Image Processing Edge Detection Technique used for Traffic Control Problem

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Submitted By : Dr. P. Srinivas

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PROPOSAL DETAILS

(CRG/2021/006341)

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Technical Details :

Scheme :	Core Research Grant		
Research Area :	Electrical Electronics & Computer Engineering (Engineering Sciences)		
Duration :	36 Months	**Contact No :**	+919849720639
Date of Birth :	10-Feb-1973		
Nationality :	INDIAN	**Total Cost (INR) :**	26,97,573

Project Summary :

The frequent traffic jams at major junctions call for an efficient traffic management system in place. The resulting wastage of time and increase in pollution levels can be eliminated on a city-wide scale by these systems. The research proposes to implement an intelligent traffic controller using real-timeimage processing. The image sequences from a camera are analyzed using various edge detection and object counting methods to obtain the most efficient technique. Subsequently, the number of vehicles at the intersection is evaluated and traffic is efficiently managed. In this research also proposes to implement a real-time emergency vehicle detection system. In case an emergency vehicle is detected, the lane is given priority over all the others.

Objectives :

• In this research tries to evaluate the process and advantages of the use of image processing for traffic control.Implementation of RFID Tags our project will eliminate the need of traffic personnel at various junctions for regulating traffic control System.
• Thus the use of this technology is valuable for the analysis and performance improvement of road traffic.
• Then depending on the signal- cycle (we have taken it to be 3 minutes), time is allotted to each lane.
• Images extracted from the video are then analyzed to detect and count vehicles.In this technology is also easily influenced by noise and requires additional hardware at every traffic signal.

Keywords :
Edge Detection System

Expected Output and Outcome of the proposal :

In this project we will have a successfully implemented an algorithm for a real-time image processing based traffic controller, comparison of various edge detection algorithms. We have also implemented a system for emergency vehicle detection based on image processing techniques and clear the lane is given priority over all the others. The use of our algorithm removes the need for extra hardware such as sound sensors. The increased response time for those vehicles is crucial for the prevention of loss of life

Any other relevant information:

No other Information

Suitability of the proposed work in major national initiatives of the Government:

Not Applicable

Theme of Proposed Work:

Environment

Collaboration Details for last 5 Years :

S.No.	Name	Type of Collaboration
1	no no no no Austria [13-Mar-2021 to 20-Mar-2021]	No Collaboration with Foreign Institutations

Planned Collaboration for the proposed work with any foreign scientist/ institution ? **Yes**

S.No.	Name	Type of Collaboration
1	Malla Reddy University Vice-Chancellor Malla Reddy Engineering College Maisammaguda, Komapally, Hyderabad Indonesia	This First start the Research Project with collaboration with Malla Reddy University, Hyderabad, Telgana State

SNo.	CO-PI Details
1	 **Anitha Jalumuri** anithanv28@gmail.com Associate Professor(Computerscience&engineering) **Malla Reddy Engineering College** Maisammaguda, Dhulapally (Post via. Kompally), Secunderabad, Rangareddy Dt, TELANGANA, HYDERABAD D.O.B : 28 Jul, 1979

Other Technical Details (OTD)

1. Origin of the Proposal: (One Page)

Current traffic control technique involving magnetic loop detectors buried in the road, infra-red and radar sensors on the side provide limited traffic information and require separate systems for traffic counting and for traffic surveillance. Inductive loop detectors do provide a cost-effective solution, however they are subject to a high failure rate when installed in poor road surfaces, decrease pavement life and obstruct traffic during maintenance and repair. Infrared sensors are affected to a greater degree by fog than video cameras and cannot be used for effective surveillance. In contrast, video-based systems offer many advantages compared to traditional techniques. They provide more traffic information, combine both surveillance and traffic control technologies, are easily installed, and are scalable with progress in image processing techniques. This research proposal tries to evaluate the process and advantages of the use of image processing for traffic control. Implementation of our project will eliminate the need of traffic personnel at various junctions for regulating traffic. Thus the use of this technology is valuable for the analysis and performance improvement of road traffic control system. Also priority to emergency vehicles has been the topic of some research in the past. A proposed system for detection of these vehicles as in is based on Radio-Frequency Identification (RFID). However, the use of this technology necessitates unnecessary extra hardware to be installed both at every junction and in every vehicle. There have also been studies to recognize these vehicles by analysis of the sound of their siren as shown in. However, this technology is also easily influenced by noise and requires additional hardware at every traffic signal. The focus shall be to implement the controller using DSP as it can avoid heavy investment in industrial control compute while obtaining improved computational power and optimized system structure. The hardware implementation would enable the project to b e used in real-time practical conditions. More information about this method can be found in. In addition, we propose a system to identify the vehicles as they pass by, giving preference to emergency vehicles and assisting in surveillance on a large scale.

2. Review of status of Research and Development in the subject

2.1 International Status:

In the U.S., Department of intelligent transportation system focuses on automation, connected vehicles, emerging capabilities, enterprise data, inter operability and accelerating deployment. European ITS has taken a major step towards deployment and use of road transport since 2008. Other public-private partnership programs aim at safety applications of ITS like connected automated driving, deployment, and use of intelligent safety. United Kingdom has done some remarkable executions of ITS as follows-electronic toll collection, cameras are installed to observe the traffic activities etc. Intelligent speed adaption is also implemented using GPS. ITS features in Dubai are traffic jam alerts, parking, parking guidance, dynamic onboard navigation system for car users. Canada is the first country that introduced ITS. ITS has traveler information system, public transport services consisting transit, management, real-time passenger information etc.

