

# **TARP**

## **DIGITAL ASSIGNMENT – 2**

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### **LITERATURE REVIEW**

<b>No.</b>	<b>Paper Title</b>	<b>Summary</b>	<b>Strengths</b>	<b>Limitations</b>
1	Patient Identification using Facial Recognition	The science of computer vision has the potential to completely alter how prescriptions are now issued to patients. The use of cutting-edge computer vision technology to do away with written prescriptions and tangible items like RFID record files has been suggested in this research as a workable solution. The benefits of having a Worldwide Medical Face Identification system for each patient have been amply demonstrated. These benefits include a reduction in inefficiency, the time spent at the front desk, and the efforts of medical staff in identifying patients and picking up on subtleties of their medical histories, prior appointments with specialists, and prescriptions. A secure platform may be used to install a database connected to the patient's face image, which can be periodically updated and will be globally accepted as the	Recovery of patient related documents is quick and efficient, computer vision coupled with a database not only makes the creation of a new entry easy but also facilitates in search of previous records of the patient.	The model needs to be more developed in the areas of detection in low lighting and detection of people who have similar facial features.

		foundation for the identification of patients accessible to doctors at all accredited medical facilities for research and prompt action.		
2	Emergency situation monitoring service using context motion tracking of chronic disease patients	With the development of convergence technology, interactive communication utilizing context-aware computing environments and a variety of devices became possible, and research on health management are receiving a lot of attention. The need for ongoing treatment and health maintenance has been emphasized rather than the traditional method to treating the condition since chronic disease is on the rise, which is being accompanied by changes in lifestyle, improvements in quality of life, and an increase in life expectancy. Thus, there is need of development of a technology such that the patient or their relatives themselves are able to monitor the vitals and tend to the needs of the patient.	Provides satisfactory monitoring and assistance especially for chronic diseases which require constant monitoring.	This research is heavily app dependent and thus requires implementation of a good user interface along with verification and authentication for security.
3	Emergency Patient Identification System	The patients' identities will be uniquely determined by this method. In an emergency, doctors can act quickly by gathering the most recent information on their patients' conditions. The technology assists the user in transmitting and receiving the essential medical information to hospitals and doctors. This	Provides detection of patient and their history in an emergency situation where time is crucial.	To achieve higher accuracy cloud-based services such as google cloud need to be used.

		<p>system offers a lot of distinctive characteristics, including the ability to locate the closest hospitals in an emergency. The history of the patient's family members might be added, which can serve to remind him of his current medical condition.</p>		
4	An IoT System for Social Distancing and Emergency Management in Smart Cities Using Multi-Sensor Data	<p>The major causes of emergency circumstances in structures and infrastructures are the occurrence of unintentional or catastrophic natural disasters and the adoption of insufficient management techniques. These factors may have an impact on the structural soundness of the aforementioned assets, which may then have an impact on the security and well-being of densely inhabited places. Disaster situations sometimes call for the surveillance of a crowd, while other times call for the detection of air components, for example. Sensor networks and Internet of Things (IOT) solutions aid in reducing these issues</p>	Integrates IOT sensors and wireless sensor networks to give an optimal solution for the problem.	It is implemented on low power devices, which might not have the necessary computational capacity for heavy loads.
5	Face Recognition for Security Efficiency in Managing and Monitoring Visitors of an Organization	<p>Currently, the majority of organizations, whether they are in the public, commercial, or even educational sectors, manage their visits using manual systems. Before entering the facility, visitors under this manual method must enroll with the person in control, who is typically a security guard. Numerous problems, particularly in managing, overseeing, and regulating the organizations' visits, plagued the manual procedure.</p>	Effective management, tracking and monitoring of the visitors which enter and are present in the organization.	Monitoring of the visitors must be done in way such that it doesn't infringe their privacy.

