SOCIAL DISTANCING MOBILE APP DEVELOPMENT

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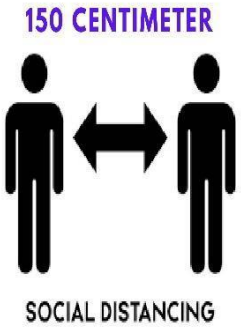
Abstract-Social distancing is an important measure to reduce the spread of infectious diseases such as influenza and coronavirus. It involves keeping a physical distance of at least two meters between people. This reduces the chances of droplets and micro-droplets, which are released when an infected person talks, sneezes or coughs, from spreading to other people. Social distancing also helps reduce the risk of contact with surfaces that may be contaminated by these droplets and micro-droplets. By implementing social distancing measures, we can help reduce the spread of infectious diseases in our communities.With the need for social distancing to mitigate the spread of Covid-19, there is an urgent need for energy-efficient and cost-effective solutions that can help monitor social distancing in public places. This paper proposes a Smart Social Distancing (SSD) mobile application that can be used to monitor social distancing in public places. The application will use sophisticated algorithms and sensors to detect people who are not adhering to the prescribed distance and alert them accordingly.

Keywords—contact tracing app, mobile social distancing app,location-based tracking app, GPS location tracking app.

I. INTRODUCTION:

Social distancing is a concept that involves maintaining a certain physical distance between individuals in order to reduce the direct contact and transmission of infectious diseases. Social distancing is an important strategy for preventing its spread and protecting public health.



Influenza is a virus that has the potential to cause serious harm to humans. It is highly contagious and can spread quickly, making it difficult to contain. Furthermore, influenza viruses have the ability to rapidly adapt and evolve, meaning that they can easily become resistant to existing treatments and vaccines. This makes them particularly dangerous for immunologically weaker individuals who are more vulnerable to infection. As such, influenza outbreaks present a significant threat that must be taken seriously in order to protect public health.The use of mobile technology has been an important tool in the fight against the COVID-19 pandemic. Mobile apps are being used to provide information about the virus, track its spread, and even help people find medical services. They are also being used to help with contact tracing and social distancing measures. These apps are accessible,

acceptable, and easily adopted by users due to their convenience and portability. This makes them an ideal tool for controlling the spread of the virus and helping individuals stay safe during this difficult time. Considering the growing dependence on mobile health (mHealth) technologies as a component of COVID-19-related response plans, there are significant knowledge gaps regarding their utility and efficacy during the current pandemic for both health professionals and the general public. This systematic review intends to shed light on research about the use and evaluation of mobile apps for the prevention, management, treatment, or follow-up of COVID-19 that have been published in the scientific literature in this regard.

II.RELATEDWORKS

This section reviews different sorts of techniques that are applied in the system that is being suggested. Pedestrian Prediction Technique, Visual Processing Method for Distance Computation, and Bluetooth Distance Estimation MethodThe identification of pedestrians in both 2D and 3D picture space has been tackled by a number of writers using a variety of techniques. Given that human mobility depends on 3D space, JianqiZhong et al. [6] developed a method for detecting pedestrian motion in 3D images.Based on posture estimation, the authors created a dual deep neural network. The duration for pedestrian road crossing is estimated in [7] using multi-task deep learning without action recognition. Based on how individuals are moving as they cross the road, this detecting system was created to prevent accidents.To identify pedestrians and prevent traffic accidents, Quintero et al. [8] suggested Gaussian dynamic models and Activity recognition. The suggested strategy is based on a variety of pedestrian movement characteristics, including walking, halting, beginning, and standing. Rehder and co.To identify pedestrians and prevent accidents on the side of the road, Quintero et al. [8] suggested Gaussian dynamic models and Activity recognition. The suggested strategy is based on a number of pedestrian movement characteristics, including walking, halting, beginning, and standing. Deep neural networks were employed by Rehder et al. [9] to study pedestrian prediction, which may be applied to traffic management and collision avoidance in autonomous vehicles. The model was developed by the authors utilising reverse reinforcement learning on a monolithic neural network. Choi et al[10] .'s Deep learning-based pedestrian trajectory took into account the link between people's locations. Every pedestrian's movement between adjacent frames in the successive video frames is computed. Low Short Term Memory (LSTM) is used to encode the motion information, while MLP (Multilayer Perceptron) is used to map the position. Several image processing methods and mathematical formulas like Euclidean and Manhattan distances can be used to determine the separation between two objects in a 2D image distance calculation formula. Johny Singh and colleagues [11] created a method for measuring distance between objects in 3D images using stereo cameras. Euclidean distance between the centroid of the bounding box and the camera was used to compute the object's distance, and they were able to get a result with an average inaccuracy of 2.08 percent.A technique to detect pedestrians and estimate distance using a thermal camera based on a smartphone that can operate in low light

