**Acknowledgement**

We are pleased to present **“Traffic Signal Management plus Control System”** projectand takethis opportunity to express our profound gratitude to all those people who helped us in completion of this project.

We thank our college for providing us with excellent facilities that helped us to complete and present this project. We would also like to thank the staff members and lab assistants for permitting us to use computers in the lab as and when required.

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**PROJECT OVERVIEW**

Introduction

* This innovative software projects is an effective traffic signal management project that allows for managing 4 way traffic signal management system.
* The system consists of 4 signals corresponding to each road.
* We here propose a density based traffic signal scheduling algorithm.
* The system is designed to manage traffic signal timings based on the density of traffic on its corresponding road.
* The system represents the traffic strength of a road graphically using traffic judgments.
* By measuring the traffic lined up on a particular road the signal timings are adjusted to let that particular way clear out and then the next populated one.
* The entire system works according to an algorithm that allows for smooth and efficient traffic flow across all four ways.
* It also consists of an emergency override that allows traffic authorities to remotely let go a particular signal in case an ambulance or important vehicle arrives on that way.

Existing System & Proposed System

* **Problem with current scenario**
* Traditionally, there was no such system developed that would analyze the traffic situation and control the long queues of traffic.
* No such use of latest technological tools to improve and stabilize the system.
* **Drawbacks of the existing system**
* Maintenance of the system is very difficult.
* Employee’s attentions are needed for maintaining the system.
* There is a possibility for getting inaccurate results.
* User friendliness is very less.
* It consumes more time for processing the activities.

**PROPOSED SYSTEM**

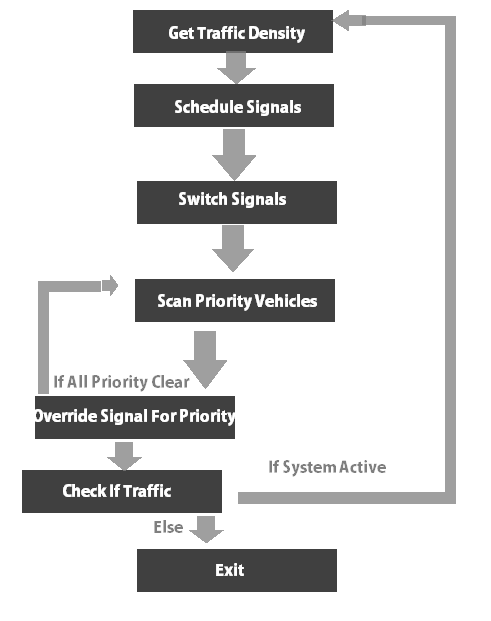
* Considering the anomalies in the above system, we have developed such a system with latest technological tools to enhance the developed system.
* Traffic Signal Management plus Control System comforts the long queues of daily traffic.
* This innovative software projects is an effective traffic signal management project that allows for managing 4 way traffic signal management system.
* The system consists of 4 signals corresponding to each road.
* We here propose a density based traffic signal scheduling algorithm.
* The system is designed to manage traffic signal timings based on the density of traffic on its corresponding road.
* The system represents the traffic strength of a road graphically using traffic judgments.
* By measuring the traffic lined up on a particular road the signal timings are adjusted to let that particular way clear out and then the next populated one.
* The entire system works according to an algorithm that allows for smooth and efficient traffic flow across all four ways.
* It also consists of an emergency override that allows traffic authorities to remotely let go a particular signal in case an ambulance or important vehicle arrives on that way.

**Features of the system:**

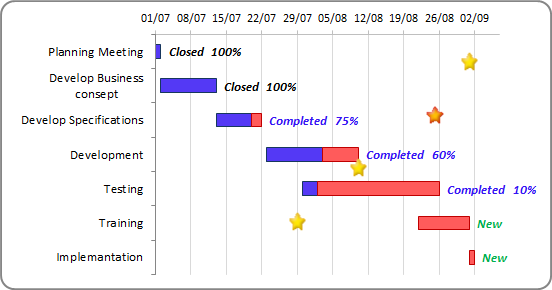
* Traffic flow GUI.
* Signal light timings for each road.
* Manual override for particular sides.
* Dynamic Traffic density input module.
* Dynamic signal scheduling functionality.
* Traffic scheduling algorithm implementation.

This Application uses Asp.net as a front-end and sql as the back-end.

**System Flowchart**

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Gantt Chart



**PROJECT DESIGN**

E-R Diagram

operates

Traffic Signal Management

User

Use Case Diagram

User

Sequence Diagram

🚺

Traffic Signal Management

Main Page

User

Access the System

Monitors the system

Analyzes the system

Maintains the system

Problem occurs / Misbehavior of system

Handles the situation if any problem occurs

Manages all Security Related issues

Activity Diagram

START 



New User

Operates

 STOP

User

Main Page

Monitors the system

Analyzes the system

Handles the situation if any problem occurs

Manages all Security Related issues

Class Diagram

USER

- Name : String

- Phone No. : Int

- Gender : String

- Age : Int

+ btn\_Click ()

Data Flow Diagram

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams. Using two familiar notations Yourdon, Gane and Sarson notation develops the data flow diagrams. Each component in a DFD is labeled with a descriptive name. Process is further identified with a number that will be used for identification purpose. The development of DFD’s is done in several levels. Each process in lower level diagrams can be broken down into a more detailed DFD in the next level. The lop-level diagram is often called context diagram. It consists a single process bit, which plays vital role in studying the current system. The process in the context level diagram is exploded into other process at the first level DFD.

