Project Report

On

"Real Time Smart Traffic System"

Submitted impartial fulfillment of the requirement for the Award of degree of

Master of Computer Applications

By

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Under the Guidance of

Dr. Amit Bhagat

Session 2016-19

Department of Mathematics & Computer Applications

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Declaration

I, hereby declare that the work presented in this project entitled "**Real Time Smart Traffic System** "presented in partial fulfillment for the award of the degree of Master of Computer Applications submitted in the Department Of Mathematics and Computer Applications, Maulana Azad National Institute of Technology, Bhopal is an authentic work carried out from1st January 2019 to 3rd May2019 under the guidance of **Dr. Amit Bhagat**, MANIT Bhopal.

The matter embodied in this project has not been submitted by me or anybody else to any institution for award of any other degree or diploma.

Raja Ruchi Rangad Jha (162120018)

Counter Signed by:

Supervisor:

Head, Department Of Mathematics and Computer Applications
MANIT, Bhopal.

Acknowledgement

Here, I gladly present this project report on **"Real Time Smart Traffic System."** as part of the 6th semester MCA Master in Computer Applications. I take this occasion to thank God, almighty for blessing me with his grace and taking our endeavour to a successful culmination. I extend my sincere and heartfelt thanks to me esteemed guide, **Dr.Amit Bhagat** for providing me with the right guidance and advice at the crucial junctures and for showing me the right way. I extend my sincere thanks to my respected head of the department **Dr. Sujoy Das**, for allowing me to use the facilities available.

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Submitted By -

Raja Ruchi Rangad Jha (162120018)

Certificate

2016-2019

DEPARTMENT OF MATHEMATICS AND COMPUTER APPLICATIONS

MAULANA AZAD NATION INSTITUTE OF TECHNOLOGY BHOPAL
(M.P.) – 462003

This is to certify that **Raja Ruchi Rangad Jha(162120018** have carried out the project work in this report entitled **"Real Time Smart Traffic System."** for the award of Master of Computer Application in Maulana Azad National Institute of Technology Bhopal (M.P) - 462003.

This report is the record of the candidates' own work carried out by them under our supervision and guidance. This project work is the part of their Master in Computer Applications in Information Technology curriculum.

Their performance was excellent and we wish them good luck for their future endeavors.

Signature of Project Guide **Signature of Head of Department**

Abstract

Real Time Smart Traffic System is a machine which is used to make traffic system smart and dynamic .this machine use's **object detection** technique for gathering real time traffic data and on the base of these data it perform traffic light management in real time . this machine is very useful to save time on traffic signals . this is generic project which can be used widely for the educational purpose .

The main goal of this project is :-

- **Detect type of object.**
- **Detect Coordinate Of each type of object.**
- **Count each type of object**
- **Optimize traffic light .**

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1. Introduction:

Real Time Smart Traffic System is a machine which is used to make traffic system smart and dynamic .this machine use's **object detection** technique for gathering real time traffic data and on the base of these data it perform traffic light management in real time . this machine is very useful to save time on traffic signals . this is generic project which can be used widely for the educational purpose . in this project we try to make automatic traffic light signal more smart we are using some pertained model doing necessary customization and retraining of that model comparing some exiting models for better , faster and accurate results . actually we are just trying to reduce waiting time at traffic signals doing replacement of pre fixed waiting time with real time waiting time according to amount of traffic.

1. Problem Definition and Algorithm :

1.1 Problem Definition:

We reframe the object detection as a single regression problem, straight from image pixels to bounding box coordinates and class probabilities.

- **Detect type of object:-**
- **Detect Coordinate Of each type of object.**
- **Count each type of object**
- **Optimize traffic light.**

1.2 Algorithm :

- **YOLO:-** YOLO (You Only Look Once), is a network for object detection. The object detection task be made up in determining the location on the image where certain objects are present, as well as classifying those objects. Old methods for this, like Faster R-CNN and etc., used a pipeline to perform this task in multiple steps. This can be slow to run and also hard to optimize, because each and individual component must be trained separately. YOLO, does it all with a single neural network.

2. My Approach:

Some Important MODEL used In this project:-

- **RetinaNet** (Size = 145 mb, high performance and accuracy, with longer detection time)

- **YOLOv3** (Size = 237 mb, moderate performance and accuracy, with a moderate detection time)

- **TinyYOLOv3** (Size = 34 mb, optimized for speed and moderate performance, with fast detection time)

Technology Used:

Language: Python
IDE : Spyder , Jupyter notebook
Tools : Anaconda, openCv

In this project work we have used several **AI & machine learning** algorithm and libraries using python

Some of most important libraries is mentioned below

- **ImageAI**
- **Tensorflow**
- **Numpy**
- **OpenCV**
- **Keras**

Some of mostly Used important libraries:

ImageAI :- ImageAI is a python library built to empower developers, reseachers and students to build applications and systems with self-contained Deep Learning and Computer Vision capabilities using simple and few lines of code. **ImageAI** can detect 80 different types of objects. They include:
person, bicycle, car, motorcycle, airplane, bus, train, truck, boat, traffic light, fire hydrant,stop sign, parking meter, bench, bird, cat, dog, horse, sheep, cow, elephant, bear, zebra, giraffe, backpack, umbrella, handbag, tie, suitcase, Frisbee, skis, snowboard,sports ball, kite, baseball bat, baseball glove, skateboard, surfboard, tennis racket,bottle, wine glass, cup, fork, knife, spoon, bowl, banana, apple, sandwich, orange,broccoli, carrot, hot dog, pizza, donot, cake, chair, couch, potted plant, bed,dining table, toilet, tv, laptop, mouse, remote, keyboard, cell phone, microwave,oven, toaster, sink, refrigerator, book, clock, vase, scissors, teddy bear, hair dryer, toothbrush.

