Integrated IoT Based Enhanced System for Intelligent Tracking in Multipurpose Applications

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Abstract- The main objective of this thesis is to design efficient and enhanced ship detection, location finding system using integrated technology. Mat-lab, Embedded system along with IOT altogether syndical forms to design this efficient and reliable concept. Here, in this concept ship is detected among all other tiny and huge partials in ocean whether it is on in-shore or off-shore. RFID readers are used to find the placing position (blocks)of ship. Country, size of the detected ship is estimated by using MATLAB interface.A software and hardware texting framework is presented using advanced technology to address some of the current logistics problems related to the screening of building blocks in the shipbuilding industry. If that detected ship at harborseems to be suspicious; harbor management needs to surveillance that ship throughout its whole journey. GPS, NODEMCU and GSM are used for tracking ship and web uploading purpose.

Keywords- Internet of Things (IOT), Radio frequency Identification (RFID), in-shore, off-shore, Global Positioning System (GPS), Global system for Messaging service (GSM).

I. INTRODUCTION

SHIP detection is one of the hottest issues in many fields, such as harbor dynamic surveillance, traffic monitoring, and maritime management. According to the complexity of background, the existing ship detection methods are divided into the offshore ship detection and the inshore ship detection. For the offshore ship detection, the gray distribution analysis or the constant false alarm rate detector is usually adopted due to the fact that the gray level of the ships is usually higher than that of the sea background, especially in the synthetic aperture radar images. The interest in vessel monitoring and surveillance springs from the need to enforce regulations and be warned of security threats; it is for the most part authorities who have these needs. Regulations are related to maritime safety, immigration, protection of the environment and natural resources, tariffs and duties, and public and workers' health and well-being. Security threats can be related to piracy, terrorism, organized crime, and military and defence issues. Ship detection in synthetic aperture radar (SAR) images has long been an activeresearch topic and has many applications, such as monitoring of fishing activities and oil pollution, marine traffic management and crime control [1]. Due to multiple backscatter of the incoming radar waves frommanmade objects, it becomes possible to separate ships from background clutters. However, the unique imaging mechanism of SAR makes it far more challenging [2], such as the bright spots induced by thecoherence of the backscattered signal, the heterogeneities of sea clutter by different weather conditionsand the unclear appearance of ships caused by different angle imaging in SAR imagery. High-resolution optical remote sensing images have become an important research topic in many marine applications. Due to their large scale and high efficiency, such images have been extensively used in ship detection, such as in dynamic harbor surveillance, maritime management, ship rescue and smuggling activity monitoring. The interest in vessel monitoring and surveillance springs from the need to enforce regulations and be warned of security threats; it is for the most part authorities who have these needs. Regulations are related to maritime safety, immigration, protection of the environment and natural resources, tariffs and duties, and public and workers' health and well-being. Security threats can be related to piracy, terrorism, organized crime, and military and defence issues. SAR has the ability to penetrate clouds and provide information on both day and night. SAR imagery can potentially be used to detect a range of maritime activity, including small vessels, large ocean-going ships and even oil spills. SAR is a proven technology that can be used to detect ships at sea which have no active transponders (commonly referred to as dark targets). Another advantage of using SAR is the large swath widths that these satellite based sensors can cover (thousands of square kilometers can be covered in a single pass) which reduces the monitoring cost per square kilometers significantly when compared to manual monitoring systems. Various methods have been proposed that process SAR images to monitor these targets. Ship detection in synthetic aperture radar (SAR) images has long been an active research topic and has many applications, such as monitoring of fishing activities and oil pollution, marine traffic management and crime control. Due to multiple backscatter of the incoming radar waves from man-made objects, it becomes possible to separate ships from background clutters. However, the unique imaging mechanism of SAR makes it far more challenging , such as the bright spots induced by the coherence of the backscattered signal, the heterogeneities of sea clutter by different weather conditions and the unclear appearance of ships caused by different angle imaging in SAR imagery. With

the need for improvement and the growing economic problem, the industries have to find better ways to best fit the scenario - cutting costs, reducing staffing, and improving manufacturing processes without a massive investment. In order to assist the commented areas, the technologies of identification and screening in industrial environments have demonstrated a vertiginous growth in the last years.

