International Journal of Engineering Technology and Management Sciences
Website: ijetms.in Issue: 4 Volume No.6 July – 2022
DOI:10.46647/ijetms.2022.v06i04.0014 ISSN: 2581-4621

Machine Learning Analysis of RFID Technology Adoption Factors

M. Pavan Kumar[1],A. Baradwaj[2], K. Yashwant[3],Ch. Vinay Kumar[4]Mr. CH. Vijaya Kumar[5]
[1,2,3,4]B. Tech (IV-CSE), Department of CST, ACE Engineering College, Hyderabad, Telangana,India
[4]Associate Professor, Department of CST, ACE Engineering College, Hyderabad, Telangana,India

Abstract:*This paper presents an approach grounded on radio frequence identification(RFID) and machine literacy for impurity seeing of food particulars and drinks similar as soft drinks, alcohol, baby formula milk, etc. We employ sticker- type inkjet publishedultra-high-frequency(UHF) RFID markers for impurity seeing trial. The RFID label antenna was mounted on pure as well as defiled food products with known adulterant volume. The entered signal strength index(RSSI), as well as the phase of the backscattered signal from the RFID label mounted on the food item, are measured using the Tagformance Pro setup. We used a machine- learning algorithm XGBoost for farther training of the model and perfecting the delicacy of seeing, which is about 90. thus, this exploration study paves a way for ubiquitous impurity/ content seeing using RFID and machine literacy technologies that can enlighten their druggies about the health enterprises and safety of their food.*

Keywords:*ultra-high-frequency (UHF); radio frequency identification (RFID); Internet of Things (IoT); machine learning; food contamination sensing*

I. INTRODUCTION

The Internet of effects (IoT) and machine literacy(ML) are reshaping our lives by furnishing multitudinous arising operations ranging from healthcare, smart surroundings, smart seeing.(). also, short- range IoT technologies similar as RFID are last- afar results in numerous operations similar as force operation, force chain shadowing, healthcare, waste operation, and so forth (). The UHF RFID technology provides seeing benefits due to its essential capability of noticing impedance variations with respect to the permittivity of background surroundings (). also, the unresistant UHF RFID label also provides a fairly long read range as compared to other challengers similar as low frequency (LF) RFID and high frequencies(HF) RFID. also, the unresistant UHF RFID markers pose fluently printable sticker- type structures, which helps their low- cost and bulk manufacturing. Food impurity is one of the biggest issues among public health problems. also, the corruption and deterioration of food quality during storehouse is another challenge for both the food assiduity and environmental perspectives. According to the world health association (WHO) fact distance, every time nearly 600 million people fall ill after eating defiled food. also, nearly0.42 million people die after eating defiled food. An RFID detector was proposed for detecting the quality of food. The quality and impurity of food were detected by measuring the read range due to variation in permittivity of background food packets. still, this fashion requires a brace of markers to be mounted at a fixed distance. A remote case monitoring system has been proposed in using RFID and ML for early discovery of suicidal gusted in internal health installations. A range of machine literacy algorithms was tested and set up that the Decision tree algorithm provides a better result as compared to arbitrary timber and XGBoost in this script. In, RFID and ML grounded ways were used to descry the mortal

presence and diurnal mortal conditioning. The proposed algorithms successfully demonstrated the delicacy of96.7 in feting 24 different diurnal conditioning

II. LITERATURE SURVEY

Philips proposed the conception of a smart terrain, which was originally published in the literature in 1999. A smart terrain is defined as a position where druggies can interact with colorful specialized outfit(detectors, compendiums , computers,etc.) in an invisible and inconspicuous manner. A room, for illustration, where the lights are turned on if the refulgence is below a certain threshold and there are people within who use this resource is an illustration of a smart terrain. This description leads to a number of study areas concentrated on automating mortal- to- mortal and mortal- to- machine relations. When it comes to dealing with ultramodern outfit, this station implies a considerable shift. Other bias that are less demanding of the stoner are replacing traditional keyboards and mouse(remote controls, wireless detectors, touch-sensitive defenses,etc.). Radio frequence identification(RFID), a technology grounded on the exchange of information via electromagnetic signals, is one of the most expansive and promising wirelessnon-contact technologies. RFID is employed in a variety of operations due to its capacity to identify and track particulars, including aeronautics, construction and property operation, health, merchandising, logistics, and security.

