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MACHINE TO MACHINE LEARNING IN AD-HOC IOT SYSTEM USING KERNEL GRANULAR SUPPORT FRAMEWORK

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ABSTRACT: In current scenario, rapid growing technologies and software development application are playing vital role in machine learning. This paper presents a novel kernel support framework method for measuring machine to machine learning in Ad-hoc in IoT system. The interconnecting different devices with internet are called as IoT (Internet of Things). The machine to machine learning is a centralized compute and storage model which is connected with network. This paper emphasis the centralized IoT eco system model with decentralized behaviour is used to measure the performance. The machine to machine model to learn the data from registered IoT end point devices. This anonymous detection model and Kernel Granular support framework is used to analyse the pattern and data stream. Here the datasets are divided into granules and reduced the space using kernels. Data distribution can be improved using support vector calculation. Spark modelling is used to demonstrate Kernel Granular method in Machine to Machine learning. Machine learning as a service is applied in Ad-hoc IoT systems for effective classification.

KEYWORDS: Machine learning, IoT, Kernel Granular Support framework, Spark Model, Support Vector method.

I. INTRODUCTION

In the technology world, the huge volume of data can be used from various applications such as social media, communication, trading, business modelling, and transportation. The various methods are used to predict the performance of each technology ventures. Today world moving towards automation, machine learning, intelligent systems, cyber physical system and deep learning models. Internet can rule the world and sitting once place accessing whole world resources. Internet of things is connecting multiple numbers of devices with internet to share and access the data. Each applications unique sensor and operating systems are used and automatic data transfer can be done.

Machine learning is a sub set of Artificial Intelligence which has supervised and unsupervised model for handling classification, data prediction and regression problems. Machine to Machine learning is used to learn the input from multiple numbers of devices connected with centralized server or internet. The data can be moved from one machine to another machine which cannot be trusted. Here the Ad-hoc IoT model is used. It is dedicated network group and connected with Sensor, Actuators, Modulators, endpoints, connected devices, etc.

The centralized monitoring system is applied for all connected devices. Each device can work ad-hoc nature. In this stage each device can join at any time. Machine can control and monitor the live date streaming applications. Kernel Granular support framework is proposed method which deals seamless connectivity, performance monitoring and data analytics process. Spark model is used for connecting IoT endpoints and machine to machine learning behaviour is obtained. This paper discussed following, section 1 describes introduction about IoT and machine to

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machine learning approach, Section 2 tells various literature and problem statements, Section 3 describes modelling, methodology and techniques, Section 4 discuss about performance and result.

II. RELATED WORKS

IoT can have many end point devices which carry huge volume of data. Deyan et al, the existing wireless ad-hoc networks, connected component model and distributed computing are approach are important for handling kernel space approach. Zion is one of the machines learning approach and it is used for profiling electronic devices. Sarkel et al, detecting and preventing connected devices are in selective prioritization approach. The input feed is important factor in Ad-hoc IoT system. The machine learning are categorized into guided learning, unguided learning and reinforcement learning. In our proposed method, we used reinforcement learning for efficient observation and combined guided/unguided model. Guided model has label and desired output, unguided model has unstable dataset, reinforcement learning has cumulative collection of dataset and labels.

Lei Zhan et al, GPS enabled IoT systems are used in real time traffic prediction. SensTrack simulators are used to measure the kernel space values. Weka tool is suggested Manikandan et al, for data modelling and feature prediction factors. The time complexity and calculating kernel space tedious process. Hie Yok et al, Linear support vector model is used for measure guided machine learning models and gave predicted output results. But non linear dataset and sudden input cannot be monitored. Dykaesh et al, Linear Reinforce Kernel approach is used to measure the performance of guided and unguided input data set. The regression table generated used Mathtable method and classification approach is applied for data prediction.

Sanjeev et al, Granular Bayes model is applied for predicting and classifying reinforced data from end point devices. Support vector model approach applied for predicting features. Gai et al, Modified kernel space model with Granular method suggested for IoT eco system with quality of service. Kernel Granular support vector is used in our proposed systems to find external feature of data set. Multiple view of data classification, prediction factor, connected components processing are used for performance calculation phase. The following are the application area of Machine to Machine learning in reinforcement learning Android malware detection, Medical Imaging, Intelligent Agent monitoring systems.

