Classification using wireless multi devices in difference range

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Abstract— *The information technology has applied in almost every industries such as banking, retail, transportation, public safety/law enforcement, and education. Biometric technology is used for access control, criminal verification, credit card and passport authentication and also let be getting more and more popular. A perfect identification system has not been discovered yet due to an unexpected variety of changes when a biometric is sensed. This technique has been employed such as Fingerprint, 2D/3D Barcode, RFID for personal identification or verifications since a century ago. In the past, its normal technique is limited on wiring process, not many research has intent to play as wireless application. This paper will be present the way to implement of an automated identification system with integrated transceiver function in type of remote sensing as the wireless multi devices in difference range and distance, which have been achieved the multi signals as input, then to monitoring as classification using artificial intelligent based on Neural Network by emphasis Radial Basis Function methodology to identify and classify the security information by using the various minutiae extracted from the multi signals. The classification conclusion has summary details of these identification paradigms as concept technique in this paper.*

***Keywords*— Classification, Biometric, Fingerprint, Identification.**

1. INTRODUCTION

Since biometrics is a system for measuring unique biological traits for the purpose of identification; it includes utilization of time clocks, the “easy way” to track and to report employee authentication to increase security. Biometric has now widely known as the technology of measuring physical characteristics that is to verify a person’s identity including voice recognition, iris scan, face explore, and fingerprint recognition. Biometric authorization is potentially the most affordable and convenient method of verifying a person's identity. Biometric technology has been served at all governments worldwide for many decade years, which had provided an accurate identification of criminals. It became the fundamental tool for the identification of people with a criminal history in almost every police agency. It remains the most commonly gathered forensic evidence worldwide and in most jurisdictions examination outnumbers all other forensic examination casework combined. Therefore, it has continued to expand as the premier method for identifying persons into databases and also can be employed as input section.

For classification problems, there is one output for each target category. The value output for a category is the probability that the case being evaluated has that category. An algorithm for classification has two major hurdles to be faced before these methods can be used. A training set must be constructed for which the true classifications of the objects are known, and a set of object parameters must be chosen that are powerful discriminators for classification. Once a possible classifier has been identified, it is necessary to measure its accuracy.

Wireless communication technique involves transmitting data between devices that are not physically connected. These devices may be anything from a personal digital assistant (PDA), to a laptop, a global positioning satellite (GPS) antenna, to a remote sensor. The communication can occur at short range using infrared technology, at a wider range using a high-speed wireless LAN within a building, or at extraterrestrial distances using satellites. This wireless aims to give mobile professionals and end users access to information anywhere and helping in tracking, locating, and managing valuable. This paper focuses on a neural network methodology as classification by training the weight. The article used the typical method for Radial Basis Function algorithm. This algorithm can be employed to classify the security identification by using the input from the wireless multi signal’s devices. These classification and wireless communication techniques have described in next.

2. WIRELESS COMMUNICATION TECHNIQUE

Wireless communication is common-place, but the frequency bands, protocols used, and features available vary widely on the wireless technology used. Implementing wireless communication in any project starts with the specification of functional requirements for the given project. However, a general understanding of the available wireless modules will help with the selection process. There are many different technologies available for wireless communication that is limited largely by the governmental allocation of communication bands. The major types of wireless communication are radio frequency (RF) communication, personal area networks (PAN)--both narrow band and ultra wide band (UWB), local area networks (LAN), cellular networks, and satellite networks. There are any number of standards and technologies contained within each major type. For example, PAN includes Bluetooth, Zigbee, Certified Wireless USB, among other specifications.

All wireless technologies are designed with mobility in mind. A basic wireless network consists of multiple stations communicating with radios that broadcast in either the 2.4GHz or 5GHz band. Almost every wireless networks have based on the IEEE 802.11 standards. This

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technology has started to play an essential role in the telecommunications infrastructure that all tiers of government and the public depend upon in managing public safety. Wireless applications are already in the hands of delivery people, equipment installers, insurance agents, and pharmacists. Later the 802.11a standard has been defined operation in the 5GHz band, including different signalling mechanisms and higher transmission rates. Still later the 802.11g standard was defined to enable use of 802.11a signalling and transmission mechanisms in the 2.4GHz band in such a way as to be backwards compatible with 802.11b networks.

The multi devices technique is the performance by letting a destination node receive the signals originating from a source node via different signal routes, and then process and correlate these signals in the destination node. Its algorithm is to mix signal on the transceivers as multi standard, which will refer to the capability to support various wireless standards and mixed signal refers to both digital and analog circuitry on the same chip and analysis the associated with the integration of wireless transceivers. The wireless multi devices algorithm and network connection has shown in Figures 1 and 2.

