DETECTING AND SPOTTING BOMBS USING WIRELESS SENSORS AND EXPERT SYSTEMS

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ABSTRACT

A combination of wireless bomb detection sensor/stick connected by an expert system . Surveillance is monitoring by 24X7 round the clock with effective notification systems. Entering and creation of bomb will be observed initially. The sensors/stick are connected to expert systems, which are installed at different locations and areas. Kalmann algorithm removes noise from the sensor data which is received. The expert system makes decision using ID3 algorithm and it automatically recognizes the type of bomb planted.

Keyword : *Explosive detection, sensor networks, surveillance system, terrorist attacks, metal*

1.Introduction

Terrorists have a huge advantage over lack of fool proof security enforcement because it is, many times, more expensive to detect terror threats and also to make decisions in right time. Current explosive detection technologies deployed for security measures are expensive and require constant operator attention. The fundamental concept behind explosives is very simple. At the most basic level, an explosive is just something that burns or decomposes very quickly, producing a lot of heat and gas in a short amount of time. A chemical explosive is a compound or a mixture of compounds when subjected to heat, impact, friction, or shock, undergoes very rapid, self-propagating, heat- producing decomposition. This decomposition produces gases that exert tremendous pressures as they expand high temperature.

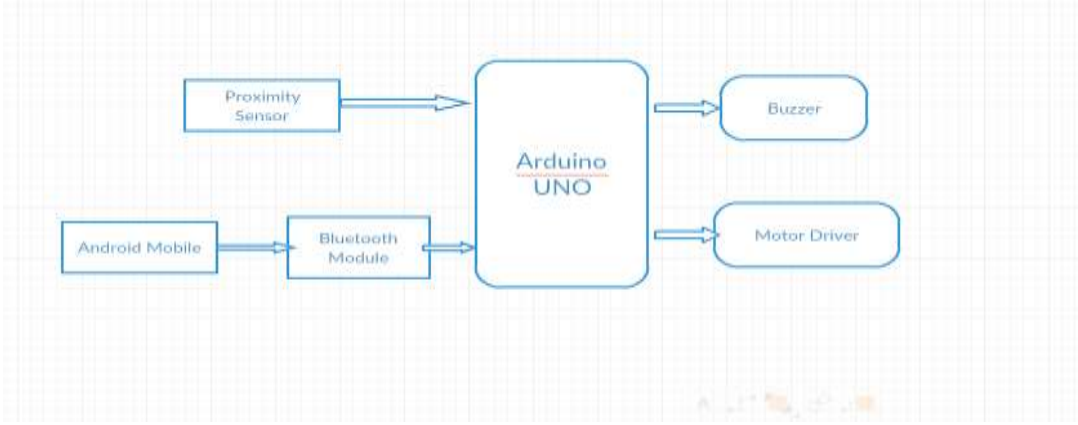

Fig.-1 System Architecture

1.1 Module

Bomb detecting devices (Stick) or sensors are used to sense the explosive materials which emanating radioactivity. Wireless bomb sensors are preferred. Bomb sensors are deployed in different locations to sense the radioactive bombs all the time. Any type of sensors can be used. This sensor can be placed in one static place or dynamic and information can be continuously gathered. Based on coverage capacity of sensors and the surveillance contour, the number of sensors is used After sensing data, it must be transmitted to the cloud systems to analyze through wired means or wireless.

Fig.-2 Explosive Detection Sensor/Stick

2 Class Diagram

Class diagram are the most common diagrams used in UML. Class diagram consists of classes , interfaces, association and collaboration. It basically represent the object oriented view of a system which is static in nature.

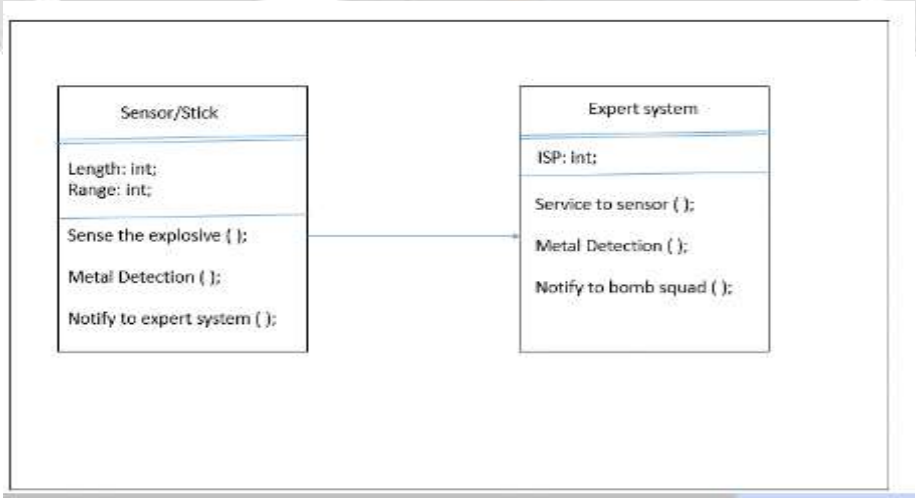

Fig.3- Class Diagram

2.1 Use Case Diagram

A use case diagram in Unified Modeling Language(UML) is a type of behavioral diagram defined by and created from a Use Case analysis. Its purpose is to present a graphical overview of the functionality provide by a system in terms of actors, their goals and any dependencies between those use cases. The main purpose of a use case diagram

is to show what system can be depicted use cases specify desired behavior ,they do not dictate how that behavior will be carried out. The user primary actor in this system and all other actors are secondary actors.