III. KERNEL GRANULAR SUPPORT FRAMEWORK

A traditional Support vector model is not sufficient for handling large volume of dataset and dynamic data. To improve the linear and non linear data set, we used granular model for classification of data set. Here the process has three steps, step 1: Building a sequence of granules from given or current data set. Step 2: Apply support vector calculation is each granule and finds the aggregated information. Step 3: Separate linear and non linear data set and set trade-off values. For different data mining applications are applied for eliminating redundant data and locality reference.

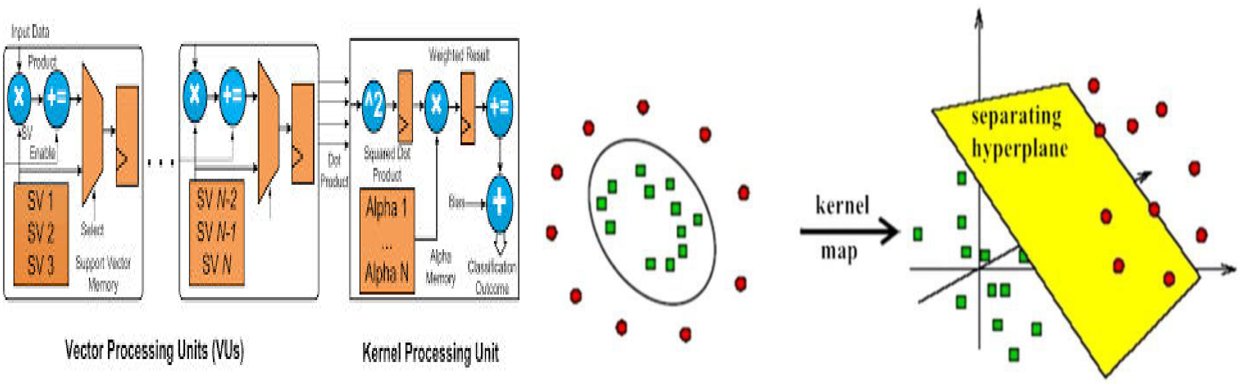

Figure 1: Kernel Space Support vector framework

Kernel space is created from trade-off values. Here the input feed data from end point connected devices. Input data set value is X = {x1, x2,...,xn} where n – number of resources. R – Granulation factor which is belongs to X. K – kernel space granule value with respect to i – samples. Here we used following algorithm for calculating kernel space granular support vector using end point connected devices data from ad-hoc IoT system.

Step 1: In k – dimensional kernel space, divided into granular values using Euclidian distance factor calculation from connected devices.

$$VU = \frac{1}{N}\left(\sum_{i=0}^{n} Xn\right) \text{ .... (1)}$$

The radial factor of kernel map value

$$r = \max | x_i - VU| \ 0 =< i <= N \text{ ...... (2)}$$

Step 2: We need to apply reinforcement classification method to each kernel space granular values. Kernel map values are selected form support vector node values from connected devices. From the equation 1 and 2.

$$\mu = \frac{1}{N}\left(\sum_{i=0,j=0}^{n} K(Xi,j)\right) \ i,j = 0,1,2,3,\dots n-1 \ \dots\dots(3)$$

Support vector calculation

$$SVM = \max \sqrt[\mu]{K(xi,j) + VUi,j} + \left(\frac{1}{N}\right)\sum_{i=0,j=0}^{n} K(Xi,j) \text{ .... (4)}$$

The following figure 2 shows that after applying SVM value of each kernel space points.

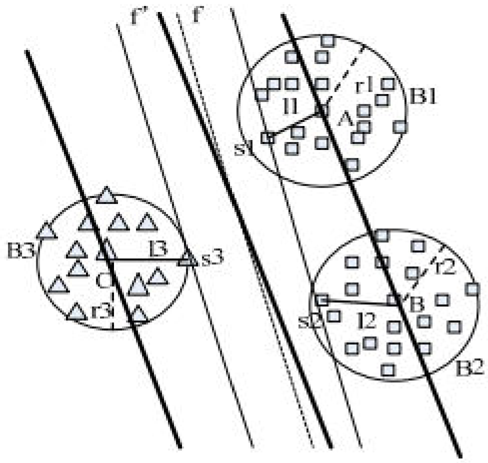

Figure 2: Kernel space granular values using SVM

Step 3: The K – diemensional kernel space applied for tranining using SPARK simulation and divided into B1, B2, B3 sub granular values. r1,r2,r3 are the radius values and compare the test results