II. LITERATURE SURVEY

Many methods have recently been developed to address these intractable problems. Based on detection approach, these detection methods can be divided into three categories. The first category is based on a priori information. Long et al. [12] employs a priori geographic information to rapidly locateharbors. An accurate geographic information system (GIS) contributes to realizing the segmentation between the sea and harbor land and facilitates separating between inshore ships from the harbor. Thesecond category is based on water–land segmentation and contour extraction. These types of methods, which rely on primary image features such as gray information and textures, are proposed in [13–15].An alterable included angle code-based method is proposed by Jiang et al. in [13]. This algorithm for the alterable included angle code is simplified by the evaluation parameter of the broken line in this paper. Xu et al. [14] employs the invariant generalized Hough transform, which could adapt to thetranslation, scale and rotation transformation of ships, to extract the ship shape. A method based onshape and context information is presented in Liu et al. [15]. Successive shape analyses are proposed in this work to achieve accurate detection of docked ship locations. Recent, model-based methods couldbe considered to belong to yet a third category. Xu et al. [16] proposes a new detection framework based on the robust invariant generalized Hough transform to detect inshore ships that could adapt to deformations of various ships. The saliency and S-HOG (histogram of oriented gradient) descriptor is presented to detect unsupervised ships by Qi et al. [17].

III. PROPOSED METHODOLOGY

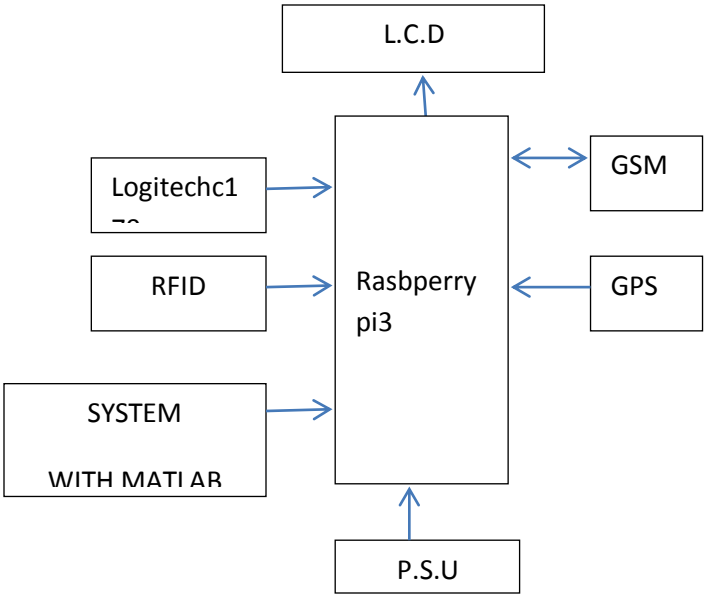


Fig.1: Proposed block diagram

The proposed architecture is as shown in above figure.
The proposed inshore ship detection method is shown in Fig. 2. The detection process mainly includes three stages: 1) the RGA-based possible pose estimation; 2) the pose weighted voting; and 3) the score-map post processing. RGA-based possible pose estimation is to find out the most related pixel pairs for the detection. Since the estimation is executed on a target pose that describes not only the direction but also the scale, the proposed method achieves rotation–scale invariance. The pose weighted voting process is to collect the evidences of the detected target from the related pixel pairs obtained in the former process. "V"-shaped structure weighting and outline continuity evaluation are added in the voting, so that the proposed method is robust to the shape-similar distractors and complex background. Finally, the detection result is outputted by the score map postprocessing.

