was achieved in conjunction with alternative sensors .The place of those units (cot rails, cot mats, control regular maintenance or a replacement, door mats create them vulnerable to constant mechanical stress).

## Proposed Work

First we are predicting the overall accurate accuracy and value from the data using decision tree,svm,k-means,naïvebayes theorem. We are considering two key issues linked to our group system. Firstly we could inspect the data in bed existing. Based on analyze of older people subjects we considered the some sequence of states:

• Lying down on cot

•  Perching oncot

• Obtaining out of cot
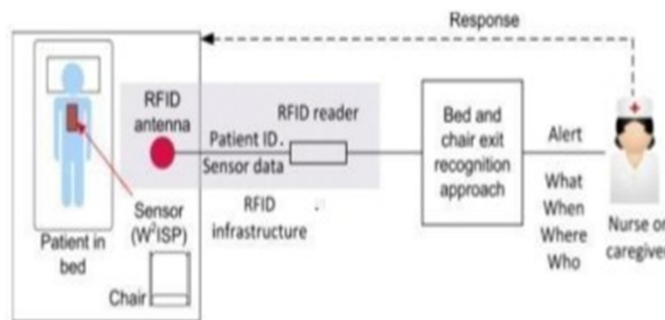
Lastly, we'd like to admit the controlling nature of RFID technology. The property of changeable distance to antenna, critical interference  to more path , reason disorderly, deficient and noisy reading which are deliver to theARS, RF band interference and occlusion by RF opaque objects like the physical body.

**System Architecture**

The RFID sensing element platform utilised during this study consists of. A passive sensing element enabled RFID tag referred to as wearable wireless identification and sensing platform (W2ISP), that relies on the WISP The RFID infrastructure is employed to energise and collect information from the W2ISP wherever the communication is ruled by the air interface protocol ISO 18000-6C.frontal (af), vertical (av), and lateral (al). Second, the RFID reader provides tag activation and measures the strength of the wireless signal backscattered from the W2ISP tag, wherever this data is correlate with the space between associate RFID reader antenna and therefore the W2ISP

**III.  Modules Description**

**SVM Algorithm**

**"Support Vector Machine" (**SVM) may be a supervised machine learning algorithm which is normally applied to classification and regression challenges and mainly used for classification problems. In this SVM algorithm, we plot each data item as point in n-dimensional space (where n is number of features you have) with the result of each characteristics being the result of a specific correlates. Then, we did classification by researching the hyper-plane that differentiate the twoclasses.From the data,we could analayze and predict the accuracy for SVM algorithm.

**Decision Tree**

A Decision tree could be a summon support tool . It uses for a model of choices or tree map-like graph and their potential cost, together with accident outcomes, source cost, and facility. During this algorithim, it contains control statement .Because this is often the core algorithim to allow management statement.A decision tree could be a chart-like structure during which every internal node indicates a "test" on correlate in Nursing data (e.g. whether or not a coin flip comes

up heads or tails), all department should identify outcome of the check, and each branch node explain a class label (decision taken when computing all attributes). The methods start from root to branch stipulate classification rules. From the information,we could interpret and predict the accuracy for calltree.

```
(venv) C:\Users\Sangeetha\PycharmProjects\1.py>python 1.py
(5897, 9)
[[ 5.0000e-01  2.7203e-01  1.0082e+00 ... -6.3000e+01  4.7369e+00
   9.2175e+02]
 [ 1.5000e+00  4.4791e-01  9.1636e-01 ... -6.3500e+01  3.0311e+00
   9.2375e+02]
 [ 1.7500e+00  4.4791e-01  9.1636e-01 ... -6.3000e+01  2.0371e+00
   9.2125e+02]
 ...
 [ 5.7250e+01  8.7003e-01  2.1588e-01 ... -5.7500e+01  1.2272e+00
   9.2225e+02]
 [ 5.7750e+01  8.7003e-01  2.1588e-01 ... -6.5500e+01  6.0163e+00
   9.2475e+02]
 [ 5.8250e+01  8.7003e-01  2.1588e-01 ... -5.8000e+01  5.0775e-01
   9.2075e+02]]
[1. 1. 1. ... 3. 3. 3.]
[3.]
[3. 3. 3. ... 1. 2. 2.]
Accuracy is 97.96610169491525
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**Comparison**
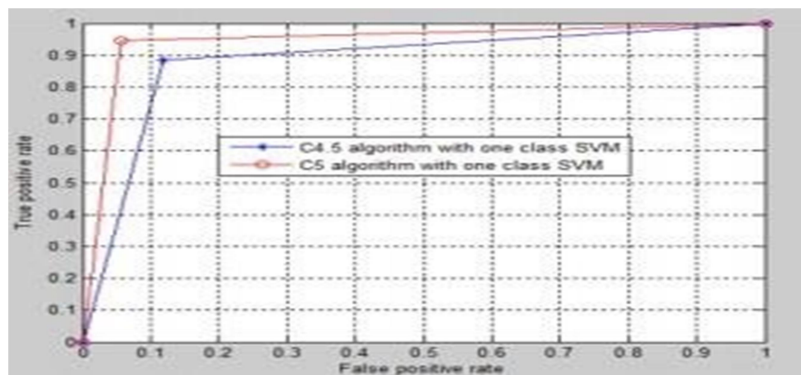


## IV. Conclusion

In this study, we have a tendency to researched and evaluated information for the employment of on-line interpolation for period activity recognition of older folks mistreatment thin and blatant acceleration data streams from a wearable passive RFID device. on-line interpolation enabled pronto computing options requiring knowledge streams with regular sampling rates.There are two vital detection from this study. Firstly, once solely acceleration from device tags are thought-about, options obtained mistreatment interpolation significantly boost the activity recognition performance compared to time-domain biomecahincal options from raw acceleration knowledge. Secondly, options supported info and therefore the knowledge from associate RFID platform also can also can activity recognition performance and come through comparable results to activity recognition models engineered mistreatment extra

options doable from interpolation. This represents that options from the RFID platform are with success replaced to exchange the additional options, likeFFT primarily based options, do able from interpolated acceleration knowledge to understand similar or higher activity recognition performance. On the opposite hand, RFID preparation agnostic activity recognition models may be learnt mistreatment options primarily based solely on acceleration knowledge whereas enjoying the benefits provided by device tags. In conclusion, this text provides a basis for several omnipresent analysis and some additional applications supported period activity recognition of older folks mistreatment wearable passive sensors, particularly passive sensors enabled RFIDtags.

**Future Scope**

1.Fraud detection

2.Email filtering

3.marketing

4. clientchurn/attrition

5. Virtual personal assistance (Ex: Sirii, Alexea,Google)

6. Social media Video policework

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