2.2 National Status:

A few cities in India have implemented ITS projects such as automatic parking, highway toll collection, traffic signal management, and public transportation management. Chennai city authorities have initiated traffic management by installing surveillance cameras at intersections and supervise the traffic flow. Being a part of the project FM radio station played a very good role in transmitting traffic jam in Chennai. With the help of radar, accelerometer gun and smart cameras traffic control, as well as vehicle number detection, is implemented in Mumbai. A pilot project was implemented in Hyderabad and Delhi by initiating SMS based system for road users and BRT system implementation in Pune. Also, because of inefficient management of traffic and increasing vehicle count creating inconsistencies reported

2.3 Importance of the proposed project in the context of current status

2.3.1 System Overview

The various steps of proposed system are described in Fig 1. A camera is fixed on polls or other tall structures to overlook the traffic scene as seen in. Images extracted from the video are then analyzed to detect and count vehicles. Then depending on the signal- cycle (we have taken it to be 3 minutes), time is allotted to each lane. For example, if the number of vehicles in a four-lane intersection is found to be 10, 30, 20 and 20, then time allotted to each lane is in the ratio 1:3:2:2. The system also takes into account the emergency vehicles at the intersection. If such a vehicle is detected, the lane is given priority over the others.

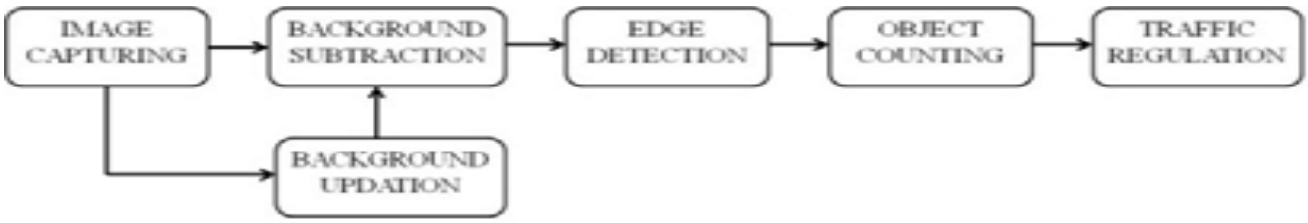

Fig. 1: System Overview

2.3.2 Background Subtraction

Static background subtraction' has been the traditional method for real-time segmentation of an object in video based system. The technique is based on computing the error between a constant background frame and the current one. Video-based techniques for outdoor environments are easily influenced by factors such as weather, change in illumination and motion. Hence, a static background proves insufficient and a robust background model is necessary to deal with change of luminance.

We propose the use of the adaptive background technique as described in. Generating the current background image based on segmentation results extracted from differencing the image with the previous extracted background is the basic idea of our method. The updated background (Bnew) is computed as a function of current background (Bo) and current frame I through the equation. Once we have developed an adaptively changing

background model, our next step is to separate the foreground from the background of the image. This is done by a pixel-by-pixel comparison of the current frame with the background at that instant. A pixel would be part of the foreground, when its value is different enough from its corresponding value in the background model. The edges and objects are then recognized on the basis of a predefined threshold**.**

2.3.3 Edge Detection System

After separating the foreground objects, we need to define their edges in the subtracted image. This is done by using an edge detection algorithm. There are a variety of edge detection techniques that have been used in the past [5]. Simple techniques such as the Boolean edge detector converts a window of pixels into a binary pattern based on a local threshold, and then applies masks to determine if an edge exists at a certain point or not. In the Marr-Hildreth Edge Detector, we smooth then the image using a Gaussian and Laplace an function. This takes the second derivative of an image. If there is a step difference in the intensity of the image, it will be represented in the second derivative by a zero crossing.

The Sobel operator is a discrete differentiation operator, computing an approximation of the gradient of the image intensity function. At each point in the image, the result of the Sobel operator is either the corresponding gradient vector or the norm of this vector. The operator consists of a pair of 3×3 convolution kernels designed to respond maximally to edges running vertically and horizontally relative to the pixel grid, one kernel for each of the two perpendicular orientations. The method finds edges using the Sobel approximation to the derivative. It then returns edges at those points where the gradient of the image is the maximum. Prewitt operator is similar to the Sobel operator used for detecting vertical and horizontal edges in images. It is a fast method only suitable for well-contrasted noiseless images.

The Canny edge detector is considered to be one of the most widely used edge detection algorithms in the industry. It works by first smoothing the image and finds the image gradient to highlight regions with high spatial derivatives. It then tracks along these regions to suppress any pixel that is not at the maximum. Finally, through hysteresis, it uses two thresholds and if the magnitude is below the first threshold, it is set to zero. If the magnitude is above the high threshold, it is made an edge and if the magnitude is between the two thresholds, it is set to zero unless there is a path from this research.

2.3.3 Background Subtraction

After finding the edges the next stage is to count the number of objects as defined by the edges. There have been many algorithms suggested for object detection and contour tracing. These include the commonly used Radial Sweep method, Theo Pavlidis' Algorithm and Square Tracing Algorithm. However, in this paper we have implemented the Moore-neighborhood algorithm based on a similar method as in. The algorithm starts by choosing a random start point. When the current pixel 'p' is black, the Moore-neighborhood of 'p' is examined in clockwise direction starting with the pixel from which 'p' was entered and advancing pixel-by- pixel until a new black pixel in 'p' is encountered. The algorithm terminates when the start pixel is visited for the second time. The black pixel walked over will be the contour of the pattern. The efficiency of the algorithm improves greatly when we stop only after entering the start pixel in the same manner as entered initially. This is known as Jacob's stopping criteria. We have implemented this algorithm which does a decent job of identifying the number of cars in a given picture.

The contour tracing algorithm enables us to define the boundary of the object as well as their size. We specify different size ranges to classify the various types of vehicles. This gives us a measure of the traffic density on each road at the intersection (refer Fig. 3(d)). The traffic light is then regulated by allotting variable time according to the measured density and size of the vehicles.

2.3.4 Emergency Vehicle Condition

In case a red beacon is detected, the next step is to identify whether it is from an emergency vehicle or not. This is done by identifying the blinking frequency of red light detected in the image sequence and comparing it to the standard used by the emergency vehicles. The conditions for detection of red light beacon during various periods

of the day are shown below. Once they are satisfied, we scan the intermediate frames for the absence of the beacon by the condition as shown below.