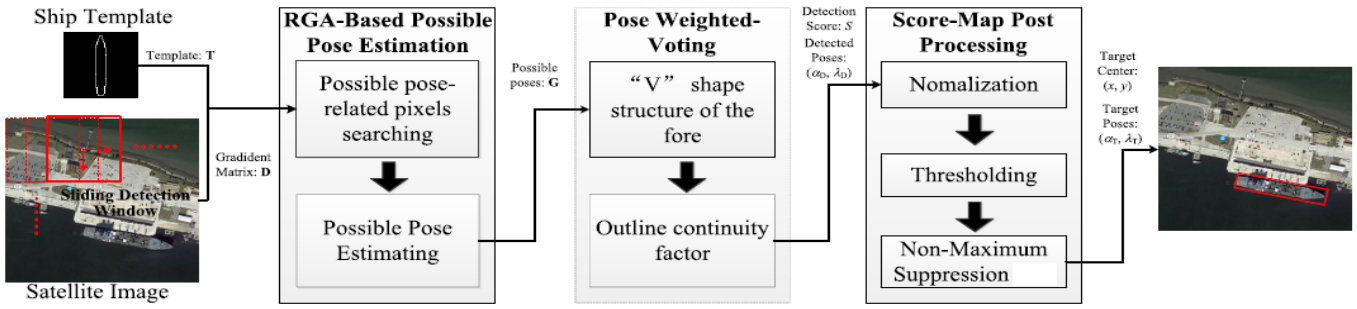


Fig.2: proposed ship detection system

Through above procedure; shape of the ship and country can be found and corresponding alternations can be done automatically with out any manual interactions.A software and hardware texting framework was presented for tracking using RFID technology to address some of the current logistics problems related to the screening of building blocks in the shipbuilding industry. The result was considered satisfactory, with the arrangement developed by the group defining the position for installation of labels in the block baseline and Hotlog. The question of using GPS to define the position of a block on the shipyard is a more complete solution than that demonstrated by since it is not necessary to define a previous route for the transfer. A megablock is composed of 13 smaller blocks, manufactured in the building line, outside the dry dock. After the steps of building, subassembling and assembling a block, they undergo a corrosion treatment, are painted and soldered in megablocks. At the point where the assembly of the blocks begins, a Hotlog will be installed. RFID tags will also be placed on the baseline (BL) of the blocks, known as the bottom panel as well. This event will mark the beginning of the life of a block. After associating the blocks with the labels, the system will follow the movement of the same ones along the yard. The locomotion of a block within the yard is carried out by several transport vehicles. We chose to stick the system on board a vehicle called as Kamag. This way it will be possible to identify your transfer in the industrial plant through GPS. The location data is sent over the internet and stored in a database so that it can be accessed by the application.

RASPBERRY PI : The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundationto promote the teaching of basic computer science in schools and in developing countries The original model became far more popular than anticipated,[8] selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards, mice and cases). However, some accessories have been included in several official and unofficial bundles. Several generations of Raspberry Pis have been released. All models feature a Broadcom system on a chip (SoC) with an integrated ARMcompatible central processing unit (CPU) and on-chip graphics processing unit (GPU).Processor speed ranges from 700 MHz to 1.4 GHz for the Pi 3 Model B+; on-board memory ranges from 256 MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating system and program memory in either SDHC or MicroSDHC sizes. The boards have one to four USB ports. For video output, HDMI and composite video are supported, with a standard 3.5 mm phono jack for audio output. Lower-level output is provided by a number of GPIO pins which support common protocols like I²C. The B-models have an 8P8C Ethernetport and the Pi 3 and Pi Zero W have on-board Wi-Fi 802.11n and Bluetooth. Prices range from US$5 to $35.The first generation (Raspberry Pi 1 Model B) was released in February 2012, followed by the simpler and cheaper Model A. In 2014, the Foundation released a board with an improved design, Raspberry Pi 1 Model B+. These boards are approximately credit-card sized and represent the standard mainline form-factor. Improved A+ and B+ models were released a year later. A "Compute Module" was released in April 2014 for embedded applications. The Raspberry Pi 2 which added more RAM was released in February 2015. On 12 January 2018, the Raspberry Pi Zero WH was launched, the same version of the Zero W with pre-soldered GPIO headers. Raspberry Pi 3 Model B was released in February 2016 with a 64 bit quad core processor, and has on-board WiFi, Bluetooth and USB boot capabilities.[19] On Pi Day 2018 model 3B+ appeared with a faster 1.4 GHz processor and a 3 times faster network based on gigabit ethernet (300 Mbit / s) or 2.4 / 5 GHz dual-band Wi-Fi (100 Mbit / s).[1] Other options are: Power over Ethernet (PoE), USB boot and network boot (an SD card is no longer required). This allows the use of the Pi in hard-to-reach places (possibly without electricity).

