

Women Security and Smart Surveillance System (Women Wellbeing Assessment in Indian Metropolises using Machine Learning Models)

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***Abstract:** Today in the current global scenario, the prime question in every girl's mind, considering the ever-rising increase of issues on women harassment in recent past is mostly about her safety and security. The only thought haunting every girl is when they will be able to move freely on the streets even in odd hours without worrying about their security. Criminal activities have reached unprecedented levels in almost every part of the world. Desperate times like these require desperate measures to ensure the safety of people, especially people that need to travel on a daily basis to places, known and unknown. The majority of these criminal offences occur while the victim is travelling, irrespective of the mode of transport: walking, personal vehicles, public transport vehicles, auto-rickshaws, or cabs. We propose a User Specific Safe Route Recommendation System which presents a safe route visualized in dataset to the user based on the past records of the geographical region then we train dataset using SVM algorithm. Generated model will fetch the graph of safest route from particular source to destination.*

***Keywords:** Machine Learning, SVM, Source, Destination.*

I. INTRODUCTION

Now a days, as the world has come closer because of advancement in technologies. Women are almost captured all the fields from sports, finance, health care, education and many more. In the Medieval period, women were taken into account as a major cause of destruction by major communities and don't give permission to the women go to outdoor or to get into the corporate and or social activities unlike men [1]. In the late Middle Ages women were involved in many fields. The statistics done by National Crime Records Bureau, the crime rate versus women registered around 4,037 incidences in the year 2000 in Chennai [2]. Due to increase in crime rates, the women growing persona is really a big challenge. Day to day, because of progressively insecure surroundings for Indian women working late at night is become very difficult. There are lots of very astonishing technologies available for women like video recording to encapsulate the cogent evidence of a crime, GPS tracker to track people to your place etc. As its difficult for the tools to save you from the disaster but it assists you to send the alert to authorities or to your loved ones and to get ahead with assistance quicker whenever required.

II.STATE OF ART

Fundamental Concept of Information Fusion Information fusion is very interesting technology that actually does fusion. Instead of many uncertain decisions it gives authentic, impartial, vigorous decision by generating one entity combining many parameters together. In this process raw data is taken as an input. Users create some information in the form of pictures, database, sensors which is input source. Technique in which data only received from sensory

III.ISSUE

After the "AI Winter" of the 80s and 90s, enthusiasm for the utilization of information driven Artificial Intelligence (AI) strategies has been consistently expanding in various building fields, including speech and image analysis [1]. As informational indexes develop, utilizing machines to take in important examples from organized information can be very ground-breaking. The volume of information is too enormous for complete investigation, and the scope of

potential connections and connections between dissimilar information sources are unreasonably extraordinary for any expert to test all speculations and determine all the worth covered in the information. AI (ML) is perfect to open doors for covered exploiting the opportunities in big Data.

[2] In this reference author provided Dynamic decision-making approach to handle unpredictable emergency events. And their Reliability of decision results are based on current situations and historical data. With the help of data Calculates accurate decision matrix. Author mainly focused on Bayesian network, decision process, and intuitionistic fuzzy sets as key concepts. [2].

[3] This reference provides approach to recognize human activities in ubiquitous computing and Human Computer Interaction (HCI). They get data using appropriate sensors. Mainly focus on feature extraction and Uses Statistical features, Deep learning, multi sensor fusion, human activity monitoring, machine learning. It helps to reduce computation time and enhance accuracy [3].

[4] This reference provides security device for women. It uses Arduino controller and sensors such as temperature, flex sensor, MEMS accelerometer, Pulse rate sensor, sound sensor, a buzzer, LCD, GSM and GPS to Senses body parameters and then perform tasks as per application objectives such as – body temperature detection, voice detection, flex motion detection, sudden fall detection, pulse rate detection of victim, activation of buzzer, send panic message to registered contacts [4].

[5] The system in this reference demonstrates the fuzzy choquet integral an amazing nonlinear collection of function. Information about the improved ChIMP and the way it has been improved. Empowering of eXplainable AI is done by the ChIMP and it is its added benefit. A novel NN architecture with a gradient descent-based optimization solution that mimics the Choquet integral for information aggregation. Accuracy is less [5].

[6] This reference mainly focuses on detailed insights about deep learning, convolutional neural network algorithm and Naïve Bayes for data fusion. Methodology in this paper is used in detection of break analysis of video frame. The CNN algorithm needs lots of training data to make training converge and over fitting [6].

[7] System proposed in this reference involves exploration of Artificial intelligence procedures to give comprehensive execution assessment of Information fusion system. This mainly focuses on Statistical analysis to exploit interactions between elements to improve IFS design and its performance [7].

[8] Portable device proposed in this reference use to provide security for women by using Pressure switch, GSM800, GPS, and Microcontroller Arduino. When pressure switch activated by user it performs tasks like - send panic message, share location and call to registered numbers, if not answered redirect to police [8].

[9] Watch to provide women security. Use of GPS and GSM, sensors have been done to send location and to send message. This paper gives idea about the application that how the system can be design to help women in such crucial time span. Tasks mainly focused are detect heartbeat, automatic call to registered number, detect nearby police station and make ring [9].

[10] This reference provides information regarding various tools for Women Security and also it gives general idea about Survey of Algorithms Several techniques and algorithms are available for example Dempster Shafer evidence theory, Bayesian belief network, center limit theorem fuzzy logic, neural network, kalman filter to combine data or information [2]. Fusion process mainly involves one important objective that is exact generation of conclusive parameters and according to application take intelligent decision.