Night time conditions:
For red light: R>230, G<250, B<250
In the intermediate frames: R<230, G>230, B>230

Day time conditions:
For red light beacon: R>230, G<250, B<250
In the intermediate frames: R<230, G<230, B<230

If matched, the normal system is overridden and the lane is given priority over all the others. The lane is turned green until the vehicle has passed the intersection.

3. If the project is location specific, basis for selection of location be highlighted:

This project is not location specific.

4. Work Plan

4.1 Methodology

To compare between various types of edge detection algorithms we tested their performance for ten images taken from real traffic in intersection. After finding the edges, the picture was subjected to an object counting algorithm. The performance of the edge detector algorithm developed by the number of vehicles accurately detected. The results are shown in Table I. Canny Edge detector was found to be the best among those compared (93.47%).

The Boolean edge detector performs a decent job of marking the locations of edges however it failed to complete the edges making object detection difficult. The Sobel and Prewitt operators are more adept at recognizing edges that are horizontal or vertical and are susceptible to noise (refer Fig 2), as also found in. The Marr-Hildreth was found to be the most susceptible to noise and gave a lot of false results. The use of two thresholds by canny edge detector makes it less likely to be fooled by noise, and more likely to detect true weak edges, providing better and fairly noise resistant method for the detection of edges. Hence we have used this method of detection in the paper, along with Moore- neighborhood method to count the vehicles marking the final step of our system

TABLE I: COMPARISON OF EDGE DETECTION TECHNIQUE

Image	Actual no.	Boolea	Marr			
1	4	2	6	2	2	4
2	3	0	4	1	1	2
3	4	2	3	2	3	4
4	5	2	3	2	3	6
5	5	2	3	3	3	5
6	7	3	5	3	2	6
7	4	1	5	1	1	4
8	5	2	5	3	2	5
9	3	0	3	0	1	2
10	6	4	3	2	3	6
Accuracy		39.13	84.78	41.30	45.65	93.47

Fig. 2: Output of various edge detection techniques.

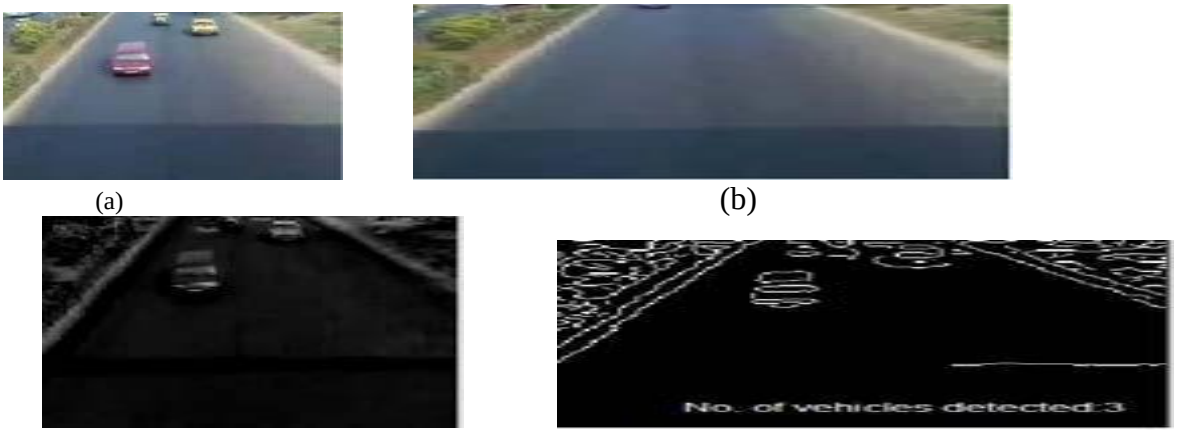

Fig. 3: (a) Real-time image (b) Background image
(c) Subtracted image (d) No. of vehicles = 3

The proposed system is used to analyze a real time traffic scene for a road (Fig 3 (a)). The adaptive background, updated from the scenes is shown in Fig. 3(b). The subtracted image contain only the foreground objects (vehicles) as seen in Fig 3(c). Using image processing algorithms (Fig 3(d)), the number of vehicles in the lane can be found out. In this case, the number of vehicles is 3. The video is also analyzed for the detection of emergency vehicles through their flashing red lights. By specifying a threshold, we have isolated the areas with high intensity of red light and comparatively lesser intensity of blue and green color. The resultant image is shown in Fig. 4(b). As we can see, the headlights of the vehicle were also deducted, which vehicles held to erroneous output. Hence the red light must satisfy the additional condition of blinking. This is achieved by taking account for the fact that the red light shall appear in every third frame only. The other lights do not appear in the image sequence with this frequency and hence are eliminated. This leads to the conclusion of the presence of an emergency vehicle as shown in Fig. 4(c). Our model was tested for ambulance during various times of the day and was found to be successful. In addition, the beacon can be identified even if the emergency vehicle is in an inclined position with respect to the camera as seen in Fig. 4(c).

Fig. 4: (a) Image of a vehicle during daytime
(b) Detection of all lights
(c) Emergency vehicle detected

4.2 CONCLUSION

In this research proposal we have successfully implemented an algorithm for a real-time image processing based traffic controller. Upon comparison of various edge detection algorithms, it was inferred that Canny Edge Detector technique is the most efficient one. Analysis of various contour tracing and object counting methods revealed the Moore neighborhood technique to be more robust when compared to the others. In this project proposal demonstrates that image processing is a far more efficient method traffic control as compared to traditional techniques. We have also implemented a system for emergency vehicle detection based on image processing techniques. The use of our algorithm removes the need for extra hardware such as sound sensors or RFID tags. The increased response time for these vehicles is crucial for the prevention of loss of life.

4.3 FUTURE WORK

The focus shall be to implement the controller using DSP as it can avoid heavy investment in industrial control compute while obtaining improved computational power and optimized system structure. The hardware implementation would enable the project to be used in real-time practical conditions. More information about this method can be found in. In addition, we propose a system to identify the vehicles as they pass by, giving preference to emergency vehicles and assisting in surveillance on a large scale.