ImageAI allow you to perform detection for one or more of the items above. That means you can customize the type of object(s) you want to be detected in the image.

Tensorflow :- TensorFlow is an end-to-end open source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML powered applications.

OpenCV:- OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc.

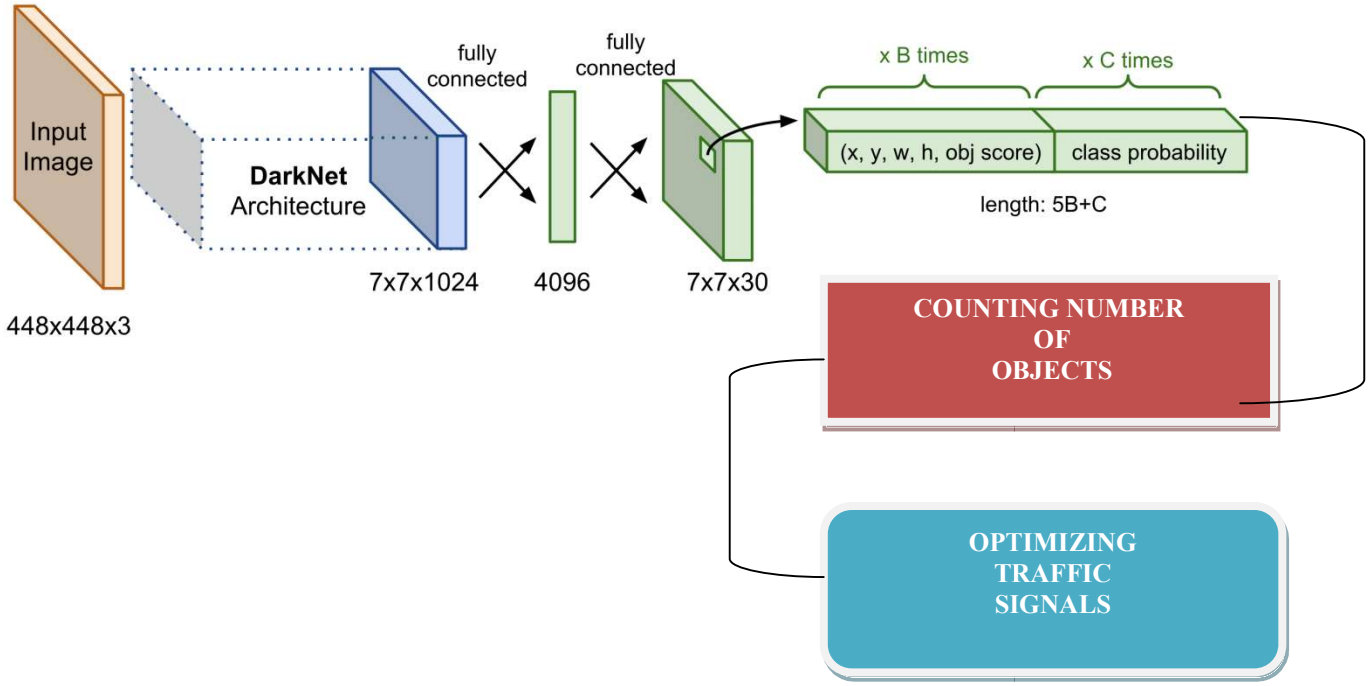
NUMPY:- NumPy is the fundamental package for scientific computing with Python. It contains among other things:

- a powerful N-dimensional array object
- sophisticated (broadcasting) functions
- tools for integrating C/C++ and Fortran code
- useful linear algebra, Fourier transform, and random number capabilities

Besides its obvious scientific uses, NumPy can also be used as an efficient multi-dimensional container of generic data. Arbitrary data-types can be defined. This allows NumPy to seamlessly and speedily integrate with a wide variety of databases.
NumPy is licensed under the BSD license, enabling reuse with few restrictions.

Keras : Keras is a high-level neural networks API, written in Python and capable of running on top of TensorFlow, CNTK, or Theano. It was developed with a focus on enabling fast experimentation. *Being able to go from idea to result with the least possible delay is key to doing good research.*

3. Architecture:



4.KEY FACTOR:-

- **Detection Speed**
- **Hiding/Showing Object Name and Probability**
- **Input & Output Types**
- **Prediction Classes**
- **Detection Classes**
- **Video and Live-Feed Detection and Analysis**
- **Custom Training and Prediction Classes**

Detection Speed:-there are several types of dictation speed available with the detection rate between 20% To 80% named AS:

- **NORMAL**
- **FAST**
- **FASTER**
- **FASTEST**
- **FLASH**

Hiding/Showing Object Name and Probability:- provides options to hide the name of objects detected and/or the percentage probability from being shown on the saved/returned detected image. Using the function **detectObjectsFromImage()** And **detectCustomObjectsFromImage()** with the parameter **display_object_name** and **display_persantage_probability.**

Input & Output Types:- supports 3 input types of inputs which are **file path to image file**, **numpy array of image** and **image file stream** as well as 2 types of output which are image **file**(default) and numpy **array** .

Prediction Classes:- provides very powerful easy to use classes to perform **Image Recognition** tasks. You can perform all of these state-of-the-art computer vision tasks with python code .