conditions was proposed by JongBae [12]. The distance is calculated using the pedestrian's location in the 2D thermal image and the detector was developed using multi-stage cascade learning.In their experiment, they achieved 91% accuracy in 85% accuracy in seeing pedestrians and distance estimation. Distance estimation between two people utilising latent variables by minimising a distance function was covered by Chong Sun et al. in their study [13]. Using an efficient metric matrix, they created a latent metric learning approach.Bluetooth low Energy (BLE) is a portable, low-cost technology that uses very little power and is rapidly gaining popularity.In their article, Lam and She [14] talked about using BLE to estimate the distance to a moving object. They received a signal by utilising the Kalman Filter (KF) to smooth the RSSI measurement, it is possible to protect the RSSI from the noisy environment.Support vector machine training uses a non-linear kernel function to estimate the filtered RSSI value.The mobile customers only received a limited rate for distance estimation, and the calculation of the distance. BLE and ultrasound signals were employed by Yoon et al. [15] to determine the distance between the devices. Due to various environmental conditions, the received RSSI value is not accurate. The authors introduced propagation constants estimation based on the time difference of arrival of BLE and ultrasound signals for calculating distance. When the distance increases in real time, the estimated error grows. They were able to estimate the distance with an average error distance of 10 cm.Based on the RSSI value from the BLE beacon, Yuan and Chang [16] devised an indoor locating system. The authors calculated real-time distance using a weighted multi-point technique with help from a cellular network and achieved an error rate of 0.8%.For the purpose of observing social estrangement, the smartphone camera records video frames. The image detection technique passes images that are rendered frame by frame via a loop. The pedestrian trained model receives image processing for noise removal. When any people are detected in the image, the outcome image will draw a rectangular bounding box. The Euclidean technique is used to compute distance from a person in a classified image.

III. PROPOSED SYSTEM

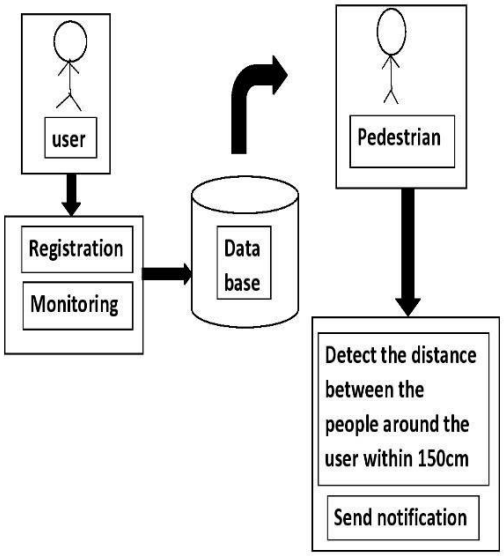
Distance Tracking Using GPS Technique is the suggested approach for using a smart phone to measure the separation between two people.A person's position is recorded by the GPS on a smart phone to monitor social isolation. An approximation of the distance can be determined when the two people install this program.GPS correlated with lessening location disturbance in close-by devices.A person's movements can help another person determine how far away they are from one another.This programme aids users in planning their time effectively and calculating the distance between two or more individuals.The location information will be updated in the server database whenever the latitude and longitude values are modified, ensuring that any changes to the person's travels are documented.Using GPS and Google Maps, the tracker will monitor the whereabouts of the individuals.As soon as another person approaches from behind within the designated distance, the pedestrian will be notified.Consequently, the suggested system calculates the distance between pedestrians using GPS and Google Maps.

Objective of Proposed System:

- Calculating the distance between the two persons using smart phone.
- To alert the person if any close within a certain distance.

Proposed System Architecture

To offer the necessary information regarding the spacing between pedestrians within a specific range on that route, an Android application is being created. Moreover, the pedestrian's location is shown.



Modules

This application contains the three modules. They are:

- User module
- Tracking module
- Pedestrian module

User Module

The user's information, including name, phone number, and date of birth, is entered into this module. It is possible to add, amend, or remove these user details.This module can make advantage of the location-based services technology, which is used to track the nearby users' current whereabouts.The technology searches Google Maps using the Global Positioning System (GPS) to determine the user's location. GPS, and then transmit the latitude and longitude through satellite to the system monitoring centre.