Schedule of activities giving milestones through BAR diagram.

DST SERB: Early Career Research Award: Project Time Line													
S.No	Work plan (including detail methodology and schedule)	Duration (in months)											
	Activity/ Quarters (Duration of Project 36 months)	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
1.	Modelling of experimental setup for epi retinal prosthesis using a simulator												
2.	Procurement of the experiment equipment and inatallation												
3.	Development of an experimental model for External BWIP												
4.	Development of an experimental model for Internal RIRS												
5.	Development of an experimental model for Wireless telemetry												
6.	Testing and validation of the experimental setup												
7.	Results and report preparation												

Figure 5: Functional Block Diagram of Image Processing Edge Detection Technique used for Traffic Control Problem

Suggested Plan of action for utilization of research outcome expected from the project.

In this project we will have a successfully implemented an algorithm for a real-time image processing based traffic controller, comparison of various edge detection algorithms. We have also implemented a system for emergency vehicle detection based on image processing techniques and clear the lane is given priority over all the others. The use of our algorithm removes the need for extra hardware such as sound sensors. The increased response time for those vehicles is crucial for the prevention of loss of life.

Objectives of System

- In this research tries to evaluate the process and advantages of the use of image processing for traffic control system.
- Applying and Implementation of our project will eliminate the need of traffic personnel at various junctions for regulating traffic jam in junctions.
- Thus the use of this technology is valuable for the analysis and performance improvement of road traffic.
- The studies to recognize these vehicles by analysis of the sound of their siren.
- Applying and implement of various types of Edge Detection Algorithms.

Environmental impact assessment and risk analysis

Image Processing Edge Detection Technique used for Traffic Control Problem implants are being developed around the world in hopes of restoring useful vision for patients suffering from certain types of diseases like Digital Signal Processing (DSP) and Digital Image Processing System (DIPS).

4. Expertise:

4.1 Expertise available with the investigator in executing the project:

4.1.1.Expertise available with the Principle Investigator

- This project is an extension work carried out of PI's doctoral research (Ph.D.) work. PI has complete knowledge in carrying out the experimental and sensors cameras work required for this project.

- Principle Investigator through his Ph.D. work "**Image Processing Edge Detection Technique used for Traffic Control Problem"** carried out research to generate an asymmetrical sum, difference patterns with new methodologies.

- PI has published 14 good impact factors of research papers in International Journals and International Conferences in the same area, which are included in his bio-data.

- Guided many new students (M.Tech and B.Tech) in conducting research project in the Research Laboratories at MREC-A College.

Computational skills

- Mathematical tool box: MAT LAB
- Hardware tools: RIFD TAGS, SENSORS CAMERS AND EMERGEINCY VECHILE
- Word Processing: MS-WORD
- Optimization algorithm: EDGE DEDECTON ALOGRITHAMS
- Experimental skills
- Expert in doing experiments in anechoic chamber

Summary of roles/responsibilities for all Investigators:

No Co- PI required for this project

Key publications published by the Investigators pertaining to the theme of the proposal during the last 5 years

Publications from PI from the project area

1. Dr. Ahmed S. Salama, Dr. Bahaa K. Saleh, Dr. Mohamad M.Eassa "**Intelligent Cross Road Traffic Management System(ICRTMS)"** 2nd Int. Conf. on Computer Technology and Development,Cairo, Nov 2010. (Accepted DST Project)

2. Dr. M. Siyal, and Dr. J. Ahmed,"A novel morphological edge detection and window based approach for real-time road data control and management," Int. Conference Information, Communications and signal Processing, IIIT-Delhi, July 2005. (Accepted AICTE RPS Project)

3. Dr. K.Srinivas and Dr. C.R.Rao, "Studies on Difference patterns from Cosecant patterns," in IOSR Journal of Electronics and Communication Engineering,Hyderabad.
Nov- Dec. 2014.(Accepted ISOR Project)

4. Dr. K.Srinivas and Dr. M.V Prasad, "Patterns of Array Dipoles for Non- Uniform Amplitude Distributions" International conference on Microwaves, antennas, Signals, Propagation & Remote Sensing digital cameras December 2011 in Jodhpur. Rajasthan (Accepted DST Project)

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5. List of facilities being extended by parent institution(s) for the project implementation.

Infrastructural Facilities

S.no	Infrastructural Facility	Yes/No/ Not required Full or sharing basis
1	Workshop Facility	Yes
2	Water & Electricity	Yes
3	Laboratory Space/Furniture	Yes
4	Power Generator	Yes
5	AC Room or AC	Yes
6	Telecommunication including e-mail & fax	Yes
7	Transportation	Yes
8	Administrative/ Secretarial support	Yes
9	Information facilities like Internet/Library	Yes
10	Computational facilities	Yes
11	Animal/Glass House	Not required
12	Any other special facility being provided	Dedicated research laboratory with high end computers containing MATLAB, SENSORS COMAMERS and other required software's

Equipment available with the Institute/ Group/Department/Other Institutes for the project:

Equipment available with	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI & his Ph.d Guide Dr. P.SRINIVAS	1. CCD/CMOS Sensors Cameras 2. Two Wheeler and Four Wheeler Vehicles	VNIR-400-1000nm or SWIR 900-1700nm	Designing and Testing of Equipments
PI's College of working Malla Reddy Engineering College – Autonomous (MREC-A)	Matlab Software	12.0 Math works year:2016	PI using this software from June 2016
	Laptop	Dell Inspiron 15R (Core i3 (10 ith Gen)/16 GB	PI is using from March 2016
	Scopes Indexed Journals	2018	For Literature and reporting purpose
Others by PI'S college of working MREC-A	Book Chapters Published Springer's Publications	2021	For good impact factors and publication book chapters

6. Name and address of experts/ institution in- terested in the subject / outcome of the project.

Expert Members:

1. **Dr. A. Ramaswami Reddy**
   Director
   Malla Reddy Engineering College- Autonomous
   Maisammaguda, Kompally, Dist. Medichal, Sec-bad, 5001000, Telagana State
   www.mrec.ac.in