III. METHODOLODY

To explore the impact of RFID technology on force delicacy, a single case study was performed. The main reason for conducting a case study is to gather an in- depth agreement of a wonder being boned (Meredith, 1998). The case study System was also considered applicable since RFID perpetration is an arising empirical content (Yin, 2009). According to Ell ram (1996) “A case reverie procedure(.) provides depth and sapience into a little given miracle. ” The case study focuses on an RFID perpetration at a supplier of cushion and spoiler systems to the automotive assiduity. The case was primarily chosen grounded on its oneness; it is one of the many items- position, open- circle RFID executions in northern Europe. In an open circle, the RFID markers are a central cost issue since they aren't continuously reused as in a unrestricted circle. The perpetration decision was also grounded on the advantages handed by RFID technology and not driven by Accreditation. The perpetration didn't make it possible for a quantification of the impact of RFID technology grounded on literal data. still, the results and conclusions drawn from this case study, and the proposed model give perceptivity into how RFID technology impacts on force delicacy. The case is presented in the following case description section.

IV. PROPOSEDSYSTEM

The proposed system for food impurity discovery using UHF RFID markers and machine literacy. For food impurity seeing proposes, the RFID anthology is placed at a fixed distance ‘ R ’ from the food item to be tasted. A UHF RFID label antenna is mounted on each food item similar as designed in(30). The backscattered power from pure food particulars and defiled food particulars will be compared and the data would be given as input to the machine learning algorithm. The machine literacy algorithm trains its tone and improves food impurity seeing.

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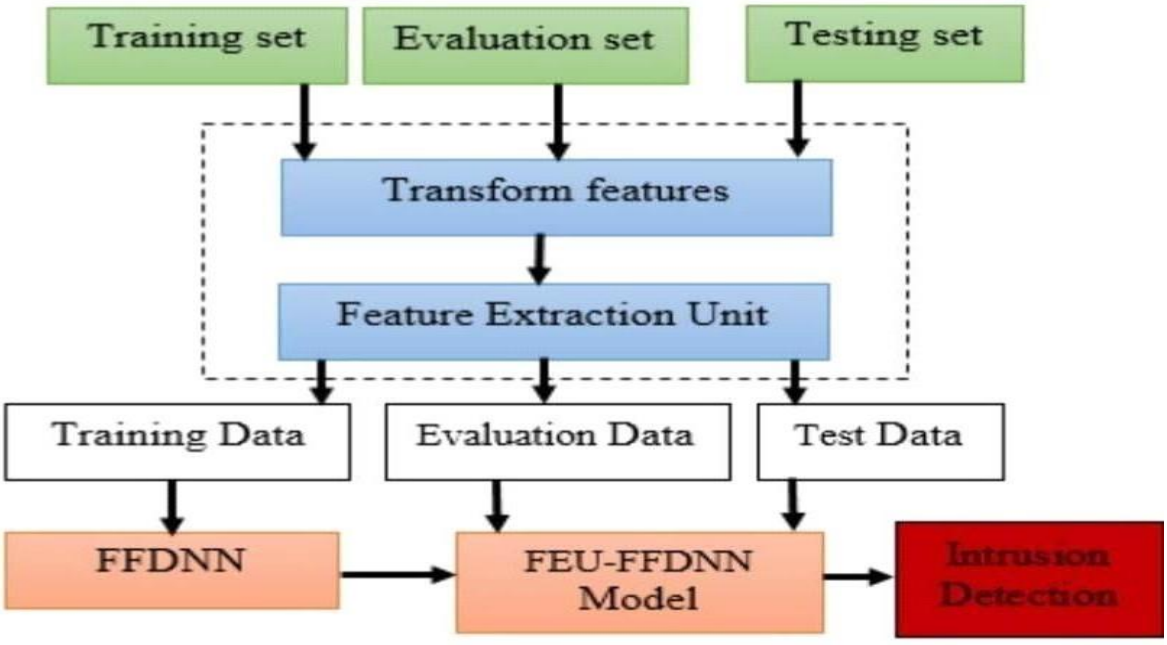
V. Working Of RFID

Radio frequencies Identification and Data Capture(RFID) is a kind of automatic data prisoner and identification system(AIDC). AIDC approaches honor particulars, collect data about them, and enter that data directly into computer systems with little or no mortal involvement. Radio swells are used in RFID technology to do this. An RFID system is made up of three corridor an RFID label or smart marker, an RFID anthology, and an antenna. RFID markers and an RFID anthology an antenna is a device that contains an intertwined circuit that transmits data to an RFID anthology(also called an interrogator). The radio swells are also converted into a further useable type of data by the anthology. The data collected by the markers is also transferred to a computer, where it can be stored in a database and analyzed.

VI. Applications of RFID Technology AND Construction Industry

RFID systems are used for beast shadowing, force operation, force chain logistics, and vehicle shadowing, among other effects. Hospitals, manufacturing shops, retail businesses, and indeed homes use them.RFID is also known as contactless payment(Tap to Pay). You can tap your smartphone or an RFID- enabled credit card against a payment terminal rather of swiping a credit card. Keeping track of tools, enhancing safety, erecting conservation, and baselines are just a many of the uses in the construction business. We can keep track of which tools have been checked out, who took them, and how long they were used after they were returned by looking at which bones have been checked out, who took them, and how long they were used once they were returned. These approaches can be applied with anything from hand tools to large ministry. At every construction point, securing worker safety is critical. One system of installing compendiums around possible pitfalls, similar as rails or open elevator shafts, is to emit an alert to advise people of the peril.