		The face recognition technology used in the computerized visitor management system that enables more effective management, monitoring, and control of the visitors is discussed in this article.		
6	Face Recognition-Based Automatic Hospital Admission with SMS Alerts	<p>The lengthy list of processes that must be completed before treating accident victims in India is to blame for the high fatality rate. These procedures include completing out entry forms and occasionally notifying the nearby police station. To ensure that the accident case is legitimate and there is no conspiracy, it is crucial to inform the police.</p> <p>The auto-filling of the form is a method that might shorten the time needed to complete the requirements. By applying image processing to identify the patient, this automatic form filling may be accomplished.</p>	Time is crucial in accident and emergency cases, this recognition system helps in reducing the time required for formalities so that the patient gets treated as soon as possible.	It takes longer to calculate the facial vectors in faces which include a bindi and beard or moustache.
7	FACE RECOGNITION SYSTEM FOR ELECTRONIC MEDICAL RECORD TO ACCESS OUT-PATIENT INFORMATION	A face recognition system to access patient information was created by means of hardware and software integration. The hardware consisted mainly of a webcam for capturing the image of the patient's face. The webcam, together with the servos were connected to a gizDuino v4.0 microcontroller to allow the camera to track the face. An interface and software program using C# (.Net Framework 4) with the use of	The test for face detection yielded a 100% result and out of 30 trials conducted for face recognition, 25 were recognized with its respective record.	To achieve smooth going higher accuracy cloud-based services such as google cloud need to be used.

		Viola-Jones algorithm code sources for face detection, Eigen-faces sources for face recognition, and Arduino IDE to program the microcontroller was developed.		
8	Project Design and Implementation of Face Recognition, Fever Detection, and Attendance Record Based on Sensing Technology	They have discussed the design, operation, and implementation of a system for face recognition, fever sensing, and attendance recording. We used software such as HTML, CSS, JS, Django, MySQL, and WeChat programs among multiple frameworks and developments for our system, and used MySQL to store employee facial information, basic personal information, attendance records, personal temperature test results, and health records.	The system has successfully integrated many pieces of software and small hardware, the initial construction cost will be low. It is also energy saving, minimizing maintenance costs. It can also perform fever screenings and track personal health records.	It is implemented on low power devices, which might not have the necessary computational capacity for heavy loads.
9	High-Capacity Real-Time Face Retrieval Recognition Algorithm Based on Task Scheduling Model for the Treatment Area of Hospital	This paper presents an in-depth study of face detection, face feature extraction, and face classification from three important components of a high-capacity face recognition system for the treatment area of hospital and a study of a high-capacity realtime face retrieval and recognition algorithm for the treatment area of hospital based on a task scheduling model.	The performance tests of the face detection model and feature extraction network show that the face detection model has a significant reduction in false-positive rate, better fitting of border regression, and improved time performance. The face feature extraction network has no overfitting,	Although the system designed in this paper improves the speed of face detection and combines soft and hard code sign to accomplish the face recognition function, there are still some short . Firstly, it is difficult to improve the recognition rate of face recognition by relying on the simple task scheduling algorithm comings.

			and the features are highly discriminative with small feature extraction time consumption.	
10	Principles of Cloud Computing Application in Emergency Management	Recent emergency situations in the world show the tendency that the occurrence frequency of natural disasters is expected to increase in future. Therefore new approaches for emergency management need to be elaborated based on the latest IT developments. Cloud computing is considered as a possible way to lower the cost and complexity of computing by providing applications that run on the Internet.	Cloud computing services are more readily available for a response to a catastrophic event. Since the cloud applications are hosted at geographically dispersed locations, they are not at risk of going down if one of the facilities fails.	In remote areas where internet availability is a problem, cloud based applications and resources cannot be used.
11	Mobile Healthcare Information Management utilizing Cloud Computing and Android OS	This work presents the implementation of a mobile system that enables electronic healthcare data storage, update and retrieval using Cloud Computing. The mobile application is developed using Google's Android operating system and provides management of patient health records and medical images (supporting DICOM format and JPEG2000 coding). The developed system has been evaluated using the Amazon's S3 cloud service.	The response time of the Amazon S3 Cloud service can play an important role on the total transmission time and makes response faster.	Limitation which needs to be worked on include improving security by implementing advanced user authentication techniques on the mobile device (e.g., through voice recognition) and deploying the platform in real healthcare environment for evaluating the system in terms of user acceptability and performance.

