# REAL-TIME OBJECT DETECTING AND TRACKING SYSTEM USING ACTIVE RFID

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***ABSTRACT: The proliferation of the Internet of Things (IoT) has fostered growing attention to real-time locating systems (RTLS) using radio frequency identification (RFID) for asset management, which can automatically identify and track gas leakage within indoor or confined environments. However, most of them are inappropriate for large-scale IoT applications owing to severe radio multipath, diffraction, and reflection. A newly fashioned RTLS using active RFID for the IoT (Internet of Things) has been used. To achieve fine-grained localization accuracy, ilocate presents the concept of virtual reference tags. To overcome signal multipath, ilocate employs a frequency-hopping technique to schedule RFID communication which presents the localization accuracy and the data transmission rate for large-scale active RFID networks.***

***KEYWORDS: Frequency hopping, Internet of Things (IoT), radio-frequency identification (RFID), real-time locating systems (RTLSs), tag–tag communication, data analyzing.***

## I. INTRODUCTION

The Internet of Things (IoT) is emerging as a new computing paradigm that connects uniquely identifiable objects to an Internet like network . It enables objects to be intelligent for interacting and cooperating with each other anytime and anyplace. The IoT might significantly change the manner we perform daily activities by real-time locating systems (RTLSs) as it opens up tremendous opportunities for economies and individuals. RTLSs can automatically identify, track, and visualize objects that are usually within indoor or confined environments mainly using RF identification (RFID). RFID is a wireless communication means using RF electro- magnetic fields to identify and track tags attached to objects . An RFID system involves tags, readers, and antennas. RFID tags can be passive, active, or battery-assisted passive tags. An active tag has an onboard battery and periodically transmits its ID signal and stored information.

An active reader's working range can be adjusted from 1 m to tens of meters, allowing flexibility in applications such as asset supervision and management. Owing to its multi-object recognition, in online of sight, and high cost-effectiveness, RFID has been widely used for indoor localization to spur IoT real-time locating applications. Note that Global Positioning System satellite signals are severely attenuated and scattered by buildings, trees, and other obstructions in confined environments. A variety of RFID localization schemes have been pro- posed during the past several years. These techniques include the angle of arrival , the time of arrival (TOA) ], the time difference of arrival (TDOA) , the received signal strength indicator (RSSI), and the received signal phase (RSP) . The second type of schemes chiefly takes advantage of the k-nearest neighbors and probabilistic techniques to locate objects by comparing the measurements of active tags with the environment fingerprints, e.g., RSSI reading sequences , .

The third type of schemes turns to the dense deployment of antennas and regards that the location of the target tag is the same as the antenna that detects it. Current efforts can locate whether an object is within a radio range but cannot pinpoint its exact location. Many applications, however, require fine-grained location information. For example, readers in libraries would like to know the specific locations of the books they would borrow. Moreover, existing works emphasize on localization accuracy or the sensing distance. To the best of our knowledge, we do not find any work that takes the tag working area and the localization accuracy into the holistic design of locating systems. To this end, we propose in this paper an RTLS using active RFID called iLocate for asset management, which can accurately locate objects with remote sensing distance. iLocate supports large-scale organizations using a radio portfolio in indoor environments.

It incorporates virtual RFID reference tags, tag– tag communication, coordinators, and a frequency- hopping technique into the design. The virtual reference tags are fictitious tags deduced from real adjacent reference tags, which are for high-level localization. The tag– tag communication is the communication means between two tags within the same coordinator's working range, where the coordinator acts as the mediator. We redesign the structure of the active tags and the readers in the secondary development by incorporating a frequency-hopping spread spectrum. We also introduce reference tags whose locations are known and RFID coordinators that are active RFID readers to improve the location estimation accuracy. Finally, the proposed system is applied to the real projects.

## II. LITERATURE SURVEY

Daqiang zhang (m'10) received B.Sc. degree in management and the M.Sc. degree in computer science from anhui university in 2003 and 2006, the ph.d. degree in computer science from shanghai jiao tong university in 2010, respectively. He is an associate professor with the school of software engineering, tongji university, shanghai, china. he is

  

the author or coauthor of more than 60 papers in major journals and international con- ferences, including the ieee transactions on parallel and distributed systems, the ieee transactions on computers, the ieee transactions on emerging topics i n computing, the ieee transactions on information forensics and security, ieee networks, the ieee wireless communications magazine, the international conference on parallel processing, the ieee international conference on communications, and the ieee wireless communications and networking conference, in his areas of research interest, which include mobile computing, distributed computing, and wireless sensor networks.

Mr. zhang is in the editorial board of telecommunication systems (springer), the european transactions on telecommunications (wiley), the international journal of big data intelligence (inderscience), the korean society for internet information transactions on internet and information systems, and the new review of hypermedia and multimedia (taylor & francis). he is a member of the china computer federation. he was the recipient of the best paper award from the 2009 asian conference on computer vision and the 2012 ieee international conference on ubiquitous intelligence and computing.