Detection Classes:- **ObjectDetection** class provides you function to perform object detection on any image or set of images, using **pre-trained** models that was trained on the **COCO** dataset.

Video and Live-Feed Detection and Analysis:- **VideoObjectDetection** class provides you function to detect objects in videos and live-feed from device cameras and IP cameras, using **pre-trained** models that was trained on the **COCO**dataset.

Custom Training and Prediction Classes:- **ModelTraining** class allows you to train any of the 4 supported deep learning algorithms (**SqueezeNet** , **ResNet** , **InceptionV3** and **DenseNet**) on your own image dataset to generate your own custom models. Your image dataset must contain at least 2 different classes/types of images (e.g cat and dog) and you must collect at least 500 images for each of the classes to achieve maximum accuracy.

5.Experimental results and discussion:-

Yolo:-

detection_speed="normal"

output-->

traffic light : 57.40169882774353

truck : 90.8550500869751

bus : 96.51610255241394

bus : 99.83268976211548

person : 73.49357604980469

person : 89.48697447776794

person : 93.7789797782898

person : 98.92159104347229

person : 99.69530701637268

Processing Time 10559.930957999995ms

##

detection_speed="fast"

output-->

traffic light : 81.35932087898254

truck : 78.33409309387207

truck : 81.58104419708252

bus : 99.70790147781372

bicycle : 64.31289315223694

person : 86.23952269554138

person : 94.8752760887146

person : 96.32670283317566

person : 97.01223373413086

person : 99.3288516998291

Processing Time 9875.941796000006ms

##

detection_speed="faster"

output-->

truck : 74.95586276054382

truck : 76.80753469467163

bus : 63.431453704833984

bus : 98.1202244758606

person : 68.12233328819275

person : 93.79541873931885

person : 97.1179723739624

person : 97.48234748840332

Processing Time 9600.54162499999ms

##

detection_speed="fastest"

output-->

bus : 90.93934893608093

car : 81.44389986991882

person : 83.8293194770813

person : 93.2661771774292

Processing Time 7191.409641ms

##

detection_speed="flash"

output-->

bus : 92.69177317619324

car : 55.582016706466675

car : 82.91438221931458

person : 50.45552849769592

person : 55.900609493255615

person : 90.95762968063354

Processing Time 6403.145388999998ms

Resnet:-
detection speed="normal"
output-->
person : 56.95698261260986
person : 52.8093159198761
person : 70.20384073257446
person : 76.83472633361816
person : 78.70040535926819
bicycle : 79.77726459503174
person : 83.55753421783447
person : 89.4381046295166
truck : 60.933083295822144
person : 69.52639818191528
bus : 98.00646901130676
truck : 83.69434475898743
car : 71.70117497444153
################################
detection speed="fast"
output-->
person : 67.60987043380737
person : 72.48536944389343
person : 62.94122338294983
bicycle : 68.4646725654602
traffic light : 51.64749026298523
truck : 70.38664221763611
person : 71.23202085494995
person : 53.621405363082886
person : 86.00450158119202
bus : 98.28432202339172
bus : 70.83768248558044
truck : 79.85028624534607
################################
detection speed="faster"
output-->
traffic light : 54.02860641479492
person : 50.62238574028015
person : 64.69148993492126
person : 82.81199336051941
person : 71.95221781730652
bicycle : 52.19396352767944
bus : 80.14761209487915
person : 84.97609496116638
bus : 97.72059917449951
car : 74.20551180839539

################################
detection speed="fastest"
output-->
person : 60.355108976364136
person : 55.61777353286743
person : 80.94267249107361
bus : 95.7231879234314
truck : 61.663031578063965
car : 85.87349057197571
################################
detection_speed=""flash"
output-->
truck : 51.99494957923889
car : 83.16107988357544
Processing Time5074.106643999999

Final Observation :-

Speed="normal"
Camera 0
truck : 50.484293699264526
truck : 71.4876651763916
truck : 74.51363205909729
bus : 58.83506536483765
car : 91.02205634117126
car : 91.49898886680603
car : 92.47969388961792
car : 92.7895724773407
car : 93.03833842277527
car : 94.33265328407288
car : 94.39647793769836
car : 95.1334536075592
car : 95.1336145401001
car : 95.5622673034668
car : 95.69589495658875
car : 96.3101863861084
car : 96.3390588760376
car : 96.391761302948

car : 97.15653657913208
car : 97.59579300880432
car : 98.16626310348511
car : 98.50777387619019
car : 98.5083818435669
car : 98.65074753761292
Number of objects 24
Camera 1
traffic light : 57.40169882774353
truck : 90.8550500869751
bus : 96.51610255241394
bus : 99.83268976211548
person : 73.49357604980469
person : 89.48697447776794
person : 93.7789797782898
person : 98.92159104347229
person : 99.69530701637268
Number of objects 9
Camera 2
bus : 95.85230946540833
motorcycle : 81.42218589782715
motorcycle : 96.28041386604309
car : 87.74840235710144
bicycle : 59.2099666595459
bicycle : 87.99861669540405
bicycle : 98.22131395339966
person : 50.47598481178284
person : 53.09971570968628
person : 58.89129638671875
person : 62.953466176986694
person : 73.92203211784363
person : 83.6195170879364
person : 85.89847087860107
person : 87.62459754943848
person : 88.12265396118164
person : 89.58780765533447
person : 94.46720480918884
person : 94.89835500717163
person : 96.03091478347778
Number of objects 20
Camera 3
truck : 50.91126561164856
bus : 70.37792801856995
motorcycle : 65.07901549339294
car : 62.48207092285156
car : 65.86607098579407