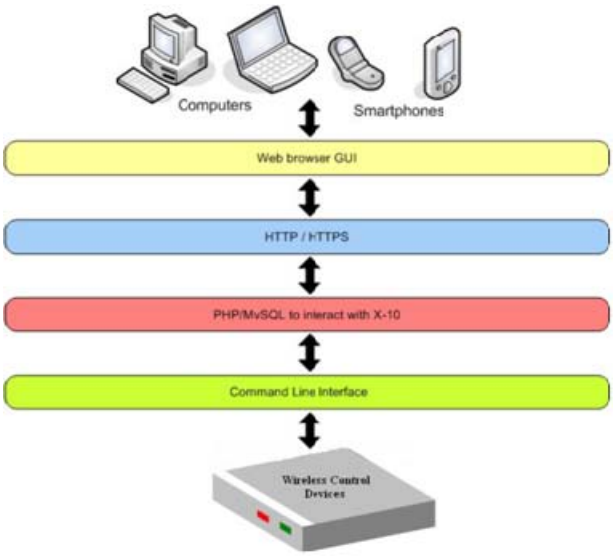

Figure 1: Wireless Multi Devices algorithm

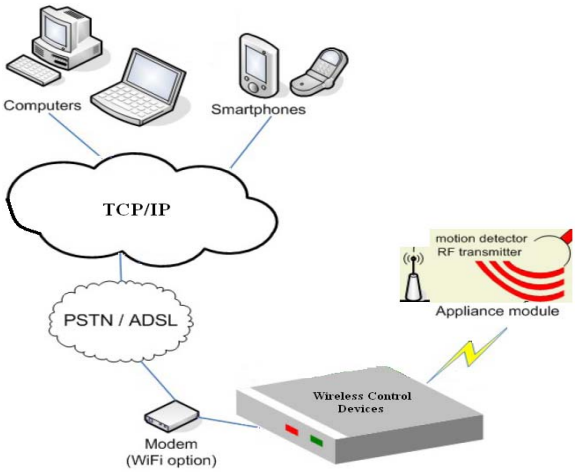

Figure 2: Wireless Multi Devices network connection

In Figures 1 and 2 is to present the wireless multi devices network connection and algorithm to retrieve the information from the wireless multi signals as input. These input signals become the parameters as data collection to apply to the classification process of neural network in Figure 3. The wireless control devices as Multi Devices network connection has functioned as Application Server. See Figure 4.

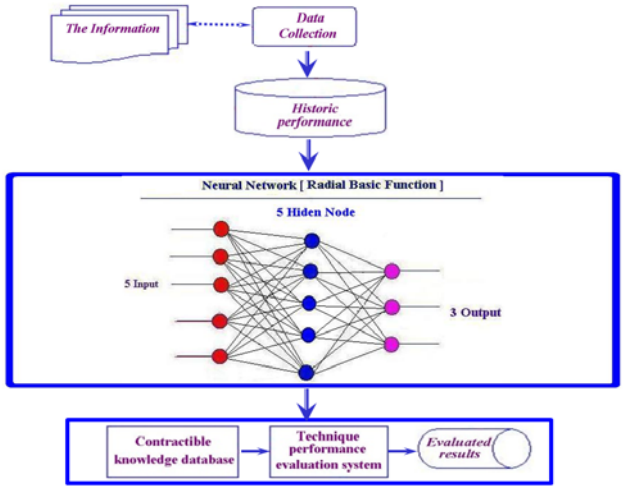

Figure 3: Neural Network structure

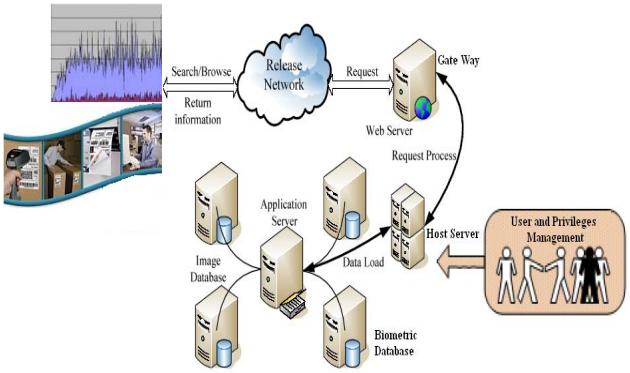

Figure 4: Multi Devices network connection.

3. CLASSIFICATION TECHNIQUE

Classification is an important problem in monitoring. Any classification method uses a set of features or parameters to characterize each object, where these features should be relevant to the task at hand. We consider here methods for supervised classification, meaning that a human expert both has determined into what classes an object may be categorized and also has provided a set of sample objects with known classes. This set of known objects is called the training set because it is used by the classification programs to learn how to classify objects. There are two phases to constructing a classifier. In the training phase, the training set is used to decide how the parameters ought to be weighted and combined in order to separate the various classes of objects. In the application phase, the weights determined in the training set are applied to a set of objects that do not

have known classes in order to determine what their classes are likely to be.