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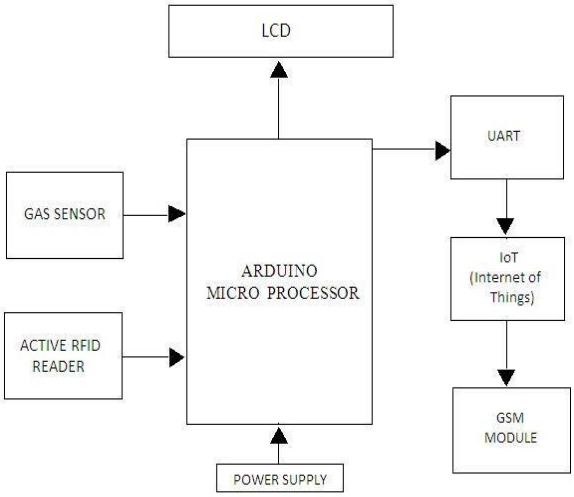
## III. EXISTING SYSTEM

In the existing system, the exact location of the object will not be pointed since, passive RFID was used. The main purpose of passive RFID is only to detect the object within the shortest range. Sometimes, it may lead to failure. Systems usually require clock synchronization among all the tags, interrogators and readers in the presence of object movement. Current efforts can locate whether an object is within a radio range but cannot pinpoint its exact location.

## IV. PROPOSED SYSTEM

RFID readers that act as a local centre to manage nearby tags using the tag–tag communication protocol. This threshold value will be monitored for every 3 – 5 seconds and this value will be updated instantly to IoT. In case if there is any change in the threshold value, then the information will be passed to the processor which sends a signal to the GSM module. This GSM module will send message to the authorized person along with the exact location by using active RFID.

## V. ARCHITECTURE DIAGRAM




GAS DETECTION:

Industries have been a key part in the swelling of the nation's economy. The swelling in industries has also lead to the swelling of tragedies in the past decades, out of which majority caused by omission or human errors. The initiate method is discussed a menace board system to detect perilous gas leaks and Gas cylinder drop level from the set value using gas sensor and active RFID reader. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals. Here a fixed type gas detector is used. Fixed type gas detectors may be used for detection of one or more gas types. Fixed type detectors are generally mounted near the process area of a plant or control room, or an area to be protected, such as a residential bedroom. Generally, industrial sensors are installed on fixed type mild steel structures and a cable connects the detectors to a SCADA system for continuous monitoring. A tripping interlock can be activated for an emergency situation.

ONLINE MONITORING:

In the online monitoring system, the gas sensor is set with a threshold value which determines the leakage of gas. This threshold value will be monitored for every 3 – 5 seconds and this value will be updated instantly to IoT.

In case if there is any change in the threshold value, then the information will be passed to the processor which sends a signal to the GSM module.

GSM MODULE:

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator.

A GSM Module is basically a GSM Modem (like SIM 900) connected to a PCB with different types of output taken from the board – say TTL Output (for Arduino, 8051 and other microcontrollers).
Finally, this GSM module interfaces with the Arduino micro processor and sends the message to the provided contact at the time of gas leakage.

IOT (INTERNET OF THINGS)
Using Internet of Things (IOT), we can control any electronic equipment in homes and industries. Moreover, you can read a data from any sensor and analyze it graphically from anywhere in the world. Here, we can read gas leakage data from gas sensor and upload it to a cloud using Arduino Uno and ESP8266-01 module. Arduino Uno is MCU, it fetches the data of gas leakage from gas sensor and process it and give it to an ESP8266 Module. ESP8266 is a WiFi module; it is one of the leading platforms for Internet of Things. It can transfer a data to IOT cloud. This IoT module has four sections; firstly gas sensor senses the gas leakage data. Secondly Arduino Uno extracts the gas sensor's data as suitable number in percentage and threshold scale, and sends it to Wi-Fi Module. Thirdly Wi-Fi Module ESP8266 sends the data to ThingSpeak's Sever. And finally ThingSpeak analyses the data and shows it in a Graph form. Optional LCD is also used to display the gas composition status.

## VI. CONCLUSION

The proposed project can automatically identify and track gas composition status within indoor or confined environments. A newly fashioned RTLS using active RFID for the IoT (Internet of Things) has been used. To achieve fine-grained localization accuracy, ilocate presents the concept of virtual reference tags. The gas sensor is set with a threshold value which determines the leakage of gas. Then it can reach by the active RFID reader and to the Arduino microprocessor. UART performs the communication network between the major components of the system i.e., IoT, GSM module and LCD. The threshold value will be monitored for every 3 – 5 seconds and this value will be updated instantly to IoT. In case if there is any change in the threshold value, then the information will be passed to the Arduino microprocessor and it sends a signal to the GSM module. Finally, it sends a message to the authorized person along with the exact location by using active RFID.

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