Kalman-Filter Prediction Algorithm

A linear recursive predictive update algorithm called Kalman-Filter Prediction Algorithms is used to calculate the parameters of a process model. The Kalman filter enables the model's parameters to be anticipated and changed with each new measurement starting with initial estimations. Below is a conceptual explanation of how the Kalman filter algorithm operates: data are used to determine the historical passenger arrival rate.Given the measurements that have been taken over time, the Kalman filtering technique can estimate some variables that are not known. Kalman filters have proven effective in a variety of applications. Kalman filters have a straightforward structure and need little computational resources.

Pedestrian Module

Similar to the user module, this module includes the fundamental data regarding the relevant mobile phone users.The phone has a GPS system integrated that can broadcast the user's location in real time to a web server. This application can be installed by a pedestrian.

Algorithm Step by Step for GPS tracking:

The steps in the algorithm to create an app for social distance using the GPS

Step1: GPS is used to track our mobile device and is thought of as a beginning point

Step2: If there are any further devices, they are likely within 150 metres.The device will detect it.

Step3: The alarm then began to sound on the device.

Step4: Red is displayed if the person is very close, green is displayed if the person is very faraway, and yellow is displayed if the person is in the middle.

Step5: The user can then move to an area that is safer after seeing the location of that specificsite.

Algorithm for Social Distance Measuring

INPUT:

An array of points with coordinates of (x, y) as input, where x denotes the point's x-coordinate and y denotes its y-coordinate

OUTPUT:

Array of points with unsafe distance

Step1: if l.length< 2 then

Step2: return nil

Step3: end if

Step4: for I = [l.length : 1] do

Step5: for i2=[1 : <] do

Step6:d=EuclideanDistance(l[i],i[i2]) / AveragePersonWidth

Step7: if(d < SafeDist) then

Step8: addUnsafe(l[i],l[i2])

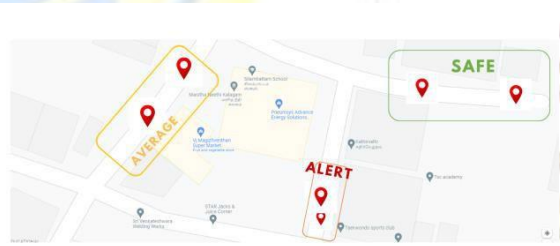
Step9: end if

Step10: end for

Step11: return unsafe

IV. IMPLEMENTATION AND RESULT

Another mobile app feature with the option to enable social distance monitoring was built for distance computation using GPS. As soon as the user switches on, a device discovery process for other GPS-enabled devices will start in order to search for distance tracking GPS. Two smartphones have the app installed, and when they are brought within 150 centimetres of one another, alarms are flashed on both phones. The popup between two Android devices that are separated by less than one centimetre is seen in the figure below.



Euclidean distance is an important concept in learning algorithms and distance calculation. It is a measure of the straight- line distance between two points in a givenspace. This can be used to calculate the realtime distance between two persons using GPS technology. By understanding the

euclidean formula, one can calculate the exact distance between two persons in real time, making it easier to track them and maintain safety protocols.

In order to calculate the distance between bounding boxes from object detection results, the center point of each box must beobtained. This can be done by finding the coordinates of each corner of the bounding box and then calculating the midpoint between them. Once these center points have been determined, it is possible to calculate distances between them using various methods such as Euclidean distanceor Manhattan distance.

The distance is measured as pixels, and some image processing techniques are usedto the pixels' values in order to determine the distance value in real time.

With the advent of mobile technology, it is now possible to implement cost effective surveillance systems. These systems are implemented in mobile applications and canbe used by anyone without having to invest in expensive infrastructure. This system is not only cost effective but also allows users to monitor their environment from anywhereat any time. Furthermore, it can be used for a variety of purposes such as security, safetyand monitoring traffic. Therefore, implementing this system is an effective approach for those who want to save money on surveillance costs.

CONCLUSION

An Android application is created in this suggested system to maintain the distance between two or more users travelling the same route. By utilising this programme, the user is able to keep track of the distances between the persons in their local vicinity. Whenever any changes occur in the person's position, the user is immediately notified that the person has passed a certain distance. When a user logs into this programme, they may view the notifications that are accessible and the distances between people on a Google Map. Also, if someone approaches when others are going through a congested location, a notice is quickly issued to that user, who is then made aware of the situation. So that the specific user can take the required steps to keep their distance from one another.

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