GLOBAL POSITIONING SYSTEM: GPS is one of the most fantastic utilities ever devised by man. GPS will figure in history alongside the development of the sea-going chronometer. This device enabled seafarers to plot their course to an accuracy that greatly encouraged maritime activity, and led to the migration explosion of the nineteenth century. GPS will effect mankind in the same way. There are myriad applications that will benefit us individually and collectively. Latitude, Longitude, AMG etc: I get many requests to explain the different numbers used by different GPS at the same location. This is a valid and sensible question, and there are easily understood answers. You may also wonder about terms such as UTM, GDA, MGA, datum, position format, grid, and true north. My customers get free assistance with these, and any other matter relating to their purchase, and the use of the GPS.

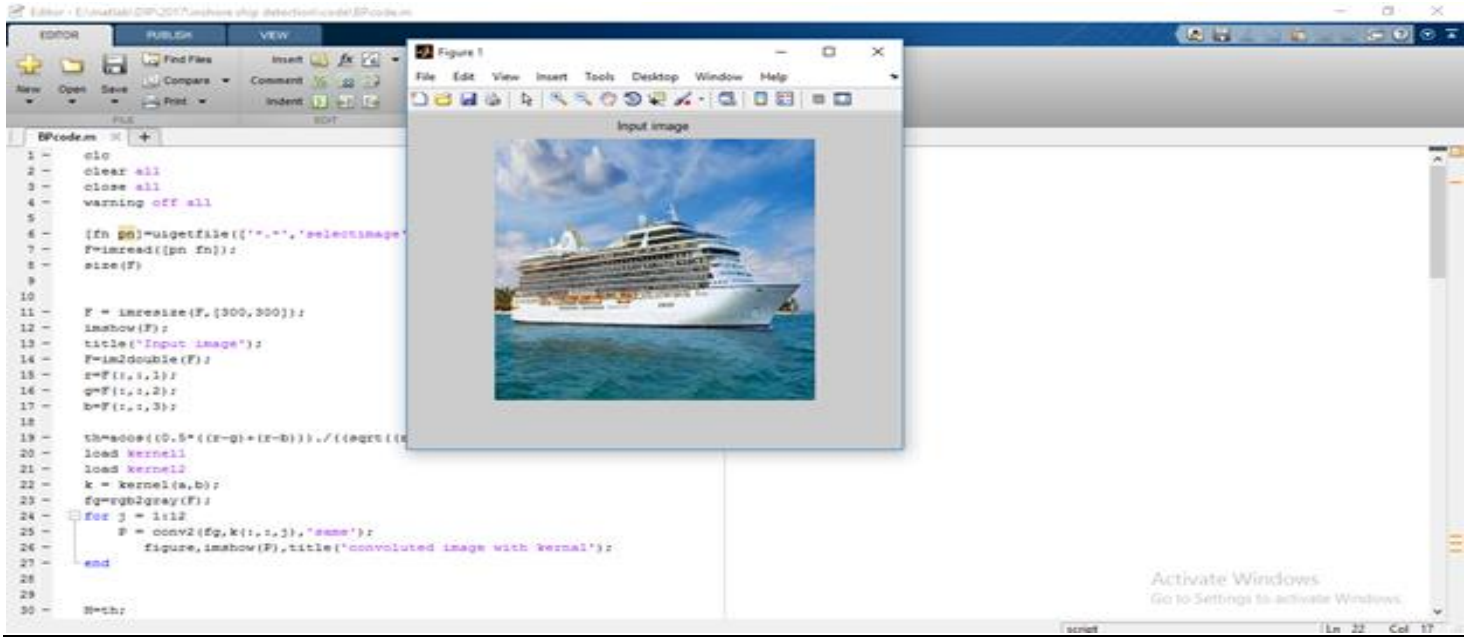
RADIO FREQUENCY IDENTIFICATION: An RFID system consists of three components: a scanning antenna and transceiver (often combined into one reader, also known as an interrogator) and a transponder, the RFID tag. An RFID tag consists of a microchip, memory and antenna. The RFID reader is a network-connected device that can be permanently attached or portable. It uses radio frequency waves to transmit signals that activate the tag. Once activated, the tag sends a wave back to the antenna, where it is translated into data. RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with