2. **Dr. A. Raveendra**
   Principal
   Malla Reddy Engineering College- Autonomous
   Maisammaguda, Kompally, Dist. Medichal, Sec-bad, 5001000, Telagana State
   www.mrec.ac.in

3. **Dr. N. Lakshmipathi Anantha**
   CSE-HOD
   Malla Reddy Engineering College- Autonomous
   Maisammaguda, Kompally, Dist. Medichal, Sec-bad, 5001000, Telagana State
   www.mrec.ac.in

Budget Details

Full Summary (in Rs)

Institute	Manpower Budget (in Rs.)	Consumables (in Rs.)	Travel (in Rs.)	Equipment (in Rs.)	Contingency (in Rs.)	Other Costs (in Rs.)	Over head Costs (in Rs.)	Total amount (in Rs.)
Malla Reddy Engineering College-Autonomous	9,00,000	25,000	75,000	24,42,450	1,00,000	25,000	1,00,000	36,57,450
Total	9,00,000	25,000	75,000	24,42,450	1,00,000	25,000	1,00,000	36,57,450

Manpower Budget Breakup

Institute Name: Malla Reddy Engineering College-Autonomous

Summary:

Budget Head	Year-1 Amount (in Rs.)	Year-2 Amount (in Rs.)	Year-3 Amount (in Rs.)	Total amount (in Rs.)
Manpower Budget	3,00,000	3,00,000	3,00,000	9,00,000
Consumables	25,000	0	0	25,000
Travel	25,000	25,000	25,000	75,000
Equipment	24,42,450	0	0	24,42,450
Contingency	0	1,00,000	0	1,00,000
Other Costs	5,000	10,000	10,000	25,000
Overhead Costs	0	0	1,00,000	1,00,000
Grand Total (in Rs.)	41,28,083	4,35,000	4,35,000	36,57,450

Manpower Budget Detail:

Designation	Year-1 Amount (in Rs.)	Year-2 Amount (in Rs.)	Year-3 Amount (in Rs.)	Total amount (in Rs.)
Junior Research Fellow	3,00,000	3,00,000	3,00,000	9,00,000

PROFORMA FOR BIO-DATA (to be uploaded)

1. Name and full correspondence address : **Dr. P. Srinivas**
   H.No. 8-1-43/A/1/22&23, Sathya Colony,
   Shikepet, Hyderabad, Telagana State

2. Email(s) and contact number(s) : pattlolasrinivas@gmail.com & 9849720639

3. Institution : Malla Reddy Engineering College-Autonomous

4. Date of Birth : 10-02-1973

5. Gender (M/F/T) : M

6. Category Gen/SC/ST/OBC : OBC

7. Whether differently abled (Yes/No) : No

8. Academic Qualification (Undergraduate Onwards)

	Degree	Year	Subject	University/Institution	% of marks
1.	B.E (CSE)	1995	Computer Science Engineering	University College of Engineering, Osmaina University	65
2.	M.Tech (CSE)	2005	Computer Science Engineering	University College of Engineering, Osmaina University	68
3.	Ph.D (CSE)	2019	---	School of Engineering, Kalinga University	--

9. Ph.D thesis title, Guide's Name, Institute/Organization/University, Year of Award.

"ACADEMIC PERFORMANCE PREDICTION BY DATA MINING AN ANALYSIS WITH REFERENCE TO THE HIGH SCHOOL STUDENTS OF DELHI-NCR", Dr. Rupak Sharma, Kalinga University, 2019.

10. Work experience (in chronological order).

S.No.	Positions held	Name of the Institute	From	To	Pay Scale
1.	Professor	Malla Reddy Engineering College (A)	March 2016	Till date	UGC VII Pay Scale
2.	Professor & HOD-CSE	Siddhartha Institute of Engineering & Technology	June 2013	February 2016	UGC IV Pay Scale
3.	Associate Professor	Geethanjali College of Engineering & Technology	October 2005	May 2013	UGC V Pay Scale

4.	Sr. Assistant Professor & HOD-CSE & IT	Kshatriaya College of Engineering	June 2001	September 2005	UGC IV Pay Scale
5.	Assistant Professor	DVR Engineering College	June, 1995	June, 1998	Rs. 9000/- P.M.

11. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

S.No	Name of Award	Awarding Agency	Year
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12. **Publications** ***(List of papers published in SCI Journals, in year wise descending order).***

S.No.	Author(s)	Title	Name of Journal	Volume	Page	Year
1.	Mr. P. Srinivas ,Ms. Y.L. Malathilatha & Dr. M.V.N.K. Prasad	Image Processing Edge Detection Technique used for Traffic Control Problems.	International Journal of Computer Science and Information Technologies (IJCSIT) Scopus Indexed Journals (SIJ)	IV	17-20	2013
2.	Mr. P. Srinivas & Dr. P.V.S. Srinivas	Biometric Security Systems and Contemporary Affirmation of State of Art	International Journal of Scientific and Engineering Research (IJSER) Scopus Indexed Journals (SIJ)	IV	150-155	2013
3.	Mr. P. Srinivas & Dr. Rupak Sharma	A Study of Prediction of Students an their Academic Performance using Data Mining Techniques	Airo International Research Journal (AIRJ)	XIII	91-98	2017
4.	Mr. P. Srinivas & Dr. Rupak Sharma	To Analysis the Performance of Higher Secondary School in Dehi NCR Using Data Mining	Airo International Research Journal (AIRJ)	XVI	862-871	2018
5.	Mr. P.	A Robust	International Journal of			