car : 66.82522892951965
car : 67.22333431243896
car : 76.63370966911316
car : 76.97793245315552
car : 79.86611723899841
car : 84.08755660057068
car : 84.19909477233887
car : 86.65236234664917
car : 87.83812522888184
car : 91.37845635414124
car : 91.72824621200562
car : 93.68608593940735
car : 94.0672755241394
car : 96.0292637348175
car : 96.4802086353302
car : 97.13120460510254
car : 98.01432490348816
car : 99.24588799476624
person : 58.146101236343384
person : 59.42915678024292
person : 63.985490798950195
person : 63.989925384521484
person : 65.95093011856079
person : 69.28902864456177
person : 79.16268110275269
person : 81.0214638710022
person : 87.13827133178711
person : 87.33267784118652
person : 87.75357007980347
person : 91.57392382621765
person : 95.45864462852478
person : 99.43534135818481
Number of objects 37
Processing Time 25152.696823ms
##
Speed="flash"
Camera 0
car : 50.0863254070282
car : 53.326207399368286
car : 56.047648191452026
car : 57.41311311721802
car : 58.55519771575928
car : 61.41618490219116
car : 80.49003481864929
car : 89.9565041065216
Number of objects 8

Camera 1
bus : 92.69177317619324
car : 55.582016706466675
car : 82.91438221931458
person : 50.45552849769592
person : 55.900609493255615
person : 90.95762968063354
Number of objects 6
Camera 2
person : 56.92325234413147
person : 58.94696116447449
person : 60.513389110565186
person : 61.27423644065857
person : 72.06350564956665
person : 84.75883603096008
Number of objects 6
Camera 3
car : 50.41944980621338
car : 51.23067498207092
car : 53.37933897972107
car : 56.675976514816284
car : 63.899773359298706
car : 75.39544701576233
car : 83.90411138534546
car : 93.24526190757751
person : 75.76871514320374
Number of objects 9

6.Project Scope:

The project has a wide scope, as it is not intended to a particular organization. This project is going to develop generic software, which can be applied by any education organization. Moreover it provides facility to record real time traffic data and on the base of that data manage the traffic signals dynamically.

7.Proposed System:

Establish a method of this system are easy to use and can make traffic system dynamic and real time with synchronized manner.

8.System Analysis

System Analysis is the main feature of the software field. It can be said that it is a sole of any of the system. The analysis needs an expert supervision & the person should be minimum System Analyst with the experience of 5 to 7 yrs. One can use some of the different tools to analyze the system.

System Analysis refers to the process of examining a business situation analytically with the intent of improving it through alternate or new better procedures and methods. More precisely, it is a management technique that help us in designing a new system or improves an existing system. It was done keeping the following objectives in mind

Some of the tools we have used to analyse the problem is given below:

- ✓ Identify the Organization's need
- ✓ Evaluate System Concept for Feasibility
- ✓ Perform Economic and Technical Feasibility
- ✓ Allocate functions to Hardware, Software, database and other System Elements

ANALYSIS TOOLS:Data Collection Tools: We have collected the information regarding the current system & procedure which are going on. This collection helps us to understand the old systems know how.

Charting Tools: The graphical representation of system & activities help us to understand the minor problems and the flow procedures, which can become very helpful in analysis as well as to generate the new system requirements.

Dictionary Tools:This tool help us to maintain & record the data & description of system element through Data items, processes & data stores. After the use of tools we have to do the analysis of a system through main factors:

Current system: We study the working of current system, which help us to collect the benefits & limitations of the current system.

Equipment's: Then we collect the information about the hardware requirement.

Space: In this we collect the information about the storage space needed in the new system.

Procedure: Which type of procedures are going on, this study is being useful to analyze that if all procedures are doing well or if there is a need for change.

2.1 Requirement Analysis

Requirement Analysis means studying or observing the current Business System to find how it works and where improvement can be made. It may include ways of capturing or processing data, producing information, or supporting management.

The First step of System Analysis is the identification of need. In this regard a series of interviews were conducted with authorized person of the institution. This was essential so as to know the processes that were being followed.

Requirements analysis is a software engineering task that bridges the gap between system level software allocation and software design.

Analysis and a bridge between system engineering and software design

Software requirements analysis may be divided into five areas of effort:-

(a) Problem recognition.
(b) Evaluation and synthesis.
(c) Modeling.
(d) Specification.
(e) Review.

Initially, the analyst studies the system specification and the software project plan. Problem evaluation and solution synthesis is the next major area of effort for analysis.

Upon evaluating current problems and desired information (input and output) the analyst begins to synthesize one or more solutions.

During the evaluation and solution synthesis activity, the analyst creates models of the system in an effort to better understand data and control flow, functional processing and behavioral operation, and information content. The model serves as a foundation for software design and as the basis for the creation of a specification for the software.

9. Configuration:

Hardware Configuration:

The section of hardware configuration is an important task related to the software development insufficient random access memory may affect adversely on the speed and efficiency of the entire system. The process should be powerful to handle the entire operations. The hard disk should have sufficient capacity to store the file and application.