Step 4: The number granules depends with K and the theresold values between r_{min} and r_{max} of each support vector factor

Step 5: Mapping the samples collected from various end points and convert into K – kernel space values

Step 6: The divided granules are in high dimensional space with respect to SVM

So the Kernel space granular accuracy faculty obtained from following equation

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$$K_{svm} = \sum_{i=0,j=0}^{N} \left(\frac{1}{N}\right) \sqrt{max(x(i,j) + VU(i,j)\ * min(x(i,j) +\ SVM(i,j)\ /\ N} \text{ ...... (5)}$$

The above formula gave test and accuracy factor and spark model is used for finding simulations.

IV. SIMULATION USING SPARK

The effectiveness is verified by using Spark model and collect endpoint data set from various source. Spark is a data analytics model which gives cumulative result of various classification and clustering modes. The following Table 1 shows that training and test data for end point Ad-hoc IoT connected components date set.

Data Set	Training Data	Test Data	K-Space Dimension
AWS Redshift	21000	7500	6
AzureSet	15700	6000	5
KiteModel	21560	8904	4
VMWareDspace	14570	5679	6
IBMChime	11265	3214	4
Techgig Mode	8900	2463	3

Table 1: Dataset values from multiple connected source outcomes

For applying Kernel space granular support framework algorithm for above data set using Spark Model. The following table 2 shows that comparison result of SVM and Kernel space model.

K-Space	Training time(ms)		Testing Accuracy(%)	
	SVM	Kernel Granular	SVM	Kernel Granular
5	0.756	0.343	78	87
4	0.542	0.254	76	88
6	0.456	0.125	81	89
4	0.561	0.324	65	91
3	0.521	0.312	75	92

Table 2: K –Space Training time and Testing Accuracy

Based on above table values compare with SVM our proposed model have accuracy and efficiency is high. Same we applied the iteration process and increase the K Kernel space iteration of two dataset kitemodel and techgigmode.

Model	Algorithm	K=10	K=25	K=50	K=100
Kitemodel	SVM	74.9	67.8	71.5	76.2
	Kernel Granular	87.33	91.23	87.12	95.22
Techgigmode	SVM	81.25	67.50	78.12	77.15
	Kernel Granular	89.15	88.12	82.15	89.21

Table 3: K – Kernel space iteration model with respect to i

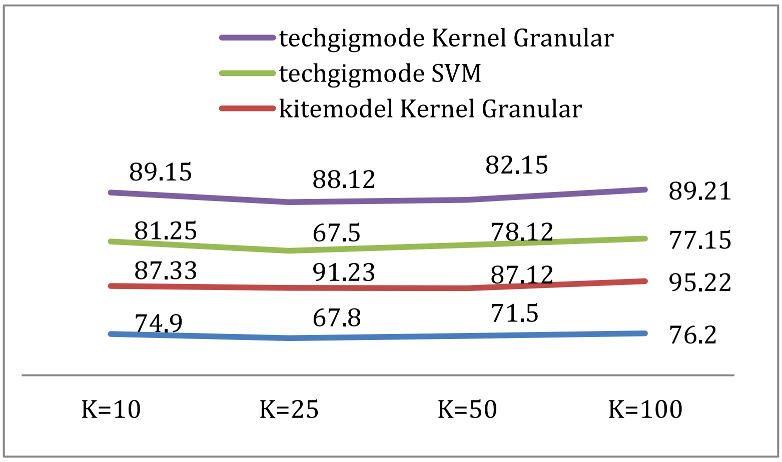

Figure 3: K-Space iteration with respect to i

From Table 3, testing results are improved with number of granules and K – space. The experiments are done using spark model that dividing granules and K-space iteration in high-dimensional space.

V. CONCLUSION

This paper proposed a novel Kernel Granular support framework method for measuring the performance and accuracy factory Ad-Hoc IoT systems. Machine to machine learning data set collected from multiple number of connected end point IoT systems. The reinforcement machine learning classification and prediction method is calculated by using Kernel Granular support framework algorithms. The Spark model is used for finding effectiveness and accuracy factory of the algorithm. The results are compared with various iteration models and methods. In future kernel space with decision tree, neural network and deep learning process are to be used and find the effectiveness.

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