	Srinivas & Dr. Y.L. Malathilatha	Reputation-Based Trust Award Cloud Model in Cloud Environment	Scientific Research in Computer Science Engineering and Information Technology (IJSCSEIT), Scopus Indexed Journals (SIJ)	III	252-259	2018
6.	Mr. P. Srinivas, Dr. Rupak Sharama & Dr. Ms.Y.L. Malathilatha	An Overview on Fuzzy Logic Issues, Architecture and Techniques of Domain Driven Data Mining (D3M)	International Journal New Engineering & Technology (IJNET) Web of Science Journals	XI	14-19	2019
7.	Dr. Pattlola Srinivas, Mr. M. Swami Das & Dr. Y.L. Malathilatha	Future Smart Home Appliances Using IoT	International Conference on Innovations in Computer Science & Engineering (ICICSE-2020 – Springer Virtual Conference)	III	6-11	2020
8.	S. Ajya Kumar, P.V. Ramana Murthy, Pattlola Srinivas, and P. Andrews Hima Kiran	Online Social Network Trend Discovery Using Frequent Subgraph Mining(FSgM)	Solid State Technology Scopus Indexed Journals	63	5934-5945	2020
9.	P.V. Ramana Murthy, P. Andrews Hima Kiran, S. Ajay Kumar, Pattlola Sriniva	Online Telugu Handwritten Character Recognition Using Efficient Machine Learning Approaches	International Journal of Future Generation Communication and Networking Web of Science Journals	13	1869-1880	2020

13. Detail of patents.

S.No	Patent Title	Name of Applicant(s)	Patent No.	Award Date	Agency/Country	Status
-	-	-	--	--	--	--

14. Books/Reports/Chapters/General articles etc.

S.No	Title	Author's Name	Publisher	Year of Publication
--	--	--	--	--

15. Any other Information (maximum 500 words)

i). More than 30 projects guided for Supervisor and Co-Supervisor a B.Tech and M.Tech students from 2010 to till date.

ii). Advisory Committee Member for one week Short Term Training Programming on "Research Methodology in Engineering and Technical Writing using LaTex" at AICTE Sponsored and MREC-A, during from 2 Dec 2019 to 7 Dec 2019.

iii). First Year Academic Course-ordinator at "Malla Reddy Engineering College-Autonomous" from during year from March, 2016 to May 2018.

iv). Convener for National Technical Fest Paper Presentations and Project Presentations in Technical Events at Siddhartha Institute of Engineering & Technology in the successive years 2014-15.

vi) Co-ordinator for Faculty Development Program on "Biometrics" covering in Image Processing & Pattern Recognitions concepts at Geethanjali College of Engineering & Technology on February, 2010-11.

vii). Co-Convener for National Technical Quest Paper Presentations and Project Presentations events at Geethanjali College of Engineering & Technology in the successive years 2007 to 2010.

viii). Paper setter in different types subjects for B.Tech(CSE), M.C.A and M.Tech(CSE) Affiliated Engineering Colleges and Universities.

Budget Details

Institution wise Budget Breakup :

Budget Head	Malla Reddy Engineering College	Total
Manpower	13,68,000	**13,68,000**
Consumables	2,50,000	**2,50,000**
Travel	50,000	**50,000**
Equipment	54,573	**54,573**
Contingencies	3,00,000	**3,00,000**
Other cost	75,000	**75,000**
Overhead	6,00,000	**6,00,000**
Total	**26,97,573**	**26,97,573**

Institute Name : *Malla Reddy Engineering College*

Year Wise Budget Summary (Amount in INR) :

Budget Head	Year-1	Year-2	Year-3	Total
Manpower	4,56,000	4,56,000	4,56,000	**13,68,000**
Consumables	70,000	80,000	1,00,000	**2,50,000**
Travel	15,000	15,000	20,000	**50,000**
Equipments	54,573	0	0	**54,573**
Contingencies	1,00,000	1,00,000	1,00,000	**3,00,000**
Other cost	25,000	25,000	25,000	**75,000**
Overhead	1,50,000	2,50,000	2,00,000	**6,00,000**
Grand Total	**8,70,573**	**9,26,000**	**9,01,000**	**26,97,573**

Manpower Budget Detail(Amount in INR) :

Designation	Year-1	Year-2	Year-3	Total
Junior Research Fellow	96,000	96,000	96,000	**2,88,000**
Research Associate-I *Assistant Research*	1,20,000	1,20,000	1,20,000	**3,60,000**
Research Associate-II *Assistant Research Fellow Ship*	1,44,000	1,44,000	1,44,000	**4,32,000**
Senior Research Fellow	96,000	96,000	96,000	**2,88,000**

Consumable Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
Consumables budget	20,000	30,000	50,000	**1,00,000**
Maintenance Research of Laboratory	50,000	50,000	50,000	**1,50,000**

Travel Budget Detail (Amount in INR) :

Justification (Inland Travel)	Year-1	Year-2	Year-3	Total
Travailing Allowance	15,000	15,000	20,000	**50,000**

Equipment Budget Detail (Amount in INR) :

Generic Name ,Model No. , (Make)/ Justification	Quantity	Spare time	Estimated Cost
Digital Sensors Cameras VNIR-400-1000nm or SWIR 900-1700nm (2021) *Equipment Purchase Details*	5	5 %	**54,573**

Contingency Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
Maintenance of the Equipment	1,00,000	1,00,000	1,00,000	**3,00,000**

Overhead Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
Research Laboratory	1,50,000	2,50,000	1,00,000	**5,00,000**

Other Budget Detail (Amount in INR) :

Description/Justification	Year-1	Year-2	Year-3	Total
Daily General Maintainace Cost for Sensors Cameras Research Laboratory	25,000	25,000	25,000	**75,000**

PROFORMA FOR BIO-DATA (to be uploaded)

1. Name and full correspondence address

2. Email(s) and contact number(s)

3. Institution

4. Date of Birth

5. Gender (M/F/T)

6. Category Gen/SC/ST/OBC

7. Whether differently abled (Yes/No)

8. Academic Qualification (Undergraduate Onwards)

	Degree	Year	Subject	University/Institution	% of marks
1.					
2.					
3.					
4.					