12	MEDiSN: Medical Emergency Detection in Sensor Networks	The paper presents MEDiSN, a hierarchical wireless sensor network for monitoring patients' physiological data. MEDiSN comprises a set of Physiological Monitors (PMs) which collect, encrypt and sign patients' physiological data (e.g., pulse oximetry, ECG, etc.) before transmitting them to a network of Relay Points (RPs). These RPs self-organize into a routing tree which reliably delivers periodic data and alerts from the PMs to the network gateway as well as management commands from the gateway to individual PMs. The gateway forwards collected data to a backend server, which persistently stores them and disseminates them to authenticated GUI clients. The design of MEDiSN's GUI and architecture were based on multiple iterations of feedback from hospital personnel and first responders who will be the end users of the system.	PMs collect physiological data measurements that are as accurate as commercial patient monitors, the system can be quickly deployed in the hospital, and supports multiple mobile PMs with high delivery ratios	Not as scalable and has high energy consumption.
13	A two way emergency medical monitoring system with a computing device fitted on a rotating holder	An application on the computing device enables remote control of the orientation of the device and zoom function on the camera, along with artificial intelligence including face detection to enable to doctor to monitor the patient remotely, and trigger actions such as siren or calling a neighbour in case of a medical emergency. This enables a	Enable multiple patients to be monitored simultaneously in real time and round the clock and from a remote location.	No developed prototype of the hardware component yet.

		comprehensive low cost interactive monitoring system.		
14	Real Time Object Detection and Tracking Using Deep Learning and OpenCV	Deep learning has gained a tremendous influence on how the world is adapting to Artificial Intelligence since past few years. Some of the popular object detection algorithms are Region-based Convolutional Neural Networks (RCNN), Faster RCNN, Single Shot Detector (SSD) and You Only Look Once (YOLO). Amongst these, Faster-RCNN and SSD have better accuracy, while YOLO performs better when speed is given preference over accuracy. Deep learning combines SSD and Mobile Nets to perform efficient implementation of detection and tracking. This algorithm performs efficient object detection while not compromising on the performance.	Excellent detection and tracking results on the object trained and can further utilized in specific scenarios to detect, track and respond to the particular targeted objects in the video surveillance	Basic working is designed, it is not deployed anywhere for real time testing.
15	Object Detection in Medical Video Using Deep Learning	We have proposed a system to recognize the moving objects through an optimal features and deep learning approach. These maximum likelihood feature points are characterized into foreground pixels and remaining matching feature points are grouped into background based on the frame-to-frame contrast process.	Detected with very high precision and accuracy values	Limitations to be worked on include utilizing reduction approach to deal with enhance power, and constancy of object recognition process.



16	An Area Efficient FPGA Implementation of Moving Object Detection and Face Detection using Adaptive Threshold Method	Digital security footage is a vital component of the global shift to digital communication. Face and moving object detection are crucial components of video surveillance systems. It is a component of security-focused programs used in hospitals, banks, and traffic control systems. The process of background subtraction is used to identify the foreground. For each input video frame, the background removal module requires an adjustable upper bound due to fluctuations in light intensity in a constantly changing environment. For video surveillance systems, face and moving object detection are essential needs. For detecting moving objects, there are typically three different types of algorithms. Its three components are the optical flow field algorithm, frame difference algorithm, and background removal method.	Detects moving objects and face rather than a static object useful in real time applications.	Uses a hardware based model, difficult to load results into the cloud.
17	Design and Implementation of an Embedded Monitor System for Detection of a Patient's Breath by Double Webcams in the Dark	The conventional method of keeping tabs on a patient's breathing calls for physical contact with the patient by attaching a gadget to it. In Impedance Pneumography, for instance, the electrode is positioned on the skin of the chest and concurrently transmits a high-frequency current while using the receiver electrode to	An innovative approach to monitor the patient is implemented. Which requires no contact with the patient's body unlike wearable devices.	The accuracy of the results is not provided.