Processor: I7 6^{th} generation and above

Processor speed: 3.0 GHz Onwards

System memory: 50 GB minimum

Cache size: 1GB

RAM: 12 GB(Minimum)

Network card: Any card can provide a 100mbps speed

Graphics card: 4 GB(Minimum)

Network connection: UTP or Coaxial cable connection

Hard disk: 100 Gb

Monitor: SVGA Color 15" 5

Camera : Digital Camera(real time recording capability)

Software Configuration:

A major element in building a system is the section of compatible software since the software in the market is experiencing in geometric progression. Selected software should be acceptable by the firm and one user as well as it should be feasible for the system. This document gives a detailed description of the software requirement specification. The study of requirement specification is focused specially on the functioning of the system. It allow the developer or analyst to understand the system, function to be carried out the performance level to be obtained and corresponding interfaces to be established.

Operating system: Windows 10,LINUX

10.Preliminary Investigation

After clearly defining the requirements of the firm during Requirement Analysis then next step is the Preliminary Investigation that is done to determine the feasibility of the System. The purpose of the Preliminary Investigation is to evaluate Project requests.
The Data during Preliminary investigation was gathered through three Primary methods

Reviewing Organization documents -

I reviewed the Organization Documents such as forms, records, Reports, Manuals, Transaction detail etc. These Documents clearly defined the important steps involved in the working of the Firm. I also had a talk with concerned Manager and other related People to get information about the Firm.

On – Site Observation -

I observed the activities of the system directly. One purpose of On-Site observation is to get as close as possible to the Real System. I closely observed the Firm's Environment, Workload on the System and the Users, the method of Work and the facilities provided by the Firm to the customer. The Physical layout of the Current System, its location and the Workflow was also observed.

Limitation of Existing System:

The following are the limitation of the current working system:

1. Manual work consumes time and energy.
2. Large Number of calculation and human errors are generated.
3. Scope of limited.
4. No protection of data.
5. More Stationery is required

Proposed System Description:

The following points describe the requirement for the new system:

The working of the system will be fully Automated and online.

System should provide concrete security features by assigning, so that only the authorized person should access the software.

System should be able to handle extremely large volumes of data.

11.Feasibility Study

Feasibility of a project is being analyzed with in some framework. The most important factor is that if a project is feasible & desirable then it include in the schedule of the management that if the clearance should be giveto it or not. Normally the assessment of feasibility depends upon some main factors like Technical, Economical and Operational.

The assessment of the "Database Management System" has the following facts.

Operational Feasibility:

1.It seems that management is very much interested in the new system.

2.The management & the user of the system are normally the same so there is no problem about confliction the management & users.

3.Since all the work is going manually that is why there is no liking for the old system.

4.The user and management both are ready to accept the new system, so they both show keen interest in giving the facts.

2.3.2 Technical Feasibility:

The technology seems sufficient to run the new system. The data holding facility is also seems sufficient because there is not enough transaction and it can be managed easily. It is also analyzed the hardware technology can be expanded if the data increases.

2.3.3 Economical Feasibility:

It is analyzed that it will benefit the company in terms of time saving as well as cost. It is also analyzed that cost of full system investigation is not much as it is not very much complex system.

12 .Software Engineering Paradigms

Software Process Models

To solve actual problems in an industry setting, a software engineer or a team of engineers must incorporate a development strategy that encompasses the process, method and tools.

A process model for software engineering is chosen based on the nature of the project and application, the methods and tools to be used, and the control and deliverables that are required.

Among the various available Software Process Models (Waterfall models, spiral model Prototyping model, etc) the best suited for this project is the Prototyping Model.

To develop the system Proto Type Modal is applied as the company wanted to see the software development process and appearance of the software so that the idea of the functionally of the system can be understood. The software developed in three phases in first phase the dry proto type is developed in which after the analysis the screens are designed and no validation are performed and also no database functionality is incorporated. After the demonstration of dry proto type suggestions from the client are noted and the development process is moved to the second phase i.e. wet prototype the actual designed is incorporated, validations are performed and the software is submitted to the user for acceptance and testing and then after final submission of the software is produced with user manual.

Prototyping Model

Often, a customer defines a set of general objectives for software but does not identify detailed input, processing or output requirements. In other cases the developer may be unsure of the efficiency of an algorithm, the adaptability of an operating system, or the form that human – machine interaction should take, in these and many other situations, prototyping paradigm may offer the best approach.

The prototype can serve as “the first system’’. It is true that both the customer and developers like the prototyping paradigm. Users get a feel for the actual system and developers get to build something immediately. Yet prototyping can also be problematic for the following reasons:

1. The customer sees what appears to be a working version of the software that the prototype is held together “with chewing gum and a baling wire’’ unaware that in the rush to get it working we haven`t considered overall software quality or long term

maintainability. When informed that the product must be rebuild so high level of quality can be maintained. Too often, software development management relents.

2. The developer often makes implementation compromises in order to get a prototype working quickly. An inappropriate operating system or programming language may be used simply because it is available and known, an efficient algorithm may become familiar with these choices and forget all the reasons why they were inappropriate. The less than ideal choice has now become an integral part of the system.

12.Analysis Documents

Document Analysis is a technique used to gather requirements during the requirements elicitation phase of a project. It describes the act of reviewing the existing documentation of comparable business processes or systems in order to extract pieces of information that are relevant to the current project, and therefore should be consider projects requirements.

Software Requirement Specification:

The software requirements specification is produced at the culmination of the analysis task. The function and performance allocated to software as a part of system engineering are refined by establishing a complete information description a detailed functional and behavioral description, a indications of performance requirements and design constraints, appropriate validation criteria and other data pertinent to requirements. The National Bureau of standard IEEE and the US Department of Defense have all proposed candidate formats for software requirements specifications. For our purpose however the simplified outline presented may be used as a framework for the specification.