The idea behind the explosion of a process into more process is that understanding at one level of detail is exploded into greater detail at the next level. This is done until further explosion is necessary and an adequate amount of detail is described for analyst to understand the process.

Larry Constantine first developed the DFD as a way of expressing system requirements in a graphical from, this lead to the modular design.

A DFD is also known as a “bubble Chart” has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design. So it is the starting point of the design to the lowest level of detail. A DFD consists of a series of bubbles joined by data flows in the system.

DFD SYMBOLS:

In the DFD, there are four symbols

1. A square defines a source(originator) or destination of system data
2. An arrow identifies data flow. It is the pipeline through which the information flows
3. A circle or a bubble represents a process that transforms incoming data flow into outgoing data flows.
4. An open rectangle is a data store, data at rest or a temporary repository of data

Process that transforms data flow.

Source or Destination of data

Data flow

Data Store

CONSTRUCTING A DFD:

Several rules of thumb are used in drawing DFD’s:

1. Process should be named and numbered for an easy reference. Each name should be representative of the process.
2. The direction of flow is from top to bottom and from left to right. Data traditionally flow from source to the destination although they may flow back to the source. One way to indicate this is to draw long flow line back to a source. An alternative way is to repeat the source symbol as a destination. Since it is used more than once in the DFD it is marked with a short diagonal.
3. When a process is exploded into lower level details, they are numbered.
4. The names of data stores and destinations are written in capital letters. Process and dataflow names have the first letter of each work capitalized

A DFD typically shows the minimum contents of data store. Each data store should contain all the data elements that flow in and out.

Questionnaires should contain all the data elements that flow in and out. Missing interfaces redundancies and like is then accounted for often through interviews.

#### SAILENT FEATURES OF DFD’s

1. The DFD shows flow of data, not of control loops and decision are controlled considerations do not appear on a DFD.
2. The DFD does not indicate the time factor involved in any process whether the data flows take place daily, weekly, monthly or yearly.
3. The sequence of events is not brought out on the DFD.

TYPES OF DATA FLOW DIAGRAMS

1. Current Physical
2. Current Logical
3. New Logical
4. New Physical

CURRENT PHYSICAL:

In Current Physical DFD process label include the name of people or their positions or the names of computer systems that might provide some of the overall system-processing label includes an identification of the technology used to process the data. Similarly data flows and data stores are often labels with the names of the actual physical media on which data are stored such as file folders, computer files, business forms or computer tapes.

CURRENT LOGICAL:

The physical aspects at the system are removed as much as possible so that the current system is reduced to its essence to the data and the processors that transform them regardless of actual physical form.

**NEW LOGICAL**:

This is exactly like a current logical model if the user were completely happy with the user were completely happy with the functionality of the current system but had problems with how it was implemented typically through the new logical model will differ from current logical model while having additional functions, absolute function removal and inefficient flows recognized.

**NEW PHYSICAL:**

The new physical represents only the physical implementation of the new system.

**RULES GOVERNING THE DFD’S**

PROCESS

1. No process can have only outputs.
2. No process can have only inputs. If an object has only inputs than it must be a sink.
3. A process has a verb phrase label.

**DATA STORE**

1. Data cannot move directly from one data store to another data store, a process must move data.
2. Data cannot move directly from an outside source to a data store, a process, which receives, must move data from the source and place the data into data store
3. A data store has a noun phrase label.

**SOURCE OR SINK**

The origin and /or destination of data.

1. Data cannot move direly from a source to sink it must be moved by a process
2. A source and /or sink has a noun phrase land

DATA FLOW

1. A Data Flow has only one direction of flow between symbols. It may flow in both directions between a process and a data store to show a read before an update. The later it usually indicated however by two separate arrows since these happen at different type.
2. A join in DFD means that exactly the same data comes from any of two or more different processes data store or sink to a common location.
3. A data flow cannot go directly back to the same process it leads. There must be at least one other process that handles the data flow produce some other data flow returns the original data into the beginning process.
4. A Data flow to a data store means update (delete or change).
5. A data Flow from a data store means retrieve or use.

Data Flow Diagrams

Traffic Signal Management DB

0.0

User

Database

DATABASE DETAIL

Query

Process

Request

1.0

User

Query

Database

Feedback For

User

Check for user

Requirement

User need

Relevant

Data

1.1

LEVEL 1 DFD

Accept

Query

2.0

User

Check Availability of or for query processing

Process

Query

Give request to user

Via Traffic Signal Management DB

Give info about DB

2.1

2.2

Query

LEVEL 2 DFD: PREDICTION

Snapshots

**PROJECT IMPLEMENTATION**

Project Implementation Technology

The Project is loaded in Visual Studio 2008. We used Visual Studio for Design and coding of project. Created and maintained all databases into SQL Server 2005, in that we create tables, write query for store data or record of project.