		<p>detect any current variations while breathing.</p> <p>Our system recognizes chest expansion and contraction in a manner akin to how image processing finds moving objects. The three main ways to find a moving item are as follows. To begin with, "Temporal Differencing" is used to compare two sets of continuous visual data and determine if an object's volume has changed.</p>		
18	Real Time Object Detection in Surveillance Cameras with Distance Estimation using Parallel Implementation	<p>Although object detection is a very effective technique, it may occasionally be challenging to deploy and get the best results. The two types of networks used for object detection are neural networks and convolutional neural networks (CNN). The way the two types of networks receive visual input is the primary distinction between them. Neural networks are often developed and trained over vectors, which means they observe an image in two dimensions. A tensor with height, depth, and breadth as its parameters is the input for CNN. Additionally, we observed that previous approaches required a picture to be transformed to grayscale before being utilized for calculation.</p>	Implemented in emergency situation so displays practically no time lag.	Real time detection consumes a lot of energy and computational power.

19	Head gesture recognition for hands-free control of an intelligent wheelchair	A robust head gesture-based interface (HGI), is designed for head gesture recognition of the RoboChair user. The recognised gestures are used to generate motion control commands to the low-level DSP motion controller so that it can control the motion of the RoboChair according to the user's intention. Adaboost face detection algorithm and Camshift object tracking algorithm are combined in our system to achieve accurate face detection, tracking and gesture recognition in real time. It is intended to be used as a human-friendly interface for elderly and disabled people to operate our intelligent wheelchair using their head gestures rather than their hands.	When head gestures are not in normal postures, i.e., the non-vertical head gestures, HGI is still able to identify the user's intention and control the RoboChair very well, which is very robust. However, HGI will ignore head gestures if the user's head is not located in the center of images or is looking around the surroundings without the intention of moving.	Both indoor and outdoor environments where cluttered backgrounds, changing lighting conditions, sunshine and shadows may bring complications to head gesture recognition.
20	Occlusion Pattern Discovery for Object Detection and Occlusion Reasoning	The fundamental issue of object detection in computer vision has drawn a lot of attention. In actual applications, partial occlusions are common and pose a significant obstacle to object recognition. As was mentioned, the majority of current object identification techniques have trouble finding things that are partially obscured. The look of an item varies as certain portions of it are obscured. It can be challenging to develop a classifier that can accurately identify one object category from other object categories as well as backdrop because partial	Can detect objects from various angles and point of views. Partially obstructed objects.	The model is still in development and needs to be improved before deployment.

		occlusions may increase appearance variance within an item category.		
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## RESEARCH GAP

We have studied research papers on and related to our domain, they span from hospital emergency, disaster situations to various algorithms implemented in object and face detection. After reviewing these papers, we identified a few research gaps which are discussed below.

Almost all of these research papers didn't use an internet enabled cloud-based model for deployment. It made fetching and storing the data both in real-time and in the future difficult. By using a cloud-based model we can not only make the computations easier but also make the data transfer and access by authorized personnel seamless. Another of the drawback that we observed was the lack of ability of the algorithms to detect faces which have accessories or birthmarks, or are in ill lit areas.

## PROBLEM STATEMENT

Identification of an accident victim in the emergency room, so that the relatives can be contacted. Both of these instances require the detection of either an object or face accompanied by generation of an alert. This can be realized by an object and face recognition and alert system.