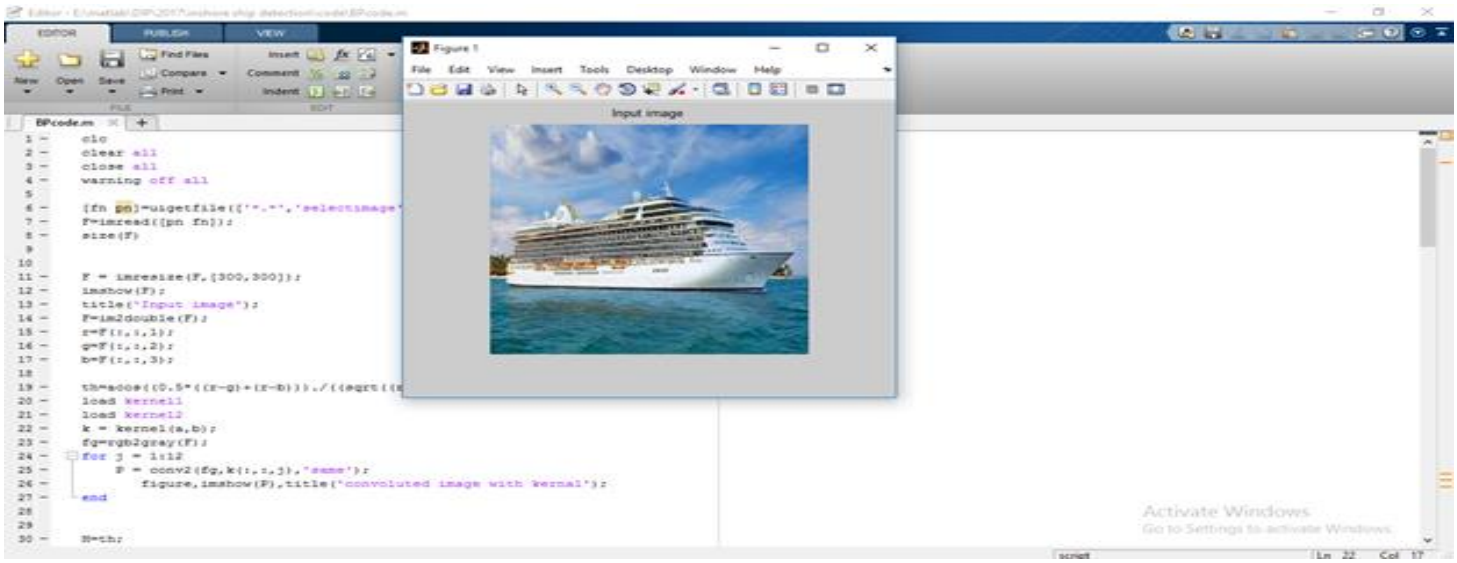
little or no human intervention. RFID methods utilize radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.