VII. SYSTEM ARCHITECTURE



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VIII. ALGORITHM

I. Adaptive Boosting, or AdaBoost, is a Boosting strategy used in Machine literacy as an Ensemble system. The weights arere-assigned to each case, with advanced weights applied to cases that were inaptly classified. Adaptive Boosting is the term for this. Boost is used to reduce bias and friction in supervised literacy.

II. The Support Vector Machine(SVM) is a supervised literacy system that can be used for bracket as well as retrogression. To distinguish classes, SVM builds a decision boundary. How to make or define the decision boundary is the most pivotal aspect of SVM algorithms. Before being used to make the decision boundary, each observation(or data point) is colluded in n- dimensional space.

III. Gaussian Naive Bayes is a Naive Bayes variant that accepts nonstop data and follows the Gaussian normal distribution. We looked at the notion of Gaussian Naive Bayes and demonstrated it with an illustration. The Bayes theorem is used to develop the Naive Bayes family of supervised machine learning bracket algorithms.

IV. A Voting Classifier is a machine literacy model that learns from a collection of models and predicts an affair(class) grounded on the affair's loftiest chance of being the asked class. It simply adds up the results of each classifier that has been submitted to Voting Classifier and forecasts the affair class grounded on the most votes.

V. In supervised literacy, data scientists give algorithms with labelled training data and define the variables they want the computer to look for connections on. Both the input and affair of the algorithm are supplied.

VI. There are three different types of machine learning.:

Supervised Learning.
Unsupervised Machine.
Reinforcement learning.

VII. MACHINE LEARNING: Machine Learning is a branch of computer wisdom that enables" computers to learn without having to be explicitly programmed." Making a machine learn from data is what machine literacy is each about. In order to read new affair values, machine literacy algorithms use literal data as input.

VIII. NUMPY: NumPy, which stands for Numerical Python, is a library conforming of multidimensional array objects and a collection of routines for recovering those arrays. Using NumPy, fine and logical operations on arrays can be accomplished. This tutorial explains the basics of NumPy analogous as its architecture and terrain. It so discusses the chromatic array functions, types of indexing, etc. A prolusion to Matplotlib is also handed. All this is explained with the help of samples for better understanding.

IX. SK-Learn: SK- Learn is the condensation for SciKit- Learn. Scikit- learn is the most extensively used and robust machine learning library in Python. It provides a suite of effective tools for machine literacy and statistical modelling, including as bracket, retrogression, clustering, and dimensionality reduction, using a Python thickness interface. The foundations of this package, which is largely written in Python, are NumPy, SciPy, and Matplotlib.

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IX. RESULT

```
The accuracy of ABC Classifier on testing data is: 82.14697960754135
```

ACCURACY of

```
testSet = [[1,1,1,1,1,1,1,1,1,1,1,0]]
test = pd.DataFrame(testSet)
predictions = classifier.predict(test)
print('ABC Prediction on the first test set is:',predictions)
testSet = [[1,0,1,0,1,1,0,0,1,0,1,0]]
test = pd.DataFrame(testSet)
predictions = classifier.predict(test)
print('ABC Prediction on the second test set is:',predictions)
testSet = [[1,1,1,0,1,1,0,1,1,1,1,0]]
test = pd.DataFrame(testSet)
predictions = classifier.predict(test)
print('ABC Prediction on the third test set is:',predictions)
```

```
ABC Prediction on the first test set is: [3]
ABC Prediction on the second test set is: [2]
ABC Prediction on the third test set is: [3]
```

Test sets of AdaBoost Predictions of

X. CONCLUSION

This design," Machine literacy analysis of RFID technology relinquishment factors," is helpful in comprehending the aspects that lead to RFID technology acceptance in associations. The Project aids businesses in deciding whether or not to apply RFID technology. The database's technological and organizational aspects are entered in the first module. The alternate module covers the addition of arbitrary factors and the creation of a data plot from a portion of the data. The dataset is classified by AdaBoost in the third module. The fourth module involves applying SVM to the same dataset and tallying the results. The fifth module involves applying Gaussian Naïve Bayes and Voting groups on the same dataset and checking the rigor and prognostications of all the groups.

XI. ACKNOWLEDGEMENT

We would like to thanks to our guide Associate Prof. Mrs. Vijaya Kumar and Associate Prof. Mrs. Soopari. Kavitha for theircontinuous support and guidance. Due to their guidance, wecan complete our project successfully.Also,we are extremely grateful to Dr.M.V.VIJAYASARADHI, Head of the Department of Computer Science and Engineering, Ace Engineering College for his support and invaluable time.

XII. REFERENCES

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