9. Ph.D thesis title, Guide's Name, Institute/Organization/University, Year of Award.

10. Work experience (in chronological order).

S.No.	Positions held	Name of the Institute	From	To	Pay Scale

11. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

S.No	Name of Award	Awarding Agency	Year

12. Publications *(List of papers published in SCI Journals, in year wise descending order).*

S.No.	Author(s)	Title	Name of Journal	Volume	Page	Year

13. Detail of patents.

S.No	Patent Title	Name of Applicant(s)	Patent No.	Award Date	Agency/Country	Status

14. Books/Reports/Chapters/General articles etc.

S.No	Title	Author's Name	Publisher	Year of Publication

15. Any other Information (maximum 500 words)

PROFORMA FOR BIO-DATA (to be uploaded)

1. Name and full correspondence address : Dr. J. Anitha
   45 – 51 – 4 , GF 2 , Ramya Arcade,
   Abid Nagar, Akkyapalem ,Visakhapatnam -530016

2. Email(s) and contact number(s) : anithanv28@ gmail.com ; 9298303067

3. Institution : Malla Reddy Engineering College (Autonomous)

4. Date of Birth : 28-07-79

5. Gender (M/F/T) : F

6. Category Gen/SC/ST/OBC : Gen

7. Whether differently abled (Yes/No) : No

8. Academic Qualification (Undergraduate Onwards)

	Degree	Year	Subject	University/ Institution	% of marks
1.	Ph.D.	2016	Computer Science &Science Engineering	Andhra University	—
2.	B.Tech.	2011-2014	Computer Science Engineering	Karnataka State Open University	71%
3.	M.Tech.	2005-2007	Computer Science &Science Engineering	Andhra University	75%
4.	M.Sc.	2001-2003	ComputerScience	Andhra University	65%
5.	B.Sc.	1997-2000	ComputerScience	Osmania University	60%
6.	Intermediate	1995- 1997	-	Board of Intermediate Education	70%
7.	S.S.C.	1995	-	Board of Secondary Education	81%

9. Ph.D thesis title, Guide's Name, Institute/Organization/University, Year of Award.

- Ph.D. thesis title : Some Studies on Automatic text summarization techniques for Hindi Language.
- Guide's Name : Prof. P.V.G.D. Prasad Reddy
- University : Andhra University
- Year of Award: 10th March '2016

10. Work experience (in chronological order).

S.No.	Positions held	Name of the Institute	From	To	Pay Scale
1.	Associate Professor	Malla Reddy Engineering College(Autonomous)	2021	Till Date	80,000/-
2.	Associate Professor	VIIT, Duvvada	2015	2020	77,500/-
3.	Associate Professor	D.I.E.T, Anakapalli	2011	2015	36,450/-
4.	Assistant Professor	GITAM university	2009	2011	24,000/-
5.	Teaching Assistant	Andhra University	2008	2009	12,000/-
6.	Assistant Professor	Al –Ameer College of Engineering	2004	2008	8000/-

11. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

S.No	Name of Award / Certificate	Awarding Agency	Year
1.	DB2 730 Fundamentals, Database Associate	IBM Certified	September '2008
2.	Associate System Administrator Lotus Notes and Domino 8	IBM Certified	February '2011

Error Tolerant Global Search Incorporated With Deep Learning Algorithm to Automatic Hindi Text Summarization**",** J.Anitha ,Prasad Reddy,PVGD and M. S. Prasad Babu, International Journal of Knowledge - Based and Intelligent Engineering Systems – under review.

12. Publications *(List of papers published in SCI Journals, in year wise descending order).*

S.No	Author (s)	Title	Name of Journal	Volume	Page	Year
1	J.Anitha , Prasad Reddy P.V.G.D. and Prasad Babu M. S.	An Approach for Summarizing Hindi Text Through a Hybrid Fuzzy Neural Network Algorithm	Journal of Information & Knowledge Management	Vol. 13, No. 4 (2014)	1450036(1-18)	2014
2	J.Anitha ,Prasad Reddy,PVGD and M. S. Prasad Babu	Error Tolerant Global Search Incorporated With Deep Learning Algorithm to Automatic Hindi Text Summarization	International Journal of Business Intelligence and Data Mining -IJBIDM	Accepted by Inder Science Publishers		2017
3	J.Anitha	Intelligent Parking System using Android Application	International Journal of Pure and Applied Mathematics (IJPAM)	volume 114 , No 7,	165-174	2017

14. Books/Reports/Chapters/General articles etc.

S.No	Title	Author's Name	Publisher	Year of Publication
N/A	N/A	N/A	N/A	

15. Any other Information (maximum 500 words)

Professional Body Memberships:

- IAENG (International Association of Engineers)Life Member with ID 107349.
- CSI (Computer Society of India) Life Member with ID I151010.
- IEI (Institution of Engineers (India) – MIE) Life Member with ID M-1576275

Extra-curricular activities:

- NSS Program Officer at Gitam Institute of Technology(GIT) GITAM University**.**
- Certificate of Appreciation as a part of Core Committee for two day International workshop on Internet of Things held during 29th Feb to 1st March '2016 at Vignan's Institute of Information Technology, Duvvada.
- Certificate of Appreciation as being invited as judge in Two day Tech Project Expo 2k16 held on 22nd and 23rd June 2016 at Vignan's Insitute of Information Technology**.**

List of Papers Published:

- "Intelligent Quality Management Expert System using PA-AKD in large Databases", International Journal of Engineering Science and Technology ,Vol .2 (4) ,2010,632-636.
- "A Rule Based Medical Expert System on Dermatology ",International Journal of Applied Artificial Intelligence in Engineering System (IJAAIES),vol .2(1).2010,81-86.
- "A New Method to minimize the clock skew to enhance performance of Digital System", International Journal of Engineering Science and Technology ,vol. 2(6),2010,2499-2482.
- "Method to Minimize the clock skew in multiple pipe line by uniform clock Distribution using parallel port", International Journal of Computer Science and Applications, vol. (1)2010 .

- “A Web Based Sweet Orange Crop Expert System using Rule Based System and Artificial Bee colony Optimization Algorithm “, International Journal of Engineering Science and Technology ,Vol. 2 (6) , 2010,2408-2417.