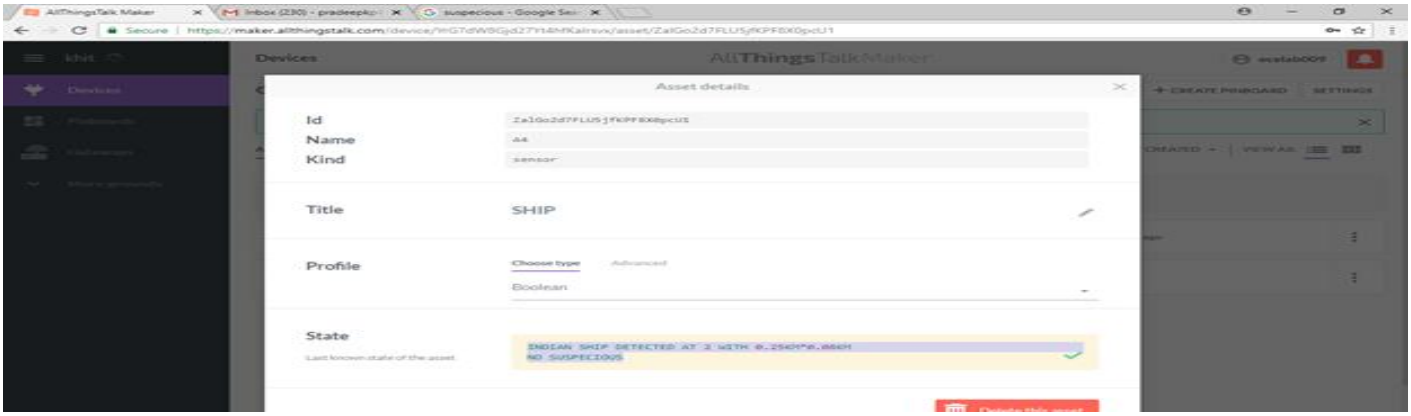
GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS:

The GSM standard has given birth to wireless services like General Packet Radio Service (GPRS) and Enhanced Data Rates for GSM Evolution (EDGE). Its end users were the first to take advantage of an inexpensive implementation of SMS (short message system), which is more popularly known as texting. Being a cellular network, GSM makes use of cells to provide wireless communication to subscribers who are in the vicinity of these cells. The four main cells that make up a GSM network are called macro, micro, pico and femto. Outdoor coverage is typically provided by macro and micro cells, while indoor coverage is usually provided by the pico and femto cells. GSM phones may be identified by the presence of a Subscriber Identity Module (SIM). This tiny object, which is about as wide as a finger, is a removable smart card that contains a user's subscription information, as well as some contact entries. This SIM card allows a user to switch from one GSM phone to another. In some countries, especially those in Asia, GSM phones are locked to a specific carrier. However, if a user manages to unlock a phone, he can insert any SIM from any carrier into the same phone.

IV. RESULT







V. CONCLUSION

Experiments on large-scale harbor remote sensing images verify that the proposed method is effective and robust when applied to unsatisfactory scenes.Compared with typical methods, the proposed method also achieves better detection results. Thismethod aims at rapidly getting the berthing situation of inshore ship from interested port by using a wide range of remote sensing images. Especially, some situations that traditional information acquisition methods could not deal with (such as non-cooperation) would suit our method. The experimental results indicate that the proposed method is rotation– scale invariant and robust to the shape-similar distractor interference as well as to the complex backgrounds. The results also demonstrate that the proposed detection method outperforms four other start-of-the-art detection methods.A software and hardware texting framework was presented for tracking using RFID technology to address some of the current logistics problems related to the screening of building blocks in the shipbuilding industry. The result was considered satisfactory, with the arrangement developed by the group defining the position for installation of labels in the blockbaseline and Hotlog. All results are uploaded to IOT and sent automatically to authorize mobile number.

VI. REFERENCES

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