There are a number of standard classification methods in use. Probably neural network methods are most widely known. Odewahn et al. [1] applied neural network methods to the star-galaxy classification problem on digitized photographic plates. They had obtained the good results for objects in a limited brightness range. The biggest advantage of neural network methods is that they are general: they can handle problems with very many parameters, and they are able to classify objects well even when the distribution of objects in the *N*-dimensional parameter space is very complex.

4. NEURAL NETWORK TECHNIQUE

A Radial Basis Function (RBF) neural network has an input layer, a hidden layer and an output layer. The neurons in the hidden layer contain Gaussian transfer functions whose outputs are inversely proportional to the distance from the center of the neuron. RBF networks have a variable number of neurons as the number of training points. Its basic idea is to predict target value of an item, which is likely to be about the same as other items that have close values of the predictor variables. Then is to assume each case in the training set with two predictor variables, *x* and *y*. This method has used in two ways, both starting from the complete list of features and reducing it by removing parameters, and starting from a minimal list, augmenting it by adding parameters. Both methods have proven effective at pruning unnecessary parameters [2].

In classification problems it is important to have a non-linearity at the output of the RBF network model. Its purpose is to ensure that the output value stays within the range indicating the different classes. Once a potentially useful classifier has been constructed, the accuracy of the classifier must be measured. Knowledge of the accuracy is necessary both in the application of the classifier and also in comparison of different classifiers. The accuracy can be determined by applying the classifier to an independent training set of objects with known classifications. Since training sets are usually difficult to assemble, one rarely has the resources to construct yet another set of objects with known classifications purely for testing. One must avoid the temptation to train and test on the same set of objects, though. Once an object has been used for training, any test using it is necessarily biased.

Normally, the five-fold cross-validation is to measure the accuracy of classifiers. The training set is divided into several randomly selected subsets having roughly equal numbers of objects. The classifier is then trained *N* times, excluding a single subset each time. The resulting classifier is tested on the excluded subset. In each training session should be completely independent of the excluded subset of objects; use the results of an earlier training session as a starting point. In most applications, though, the computer time necessary to repeat the training is more readily available than is the human expert time required to generate completely independent test and training sets.

The training set has contained a list of objects with known classifications. Creating a training set requires a source of true object classifications, which is usually difficult even for human experts to generate if it must rely on the same data being used by the classifier. Adding many irrelevant parameters makes classification harder for all methods, not just the nearest neighbor methods. Training classifiers is an optimization problem in a many-dimensional space.

The Euclidean distance is computed from the point being evaluated to the center of each neuron, and a radial basis function (RBF) is applied to the distance to compute the weight for each neuron, it is so named because the radius distance is the argument to the function [3]. RBF networks have three layers: (1) Input layer, there is one neuron in the input layer for each predictor variable. The input neuron standardizes is the range of the values by subtracting the median and dividing by the inter-quartile range. The input neurons then feed the values to each of the neurons in the hidden layer. (2) Hidden layer, this layer has a variable number of neurons. Each neuron consists of a radial basis function centered on a point with as many dimensions as there are predictor variables. The spread (radius) of the RBF function may be different for each dimension. The centers and spreads are determined by the training process. (3) Summation layer, the value coming out of a neuron in the hidden layer is multiplied by a weight associated with the neuron (*W1*, *W2*, ...,*Wn*) and passed to the summation which adds up the weighted values and presents this sum as the output of the network [3]. This technique has shown in Figure 3.

5. CONCLUSION

This paper can be carried out in the key activity of multi-detected applications of an advanced surveillance system, basic functional parts that include changing detection, object recognition, target tracking, and target positioning. They also employ the technique to detect humans in motion, track their motion methodology with alarms rates in typical surveillance scenarios, where is significant activity in the scene using the camera tampering to detect occluded camera view, and providing the guidance for remote sensing image databases. The modern nonlinear prediction technique had been also introduced the measuring changes between images and temporal segmentation. The wireless multi devices network connection will transfer the parameters via Gate way, Host server, and Application server. The filtering techniques for analyzing patterns of change over time with end-to-end security through IP networks functions. Therefore, the database system for overall function enhancements and various applications can be proposed to introduce with able to record and play images online, where the remote user can use the system through authentication process by using web browser. And then to able to record the signals that are sent and started through database and image information of corresponding time is played through file classification processor. The further research can be more deeply in setup the experimental test based on test rig as the real-time embeded network control system.

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