S.R.S. Of Our Project:

Introduction: It states the goals and objectives of the software descriptions in the context of the computer – based system actually, the introduction may be nothing more than the software scope of the planning document.

Information description

It provides a detailed description of the problem that the software must solve information contest and relationships, flow and structure are documented. Hardware, software and human interfaces are described for external system elements and internal software function. The Department of Administrative Reforms and Public Grievances aims to facilitate the pursuit of

excellence in governance. It gives the information about the citizen with grievances against public a institution and government organization viz. central Government Ministries / departments / Organizations / State Governments /UT Administrations and services to them. It forward all the information to citizens with grievance to the concerned Government organization within 15days under intimation to the petition.

Functional Description

It present description of each function required to solve the problem. A processing narrative is provided for each function, design constraints are stated and justified, performance characteristics are stated, and one or more diagrams are included to graphically represent the overall structure of the software and interplay among software function and other system elements under this topic, the functional working of the various modules where give the complete picture for the data flow from one location to other. There proper linking between them. The department of Administrative Reforms and Public Grievance aims to facilitate the pursuit of excellence in governance through promotion of:-

(1) Improvements in Auction structures and processes.
(2) Consumer friendly initiatives including redressal of grievances.
(3) Documentation, incubation and discrimination of best practices.
(4) Codification and simplification of procedures.
(5) Internet Based.

Behavioral Description

This section of the specification examiners the operation of the software as a consequences of external events and internally generated control characteristics. In this topic may project shows the event flow diagram which tells us at what step what will be the result.

13.Code Efficiency

In software project we must keep a balance between the language used & the area of the application as well as database management system were actual data is being stores. There must be provision for those situations which are not meeting at the time of making the project for example the codes should be written keeping the aspect that software should compatible with others database or data can be migrated from outside. The information systems are designed with space & time complexity and cost saving in mind. The coding systems are methods in which conditions, words, ideas or relationship are expressed by a code. A code is an ordered collection of symbols designed to provide unique identification of an entity or attribute. It may be brief number, title or symbol. The main purpose of codes is to facilitate the identification and retrieval of times of information from the system.

There are many possible-coding structures. The main types of codes are described below:
Classification Code: Classification is the best described as the establishment of categories of entities, types and attributes in away that brings like or similar items together according to pre-determined relationships. A classification is by nature an order systematic structure. So the classification code places separate entities like events, people, or object into distinct groups called classes. A code is used to identify one class from another. Using the code the user classifies the event into one of several possible categories and records the code.
Classification codes vastly simplify the input process because only a single-digit code is required. The need for writing lengthy description or making judgments is eliminated.
Function Code: Function codes states the activities or work to be performed without spelling out all of the details in narrative statement.
It has been recognized that good coding style can overcome many of the deficiencies of a primitive programming language, while poor styles can defeat the intent of an excellent language. The goal of a good coding style is to provide easily understood, straight-forward and elegant code. The guidelines for coding includes:

- Use of a few standard control constants.
- Use of unconditional branching (go to) in a disciplined manner.
- Introduction of user-defined data types to model entities in the problem domain.
- Hiding of data structures behind access functions.
- Providing standard documentation prologues for each subprogram and compilation unit.
- Use of indentation, parenthesis, and blank spaces, blank lines, borders and comments to enhance readability.

14.Code Optimization

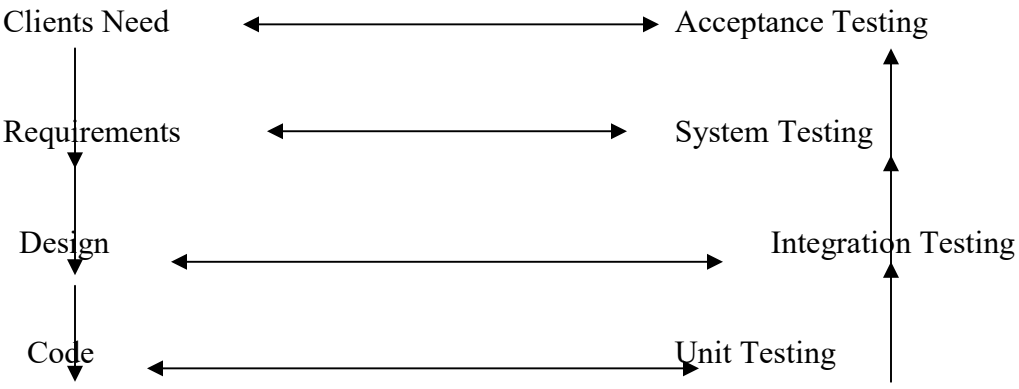
The main purpose of the optimization of code is to reduce redundancy of code, for this user has to write procedure function for repetitive. If in two situation the same type of interface needed then only one interface should be created and it may be called by passing different parameter.
The basic design model uses the analysis model as the framework for implementation. The analysis model captures the logical information about the system, while the design model must add details to support efficient information access.

During design optimization we must:

- Add redundant association to minimize access cost and maximize convenience.
- Rearrange the computation for greater efficiency.
- Saved derived attributes to avoid re-computation of complicated expression.
- During report generation we used an optimization technique of rearranging execution order for greater efficiency.
- Redundancy of data in the tables has been removed through Normalization technique. All the tables are designed in normalized form.
- Explicit and Implicit locks are used where needed.
- Explicit update: In this each derived attribute is defined in terms of one or more fundamental base object. We determined that which derived attributes are affected by each change to a fundamental attribute and inserted code into the update operation on the base object to explicitly update the derived attribute that depends on it.
- Optimization of Resource: During coding we have kept the strict vigil to use the same function again by writing the code in a module, so it keeps our coding minimize.