- “ A Web Based Egg Quality Expert Advisory System using Rule Based and Ant Colony (ACO) Optimization Algorithms “ ,International Journal of Advanced Research in Computer Science ,Vol 1, no 3 , sept - oct 2010.

- “Improved Ant colony optimization Algorithm based Expert System on Nephrology”, International Journal of Computer Science and Engineering, vol. 2(4),2010,1142-1152.

- “Tailoring Dynamic Fuzzy Ontology Generation on semantic web”, International Journal of Advances in Science and Technology.vol 1(2),2010.

- “Research Automatic Fuzzy Ontology Generation for world Wide Web”, Global Journal of computer science &Technology, Vol. 10(4) Ver.10 Nov’2010.

- “Wireless Telecommunications Call Records Data warehouse Data flows”, International Journal of Computer Science and Information Technologies, Vol. 3(3) 2012,4439-4442.

- “Analyzing Earth Movers Distance as Mallow Distance from existing Facts”, Global Journal of computer science and Technology, Vol.XII(9) Ver.1 April’2012.

- “Data Warehousing Concept Using ETL Process For SCD Type-1” The International Journal of Computer Science & Applications (TIJCSA), Volume 1, No. 10, December 2012 ISSN – 2278-1080.

- “Data Warehousing Concept Using ETL Process For SCD Type-2” American Journal of Engineering Research (AJER), Volume-2, Issue-4,April-2013. pp-86-91, e-ISSN: 2320-0847 p-ISSN : 2320- 0936.

- "Data Warehousing Concept Using ETL Process For SCD Type-3" International Journal of Emerging Trends & Technology in Computer Science (IJETTCS) , Volume 2, Issue 5, September – October 2013.

- " A Novel Multi owner Data sharing Group key protocol", International Journal of Research in Computer and Communication Technology (IJRCCT), Vol. 2, Issue 10, October- 2013.

- " ETL Work Flow For Extract Transform Loading" , International Journal of Computer Science and Mobile Computing (IJCSMC), Vol. 3, Issue. 6, June 2014, pg.610 – 617.

- "Permit Access Control of Data Stored in Cloud to Authenticate Users", International Journal of Advanced Research in Computer Science and Software Engineering ,volume 5, Issue 1, January 2015 pp.1028-1032.

- "A Novel Frame Work for Hindi Text Summarization in Android Mobile Devices", J.Anitha, Prasad Reddy
  P.V.G.D. and Prasad Babu M. S., An International Journal of Science, Technology and Management (IJSTM), Volume No.04, Issue No. 03, March 2015.(68-78).

- **"** Intelligent Parking System using Android Application " , International Journal of Pure and Applied Mathematics (IJPAM), volume 114 , No 7, 165-174.

- **"**Error Tolerant Global Search Incorporated With Deep Learning Algorithm to Automatic Hindi Text Summarization" International Journal of Business Intelligence and Data Mining -IJBIDM-4295 , Inderscience Publishers.(Accepted)

References:

1 Prof. P.V.G.D Prasad

Reddy Head of the

Department,

Department of CS &

SE, Andhra University,

Visakhapatnam .

2. Prof. Challa

   Narasimham Principal

   ,

   Vignan’s Institute of Information

   Technology, Duvvada,

   Visakhapatnam

Undertaking by the Principal Investigator

To

The Secretary
SERB, New Delhi

Sir

I **Dr. P. Srinivas, Professor at Malla Reddy Engineering College-Autonomous** herby certify that the research proposal titled **"Image Processing Edge Detection Technique used for Traffic Control Problem"** submitted for possible funding by SERB. New Delhi is my original idea and has not been copied/taken verbatim from anyone or from any other sources. I further certify that this proposal has been checked for plagiarism through a plagiarism detection tool i.e. **Turnitin** approved by the Institute and the contents are original and not copied/taken from any one or many other sources. I am aware of the UGC Regulations on prevention of Plagiarism i.e. University Grant Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulation, 2018. I also declare that there are no plagiarism charges established or pending against me in the last five years. If the funding agency notices any plagiarism or any other discrepancies in the above proposal of mine, I would abide by whatsoever action taken against me by SERB, as deemed necessary.

15/3/21

Signature of PI with date

Name / designation

Dr. P. Srinivas
Professor

Endorsement from the Head of the Institution of Co-PI

(To be given on University/ Institute/Organization/College Letter head)

This is to certify that:

1. Institute welcomes participation of Name : **Dr. P. Srinivas** Designation **Professor** as the Principal Investigator and **Dr. Ms. J. Anitha** as the Co- Investigator for the project titled ""**Image Processing Edge Detection Technique used for Traffic Control Problem"** and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.

2. The Co-PI, **Dr. Ms. J.Anitha** is a permanent or regular employee of this Institute/University/Organization and has **1** years of regular service left before superannuation

3. The Co-PI will be governed by the rules and regulations of University/ Institute/Organization/College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.

4. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.

5. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.

6. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.

7. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.

8. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Signature

Seal of

University/ Institute/Organization/College

Registrar of University/Head of the Institute/
Head of organization / Principal of College

Date: 15/03/2021

Certificate from the Investigator

Project Title: "Image Processing Edge Detection Technique used for Traffic Control Problem"

It is certified that

1. The same project proposal has not been submitted elsewhere for financial support.
2. We/I undertake that spare time on equipment procured in the project will be made available to other users.
3. We/I agree to submit a certificate from Institutional Biosafety Committee, if the project involvesthe utilization of genetically engineered organisms. We/I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology. Department of Health Research, GOI would be followed in toto.
4. We/I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involves field trails/experiments/exchange of specimens, human & animal materials etc.
5. The research work proposed in the scheme/project does not in any way duplicate the work already done or being carried out elsewhere on the subject.
6. We/I agree to abide by the terms and conditions of SERB grant.

Name and signature of Principal Investigator: **Dr. P. Srinivas**

Date: 15th, March, 2021
Place: Secunderabad.

Name and signature of Co-PI (s) (if any): **Dr. Ms. J. Anitha**
Date: 15th March, 2021
Place: Secunderabad