The suitable algorithms to proposed algorithm are Bayesian network, neural network and fuzzy logic.

1. Fuzzy Logic The fuzzy logic was put forth by Dr. LolfiZadeh. The Boolean logic works on true or false i.e 1 or 0. Working of computer depends on this Boolean logic. The computations and reasoning done between 0 and 1 in fuzzy logic. Humans consider various possibilities between YES and NO while making decisions which computer cannot. The way humans consider all the possibilities between digital values YES and NO while making decisions is followed by the fuzzy logic. Accurate reasoning may not be possible by fuzzy logic but it gives acceptable reasoning. Fuzzy logic manages unreliability, imperfect, unclear, distorted or incorrect inputs.
2. Neural Network Supervised learning mechanism supported neural networks were put forth in 1960. To build a system in neural network it requires lot of training examples so that the system can able to learn also to enhance the accuracy it creates deductions or derive rules from examples which are considered for training. There is no involvement of human is required in neural network.
3. Kalman Filter Kalman Filter initially put forth by the Kalman in 1960. At that point it turned out to be exceptionally famous fusion strategy. To combine low-level redundant data Kalman filter is utilized. For getting precise outcome between Estimated Value and Data Kalman filter is mainly considered. User satisfaction is important so till their approval iteration process of Kalman filter goes on.
4. Bayesian Theory Bayesian theory totally depends on probability theory. We can address the difficulties of insufficient data fusion and can discover the solution for the equivalent by utilizing information fusion or sensor fusion enabled Bayesian theory. Data uncertainty issue is conveyed by probabilistic techniques and it totally depends on the probability distribution or density functions.

IV.GAP ANALYSIS OF RELATED WORK

Gap analysis- Research Papers Solution provided in reference [1] cannot be considered as universal solution and systems, learning tasks are carried out at distributed machines that need to coordinate via communication e.g. by transferring the results of intermediate computations. Proposed system in reference [2] might have potential information loss in transformation process and it may lead to delays in emergency decision making. Solution given in reference [3] is difficult to feature extraction and recognize

V. METHODOLOGY

When system takes input from sensory resources which is in the form of raw data the major hurdle is to convert the received input into proper knowledge and information. It can help the decision maker to take intelligent decision in complex human activity recognition. In reference [5] solution uses NN architecture with gradient based optimization solution that mimics Choquet integral for information aggregation but has less accuracy. As in [6] The CNN algorithm is used it needs lot of training data to make training converge and over fitting. As per analysis reference [7] has limitations as system consumes memory and takes much time to respond.

Women Security system given in reference [4] works automatically on increase in pulse rate but there might be possibility of false notifications. Solution provided in reference [8] contains some complex designing issues and immediate response is not possible with this approach. System proposed in [9] totally depends on heart rate. Increase in heart rate gives notifications but heart rate may increase due to some non-emergency situations also so this can give false notification. Solution given in [10] takes maximum time to operate and there are chances of data loss. sufficient time span. The proposed system architecture depicted in fig. 5 shows the various phases through which the system can give the final decision taking sensory data as an input and using unsupervised learning approach.

Table no. 1 Literature Survey of Domain Papers and Application papers

Sr. No.	Title	Authors & Publication	Limitations	Proposed work
[1]	A Very Brief Introduction to Machine Learning With Applications to Communication Systems	Osvaldo Simeone 2018 IEEE Transaction	1. It cannot be recognize as a broad solution 2. Learning tasks are completed at distributed machines that need to organize by means of correspondence e.g., by moving the outcomes of calculations.	Where to put the learning tasks (machine learning algorithms)
[2]	A Dynamic Weight Determination Approach Based on the Intuitionistic Fuzzy Bayesian Network and Its Application to Emergency Decision Making	Zhinan Hao, Zeshui Xu, Senior Member, IEEE, Hua Zhao, Hamido Fujita 2017 IEEE Transaction	The quality of accumulated outcomes totally depends on reliability and accuracy of weights	Use fuzzy logic to make decision
[3]	Deep Learning Fusion Conceptual Frameworks for Complex Human Activity Recognition Using Mobile and Wearable Sensors	Nweke Henry Friday Ghulam Mujtaba Mohammed Ali Al-garadi Uzoma Rita Alo 2018 IEEE Transaction	Difficult to feature extraction and complex human activity recognition	Ubiquitous computing to recognize activity using wearable sensors
[4]	A Novel Approach to Provide Protection for Women by using Smart Security Device	Kalpna seclam K.Prasanti Asst.Prof. 2018 IEEE Transaction	As it depends on pulse rate chances of false notifications possible	1. Safe and secure electronic system for women. 2. Device senses some parameters when women is in threat 3. Victim location is sent to the registered mobile number
[5]	Enabling Explainable Fusion in Deep Learning with Fuzzy Integral Neural Networks	Muhammad Aminul Islam, Derek T. Anderson, Anthony J. Pinar, Timothy C. Havens, Grant Scott, and James M. Keller, 2019 IEEE Transaction	Need to improve accuracy	A novel NN architecture with a gradient descent-based optimization solution that mimics the Choquet integral for information aggregation.

VI.CONCLUSION

This survey paper gives brief description of the term information fusion. In some of the domains like machine learning, artificial intelligence, neural network etc. this information fusion technology can be used to provide accurate solutions to various issues. Using machine learning with sensor fusion technique women security problem can be solved. Literature survey and methodology for these concepts is done briefly in this paper. This framework will end up being exceptionally helpful in sparing lives just as forestalling rapes against women.

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