15. Testing:

In this section we have tested our system in different modes.
Basically the testing is done on different level like Unit testing, Integration testing , System testing and Acceptance testing. These different testing tests different types of faults.
We have tested in the following manner and whatever the fault we have got, fixed it immediately.



Testing levels

SYSTEM TESTING

As the part of system testing we execute the program with the intent of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. The ultimate aim is quality assurance.

Tests are carried out and the results are compared with the expected document. In the case of erroneous results, debugging is done. Using detailed testing strategies a test plan is carried out on each module. The various tests performed are unit testing, integration testing and user acceptance testing.

Unit Testing:

The software units in the system is are modules and routines that are assembled and integrated to perform a specific function. As a part of unit testing we executed the program for individual modules independently. This enables, to detect errors in coding and logic that are contained within each of the three module. This testing includes entering data that is filling forms and ascertaining if the value matches to the type and entered into the database. The various controls are tested to ensure that each performs its action as required.

Integration Testing:

Data can be lost across any interface, one module can have an adverse effect on another, sub functions when combined, may not produce the desired major functions. Integration testing is a systematic testing to discover errors associated within the interface. The objective is to take unit tested modules and build a program structure. All the modules are combined and tested as a whole. Here the admin module, sec module and student module options are integrated and tested. This testing provides the assurance that the application is well integrated functional unit with smooth transition of data.

User Acceptance Testing:

User acceptance of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keep the records of applicants and

16. Implementation

A crucial phase in then systems life cycle is the successful implementation of the new system design. Implementation means converting a new system design into operation. This creating computer-compatible files, training the operating staff before the system is up and running. A major factor in conversion is not disrupting the functioning of the organization.

The implementation phase of software development is also concerned with translating design specification into source code. it is necessary to write source code and internal and documentation so that conformance of the code to its specification can be easily verified, and so that debugging, testing and modification are eased. This can be achieved by making the source code as clear and straight forward as possible. The implementation team should therefore be provided with-defined set of software requirements.

1. First, we take an image as input:
2. Then we divide the image into various regions:
3.We will then consider each region as a separate image.
4. Pass all these regions (images) to the CNN and classify them into various classes.
5. Once we have divided each region into its corresponding class, we can combine all these regions to get the original image with the detected objects**:**

Observed Results:-

Speed- Normal: Total Execution Time:- 25152.696823ms

CEMRA	NUMBER OF OBJECT DETECTED
C_0	24
C_1	9
C_2	20
C_3	37

Speed-Flash: Total Execution Time:- 25152.696823ms

CEMRA	NUMBER OF OBJECT DETECTED
C_0	8
C_1	6
C_2	6
C_3	9

17.Evaluation:

Evaluation of the system is performed to identify its strength and weaknesses.

The actual evaluation can occur along any of the following dimensions:

- **Operational Evaluation**: Assessment of the manner in which the system functions, including ease of use, overall reliability and level of utilization.
- **Organizational Impact**: Identification and measurement of benefit to the organization in such areas as financial concerns, operational efficiency and competitive impact.
- **User Manager Assessment**: Evaluation of attitudes of senior and user manager within the organization as well as end users.
- Development Performance: Evaluation of the development process in accordance with such yardsticks as overall development time and effort, conformance to budgets and standards and other project management criteria.

18.Maintenance

Software maintenance is used to describe the software engineering activities that occur following delivery of a software product to the customer.

The maintenance of existing software can account for over 60% of all effort expanded by a development organization, and the percentage continues to rise as more software is produced.

- Activities involved in maintenance of a software product include:
    - Analysis activities
    - Standards and guidelines
    - Design activities
    - Implementation activities
    - Supporting documents
- Configuration management is concerned with tracking and controlling of the work product that constitute a software product.
- Configuration management tools include:
    - Configuration management databases
    - Version control libraries
- Automated tools to support software maintenance include technical support tools and managerial support tools.
- Other automated tools include

    - Text editors
    - Debugging aids
    - Linkage editor

Computer Maintenance covers a wide range of activities. Many activities performed during development of Airlines Reservation System for Global Airways to enhance the maintainability of it are as follows-

- **Analysis Activities:** The analysis phase of software development is concerned with determining customer requirements and constraints and establishing feasibility of the product. From maintenance view point, the most important activities that occur during analysis are establishing standards and guidelines for the project and the work products to ensure uniformity of the products; setting of milestones to ensure that the work products are produce on schedule; specifying quality assurance procedures to ensure development of high2/ quality documents; identifying product enhancements that will most likely occur following initial delivery of the system; and estimating the response (personnel, equipment, floor space) required to perform the maintenance activities.
- **Standards and Guidelines:** Various types of standards and guidelines we developed to enhance the maintainability of our software.
- **Design Activities:** Design is concerned with developing the functional components, conceptual data structures and interconnection in a software system. The most important activity for enhancing maintainability during the design.