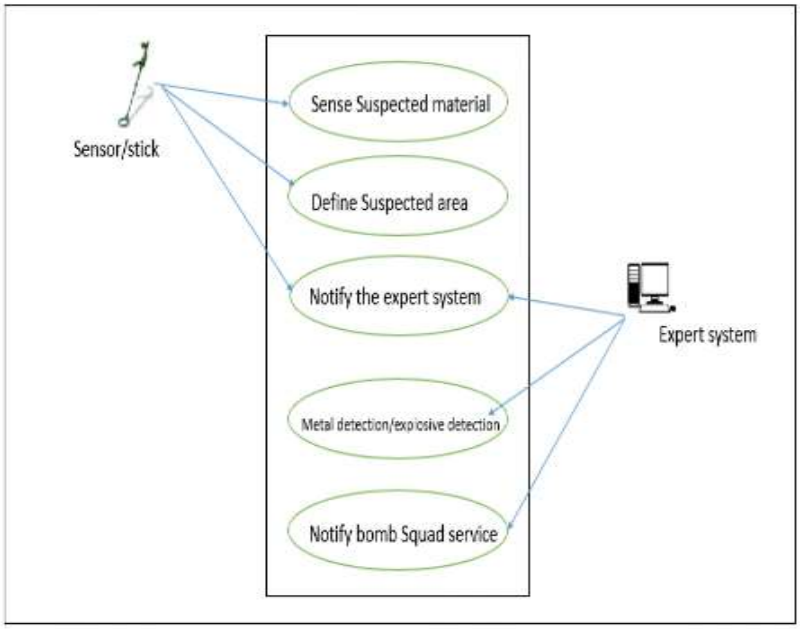

Fig -4 Use Case Diagram

3. PROTOTYPE MODEL

3.1 ID3

To design a decision tree, there are many algorithms like CART,ID3, C4.5, etc., ID3 design or construct decision tree by applying a top-down, greedy search through the given sets of training data to test each an attribute at everyone node. ID3 algorithm select the attribute to be slotted based on two property.

3.2 Decline Metric

It used for measure the amount of information in an attribute. Decline is calculated for all the remaining attributes division occurs at the attribute that has smallest decline.

3.3 Information progress

It is a analytical property which measures how well a given attribute dividing training examples into targeted classes. The one with the highest information that information being the most useful for classification is selected based on decline.

3.4 Implementation

Bomb detecting devices or sensors are used to sense the explosive materials which originate radioactivity. Wireless bomb sensors/stick are preferred. Bomb sensors are placed in different locations to sense the radioactive bombs 24x7 hrs. Any type of sensors can be used. The characteristics of sensors different from other sensor. Some shows absorption level. Some shows range. Some shows direction. The coverage area also differs from one type of sensor to the other one, some has maximum range and some has minimum range to detect the explosive materials.

3.5 Sensing

Trace explosive materials detection consists of the chemical identification of absorption entity of explosive compound, in vapor or in particulate form or may be in both. Vapor refers to the gas phase molecules emitted from the explosive's surface (solid or liquid) because of its finite vapor pressure. Particulate refers to microscopic particles of solid material (typically down to sub pictogram Bomb detecting device is taken as sensor node. This sensor can be placed in one static place or dynamic and information can be continuously gathered. Based on

coverage capacity of sensors and the surveillance contour, the number of sensors is used. size - 1 pictogram of TNT contains about 2.6 billion molecules)that adhere to and contaminate surfaces that have, directly or indirectly, come into contact with an explosive material. We can use any kind of trustworthy bomb sensors and portioning of area depends on these sensors. For understanding, we can name the sensors as SI, S2, S3 ..... These sensors will sense the bomb when it enters their sensing area. After analyzing the information the data will be transmitted to the expert system.

3.6 Data Transport

After sensing data, it must be transmitted to the expert systems to analyze through wired means or wireless. The wired mode of transfer of data may be subjected to intrusion or any kind of fatal damages.. Wireless sensors are apt to connect with expert systems for processing.

4. CONCLUSIONS

There may be many varieties of sensors and so many types of bombs. but selecting precise sensors and removing bomb earlier by analyzing easier is important. Preventing from chaos and protect humanity from any fatal damages through strong intelligence mechanisms is our prime concern.

5. REFERENCES

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