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The Vehicle Counting, Classification and Speed Measurement Using AMR Sensors

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ABSTRACT: This paper concentrates on the development of a portable roadside magnetic sensor system for vehicle tallying, order, and speed estimation. The most magnetic field detectors permitted route over trackless seas by detecting the world's attractive shafts. Attractive field detecting has immeasurably extended as industry has adjusted an assortment of attractive sensors to recognize the nearness, quality, or course of attractive fields not just from the earth, but also from permanent magnets, magnetized soft magnets, vehicle disturbances, brain wave activity, and fields generated from electric currents. Magnetic sensors can measure these properties without physical contact and have become the eyes of many industrial and navigation control systems. Here in this paper we are doing a survey of various speed measurement techniques. The Arduino board can access the data from the sensor via its analog pins. The data then access by the PC. This data is then pass through MATLAB for image processing where a kalman filter is used to find estimates of vehicle characteristics for classification, then this predicted data is further process for useful feature extraction and then it is classify based on the features.

KEYWORDS: vehicle counting Arduino, AMR sensor, Kalman filter.

I. INTRODUCTION

The significant reason for vehicle speed recognition is to give a number of ways that law requirement organizations can uphold movement speed laws. The most popular strategies incorporate utilizing RADAR (Radio Location and Ranging) and LIDAR (Light Detection and Ranging) gadgets to identify the speed of a vehicle. The reflected flag is picked up by a beneficiary of RADAR gadget. The beneficiary of movement radar at that point computes the recurrence distinction between the first and reflected flags, and changes over it into the speed of the vehicle in movement. A LIDAR gadget records to what extent does it take for a light heartbeat to travel from the LIDAR weapon to the vehicle and return. In view of this data, LIDAR can all of a sudden compute the separation between the firearm and the vehicle. By making a few figuring's and contrasting the separation the vehicle went between estimations, LIDAR can decide the speed of vehicles accurately. Speed Detection Camera System (SDCS) that is relevant as radar elective. SDCS utilizes picture preparing systems on video stream in online caught from single camera or disconnected mode, which makes SDCS ready to measuring the speed of moving items maintaining a strategic distance from the radars' issues. SDCS offers an un-costly contrasting option to radars with a similar precision or far and away superior to it. In Single Motion Blurred Image (SMBI) strategy for vehicle speed recognition and distinguishing proof in light of single picture taken by a stationary camera.

Due to the relative movement between the camera what's more, the moving item for an expanded time of camera presentation time, movement obscure will happen in an area of the picture comparing to the moving item in the scene. For any settled time interim, the dislodging of the vehicle in the picture is relative to the sum of obscure caused by the imaging procedure. Consequently the movement obscure parameter (e.g., the movement length and the introduction) and the relative position between the camera and the protest can be recognized; the speed of the vehicle can be assessed by the imaging geometry. Besides, for the movement obscured picture brought with the tag, picture rebuilding gives an approach to distinguish the vehicle.

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II. OBJECTIVES

The objective of the proposed system is given below.

- To proposed a system which can Count Vehicle accurately.
- To propose a system which can classify the vehicles and which are accurately Speed Measurement.

III. LITERATURE SURVEY

In literature, the problem and the previous techniques of vehicle counting and classification is described.
A vehicle tracking and classification system made by Lipton et al, [1] recognizes moving articles as vehicles or people, yet anyway it doesn't arrange vehicles into various classes.
A dream based calculation was produced for identification and grouping of vehicles in monocular picture successions of movement scenes are recorded by a stationary camera. The handling is done at three levels: crude pictures, local level, and vehicle level. Vehicles are demonstrated as rectangular examples with certain dynamic behavior [2].
Daniel et al., [3] presents the background subtraction and displaying system that gauges the movement speed utilizing a succession of pictures from an uncalibrated camera. The blend of moving cameras and absence of alignment makes the idea of speed estimation a testing work.
Toufiq P. et al., in [4] portrays foundation subtraction as the broadly utilized worldview for identification of moving articles in recordings taken from static camera which has an extensive variety of uses. The fundamental thought behind this idea is to naturally create and keep up a portrayal of the foundation, which can be later used to arrange any new perception as foundation or frontal area.
In [5], foundation subtraction additionally includes figuring a reference picture and subtracting each new casing from this picture and thresholding the outcome. This strategy is an enhanced variant of versatile foundation blend display; it is quicker and adjusts viably to evolving situations.
Karmann and Brandt [6] examine the division approach utilizing versatile foundation subtraction that utilizations Kalmansifting to anticipate the foundation. Division expects vehicles to be precisely isolated from the foundation with negligible measure of introduction.
Chen et al., [7], [8] have tended to the issues in regards to unsupervised picture division and protest demonstrating with interactive media contributions to catch the spatial and fleeting conduct of the protest for movement checking.
D.Beymer et al., [9] proposes a constant framework for measuring activity parameters that uses an element based strategy alongside impediment thinking for following vehicles in congested activity zones. Here as opposed to following the whole vehicle, just sub highlights are followed. This approach however is computationally costly.
Cheng and Kamath [10] think about the execution of a substantial arrangement of various foundation models on urban activity video. They explored different avenues regarding successions recorded in climate conditions, for example, snow and mist, for which a hearty foundation show is required.
Kanhere et al., [11] applies an element following way to deal with activity saw from a low-edge off-hub camera. Vehicle impediments and viewpoint impacts represent a more noteworthy test for a camera put low to the ground