Automated tools to support software maintenance include technical support tools and managerial support tools. Tolls to support the technical aspects of software maintenance span the spectrum from analysis and design tools to implementation to debugging the testing tools. Automated tolls include text editors debugging aids, cross-reference generators, linkage editors, comparators, complexity metric calculators, and version control system and configuration management databases. Text editors permit a rapid, efficient modification of source programs, test data and supporting documents. Text editors can be used to insert the replace segments of source code, internal comments, test data and supporting documents; to systematically change the occurrences of an identifier or other textual strings to locate all references to a given identifier or other string of text; and to save both old and new version of a routine, test files or document. A syntax-directed text editor can ensure that all cross-references in the supporting documents are correctly updated.

Debugging aid provide traps, and traces assertion checking and history file aid in locating the causes of known errors. System-level-cross-reference generators provide cross-reference listing of procedure calls, statements usages and data references. Cross-references directories provide

the calling structures of who calls whom and for where, and procedures names and statements numbers where formal parameters local variables and global variables are defined, set and used.

19. System Security

System must provide built-in feature of security and integrity of data without sage guard against unauthorized development access, fraud, even embezzlements, fire and natural disasters, a system could be so well vulnerable as to threaten the survival of the organization.
To do an educated job on security a system analyst must analyze the risk exposure and cost and specify measures such as password and encryption to provide protection. In addition backup copy of the software and recovery restart procedure must be available when needed. A disaster/recovery that has management support should also be prepared. Then no matter that the disaster, the firm can recover.

The strength behind integrity and success is ethics and professional standards of behavior. When ethics are compromised regardless of technology.

The main objective during the development of this system, which kept in mind, are

A. The various threats to system security and their defenses.
B. How to do risk analysis and specify measures
C. The importance of disaster recovery planning and how such a plan is initiated.
D. The meaning and importance of ethics in system development.

We also followed following methods for the development of this system for the security reasons.

1. Recovery of table structure with detail of full of modification date and time.
2. Password feature support by the software.
3. Detail of nomenclature of variable and acronyms use Assumption of system failure and recovery.
4. No unauthorized user can use the software without providing correct login and password.
5. The system should have daily backup and restore facility and restore facility to complete protection to data.

20.Cost Estimation

For a given set of requirement it is desirable to know how much it will cost to develop the software to satisfy the given requirements & how much time development will take.

NEED:

For a given set of requirements it is desirable to know how much it will cost to develop the software to satisfy the given requirements, and how much time development will take. These estimates are needed before development is initiated. The primary reason for cost and schedule estimation is to enable the client or developer to perform a cost benefit analysis and for project monitoring and control. A more practical use of these estimates is in bidding for software projects, where the developer must give cost estimates to a potential client for the development contract.

The Cost of our project has been projected in the following manner-

As we know that cost estimation for a project is due to the requirements for software, hardware resources and human resources. In hardware it includes computer time, terminal time & memory required for the project. Besides it software development is due to the human resources needed & the most cost estimation procedure focus on this aspect.

We have found that we should follow the **"COCOMO MODEL"** will suit the best of calculation of estimation of our project.

We have also projected our cost on the basis of person /month on for all Cost Drivers and Project Duration in months.

The COCOMO model defined for three classes of software projects are :-

1) **Organic Model**: - Relatively small, simple projects in which small teams with good application experience work to a set of less than rigid requirements.
2) **Semidetached Model: -** An intermediate (in size and complexity) software project in which teams with mixed experience levels must meet a mix of rigid and less than rigid requirements.
3) **Embedded Model**: - A software project that must developed within a set of tight hardware, software and operational constraints.

21.Future Scope of the Project.

This software is made according to the requirement of organization but expansion of modules can be easily included in the software.
This package can be used in internet environment that will make handling of different customers easier..

Following features can be added for enhancement:

- This software can be used for B2B and B2C sites.
- A proper revenue model for the system can be defined.
- With slight modifications it can be made to work or to fit into any such organization.

Future expandability and interconnectivity are the features, which are considered for scope in future.

Software Development:

The total span of developing the Database Management System that I got was 3 months. During this duration, I was involved in the different aspects of system development viz. System analysis, System design and development.
In this limited period of time, it was impossible for me to devote as much time as I would have wanted, on each of the phases.
Despite this limitation, the project gave me an opportunity to understand and learn about the various phases of the Software development life cycle.
It was a good opportunity for me to learn about the various phases of System development in depth, by means of documents, System Study and interacting with System users and further clarifications of doubts with the guide.
Since it was an individual activity, it helped me even more to strive harder to gain invaluable experience and knowledge to handle a software development project.

Achievements:

Working on a live project form its initial stages gave me an advantage of understanding the various needs of the customer and devising a plan to satisfy his requirements. Working on this project has benefited me in a number of ways. It gave me an opportunity to understand the users need, interact with them on personal basis and consequently develop a plan to meet their requirements.
The project gave me an experience of working in a professional set-up enriched with quality systems. I got an opportunity to learn and discover the various powerful features .An important aspect of developing an information system is to understand, in depth the entire functionality and features of the system before planning to develop the proposed system.

5. Conclusions and future work

Conclusion:

Conclusions drawn from these benchmark tests clearly show that the YOLOV3 algorithm performs better in terms of real time object detection.YOLOv3 is fast, has at par accuracy and this makes it a very powerful object detection model. Applications of Object Detection in domains like media, retail, manufacturing, robotics, etc need the models to be very fast(a little compromise on accuracy is okay) but YOLOv3 is also very accurate. This makes it the best model to choose in these kind of applications where speed is important either because the products need to be real-time or the data is just too big. Some other applications like Security or Autonomous driving require the accuracy of the model to be very high because of the sensitive nature of the domain, so maybe we cannot use YOLOv3 in such sensitive domains.

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