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IV. BLOCK DIAGRAM

The block diagram of proposed system is shown in figure 1. The block diagram consists of 1) AMR SENSOR, 2) Arduino board and 3) PC with MATLAB software.

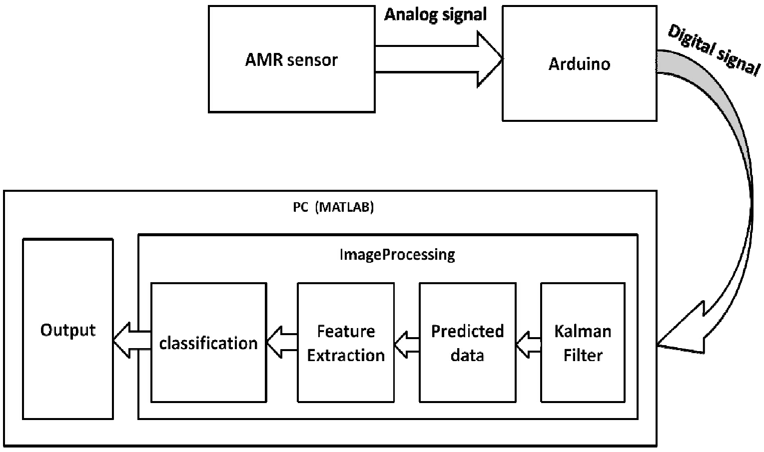

Fig: - Block Diagram of the system

The AMR sensor comprises of the Si or glass board, and the thin film of amalgam framed on the board. The central element of compound is ferromagnetic metals, for example, Ni and Fe. The protection of the framed ferromagnetic thin movie metal differs as per the quality of the connected attractive recorded with the particular heading. Since its protection changes as indicated by the particular heading of the attractive recorded, the sensor is called AMR (Anisotropic Magnet Resistance) sensor. In the proposed system HMC-58831 AMR sensor is used. The Arduino board can access the data from the sensor via its analog pins. The data then access by the PC. This data is then pass through MATLAB for image processing where a kalman filter is used to find estimates of vehicle characteristics for classification, then this predicted data is further process for useful feature extraction and then it is classify based on the features. The output can be seen on the MATLAB. Speed measurement performed on Arduino (Arduino IDE software used for programming Arduino board) whereas classification of vehicles performed on MATLAB.

V. KALMAN FILTER

The formula for kalman filter is as shown below.

current estimation — measured value

$$\hat{X}_k = K_k . Z_k + (1 - K_k) . \hat{X}_{k-1}$$

Kalman Gain — previous estimation

$\mathbf{\hat{X}_k}$ = The estimate of the signal **x**,when $\hat{X}_k = 0.5$we get average values
$\mathbf{Z_k}$ = The measurement value
$\mathbf{K_k}$ =Kalman Gain
$\mathbf{\hat{X}_{k-1}}$ = The estimate of the signal on the previous state

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VI. RESULT

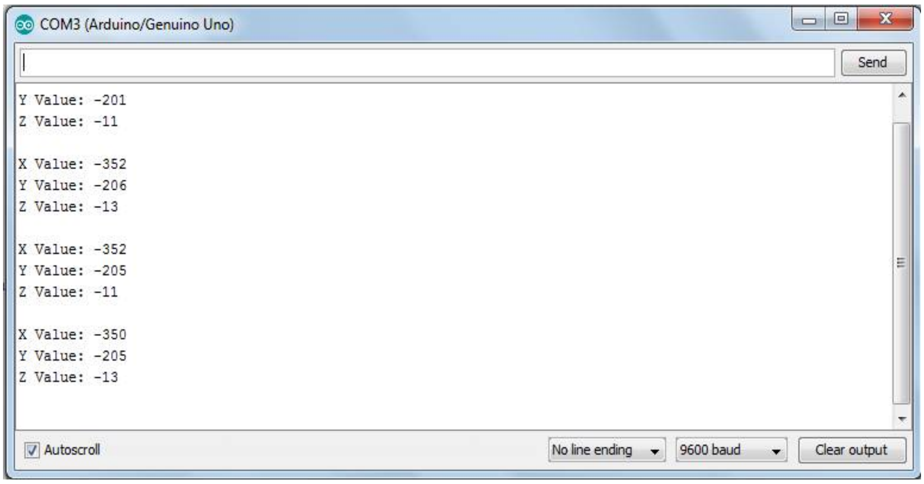

Fig: - Serial monitor of the roadside vehicle

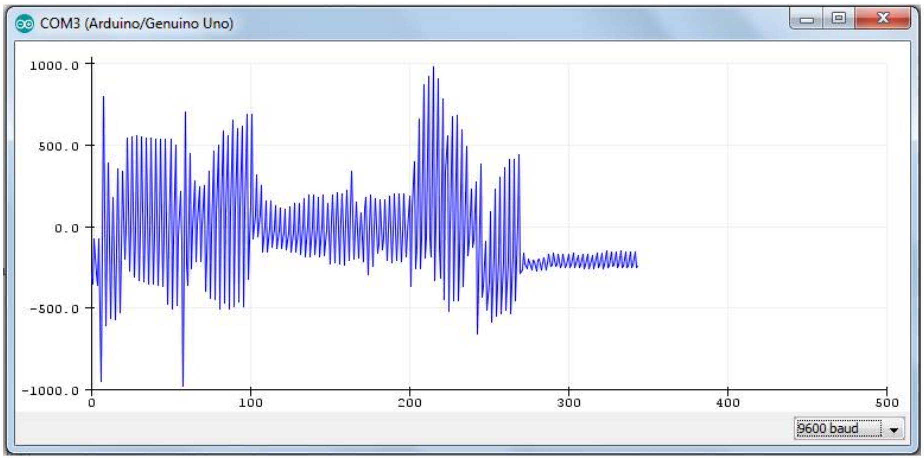

Fig: - Magnitude plotter of vehicle counting.

VII. CONCLUSION

The proposed system uses the Arduino board for the programming and the MATLAB for classification of vehicle. The AMR is the magnetic sensor used for the counting of the vehicle. The system posse's higher accuracy than the previous techniques used before.In this system the Arduino board accesses the data from the sensor via its analog pin. The data then access by the PC. This data is then pass through MATLAB for image processing where a kalman filter is used to find estimates of vehicle characteristics for classification, then this predicted data is further process for useful feature extraction and then it is classify based on the features.

REFERRENCES

[1] A. J. Lipton, H. Fujiyoshi and R. S. Patil, Moving Target Classification and Tracking from Real-time Video, IEEE Workshop Applications of Computer Vision, 1998, pp. 8–14

[2] Gupte S., Masoud O., Martin R. F. K. and Papanikolopoulos N. P., Detection and Classification of Vehicles, IEEE Transactions on Intelligent Transportation Systems, vol. 3, no. 1, March, 2002, pp. 37– 47.

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[3] Dailey D. J., Cathey F. and Pumrin S., "An Algorithm to Estimate Mean Traffic Speed Using Uncalibrated Cameras", IEEE Transactions on Intelligent Ttransportations Systems, vol. 1, no. 2, pp. 98-107, June, 2000

[4] Toufiq P., Ahmed Egammal and Anurag Mittal, A Framework for Feature Selection for Background Subtraction, IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'06), 2006

[5] P. KaewtraKulpong and R. Bowden, An Improved Adaptive Background Mixture Model for Real-time Tracking with Shadow Detection, In Proceedings of 2nd European Workshop on Advanced Video-Based Surveillance Systems, Sept. 2001

[6] K. P. Karmann and A. Von Brandt, Moving Object Recognition using an Adaptive Background Memory, In Proceedings of Time-Varying Image Processing and Moving Object Recognition, vol. 2, V.Capellini, Ed., 1990

[7] Chen S. C., Shyu M. L. and Zhang C., An Unsupervised Segmentation Framework for Texture Image Querie, IEEE COMPSAC, Chicago, Illinois, USA, Oct 2000.

[8] Chen S. C., Shyu M. L. and Zhang C., An Intelligent Framework for Spatio-Temporal Vehicle Trackin, IEEE Conference on Intelligent Transportation Systems, California, USA, Aug 2001

[9] D. Beymer, P. McLauchlan, B. Coifman and J. Malik, A Real-time Computer Vision System for Measuring Traffic Parameter, IEEE Conference. Computer Vision and Pattern Recognition, Puerto Rico, June, 1997, pp. 496–501.

[10] S. Cheung and C. Kamath, Robust Techniques for Background Subtraction in Urban Traffic Vide, In Video Communications and Image Processing, SPIE Electronic Imaging, San Jose, January, 2004

[11] . N.Kanhere, S.Pundlik and S.Birchfield, Vehicle Segmentation and Tracking from a Low-Angle Off-Axis Camera, IEEE Conference on Computer Vision and Pattern Recognition", San Diego, June, 2005.

[12] Duy H. Nguyen, John H. Kay, Bradley J. Orchard, and Robert H. Whiting, Classification and Tracking of Moving Ground Vehicles, LINCOLN LABORATORY JOURNAL, VOLUME 13, NUMBER 2, 2002