* **Hardware Requirement:-**
* i3 Processor Based Computer
* 1GB-Ram
* 5 GB Hard Disk
* **Software Requirement:**
* Windows XP, Windows 7(ultimate & enterprise)
* Visual studio 2008.
* SQL Server 2005.

CODING

FEASIBILITY REPORT

Feasibility Studyis a high level capsule version of the entire process intended to answer a number of questions like: What is the problem? Is there any feasible solution to the given problem? Is the problem even worth solving? Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system is Feasible by considering the technical, Operational, and Economical factors. By having a detailed feasibility study the management will have a clear-cut view of the proposed system.

The following feasibilities are considered for the project in order to ensure that the project is variable and it does not have any major obstructions. Feasibility study encompasses the following things:

* Technical Feasibility
* Economic Feasibility
* Operational Feasibility

In this phase, we study the feasibility of all proposed systems, and pick the best feasible solution for the problem. The feasibility is studied based on three main factors as follows.

* Technical Feasibility

In this step, we verify whether the proposed systems are technically feasible or not. i.e., all the technologies required to develop the system are available readily or not.

Technical Feasibility determines whether the organization has the technology and skills necessary to carry out the project and how this should be obtained. The system can be feasible because of the following grounds:

* All necessary technology exists to develop the system.
* This system is too flexible and it can be expanded further.
* This system can give guarantees of accuracy, ease of use, reliability and the data security.
* This system can give instant response to inquire.

Our project is technically feasible because, all the technology needed for our project is readily available.

**Operating System :** Windows XP, 7(ultimate & enterprise)

**Languages :** Asp.Net with C# (**.**Net 2008)

**Database System :** MS-SQL Server 2005

**Documentation Tool :** MS - Word 2010

* Economic Feasibility

Economically, this project is completely feasible because it requires no extra financial investment and with respect to time, it’s completely possible to complete this project in 6 months.

In this step, we verify which proposal is more economical. We compare the financial benefits of the new system with the investment. The new system is economically feasible only when the financial benefits are more than the investments and expenditure. Economic Feasibility determines whether the project goal can be within the resource limits allocated to it or not. It must determine whether it is worthwhile to process with the entire project or whether the benefits obtained from the new system are not worth the costs. Financial benefits must be equal or exceed the costs. In this issue, we should consider:

* The cost to conduct a full system investigation.
* The cost of h/w and s/w for the class of application being considered.
* The development tool.
* The cost of maintenance etc...

Our project is economically feasible because the cost of development is very minimal when compared to financial benefits of the application.

* Operational Feasibility

In this step, we verify different operational factors of the proposed systems like man-power, time etc., whichever solution uses less operational resources, is the best operationally feasible solution. The solution should also be operationally possible to implement. Operational Feasibilitydetermines if the proposed system satisfied user objectives could be fitted into the current system operation.

* The methods of processing and presentation are completely accepted by the clients since they can meet all user requirements.
* The clients have been involved in the planning and development of the system.
* The proposed system will not cause any problem under any circumstances.

Our project is operationally feasible because the time requirements and personnel requirements are satisfied. We are a team of four members and we worked on this project for three working months.

**TESTING**

As the project is on bit large scale, we always need testing to make it successful. If each components work properly in all respect and gives desired output for all kind of inputs then project is said to be successful. So the conclusion is-to make the project successful, it needs to be tested.

The testing done here was System Testing checking whether the user requirements were satisfied. The code for the new system has been written completely using ASP .NET with C# as the coding language, C# as the interface for front-end designing. The new system has been tested well with the help of the users and all the applications have been verified from every nook and corner of the user.

Although some applications were found to be erroneous these applications have been corrected before being implemented. The flow of the forms has been found to be very much in accordance with the actual flow of data.

Levels of Testing

In order to uncover the errors present in different phases we have the concept of levels of testing. The basic levels of testing are:

Client Needs Acceptance Testing

Requirements System Testing

Design Integration Testing

Code Unit Testing

A series of testing is done for the proposed system before the system is ready for the user acceptance testing.

The steps involved in Testing are:

* **Unit Testing**

Unit testing focuses verification efforts on the smallest unit of the software design**,** the module**.** This is also known as “Module Testing”**.** The modules are tested separately**.** This testing carried out during programming stage itself**.** In this testing each module is found to be working satisfactorily as regards to the expected output from the module**.**

* **Integration Testing**

Data can be grossed across an interface**;** one module can have adverse efforts on another**.** Integration testing is systematic testing for construction the program structure while at the same time conducting tests to uncover errors associated with in 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 correction is difficult because the isolation of cause is complicate by the vast expense of the entire program. Thus in the integration testing stop**,** all the errors uncovered are corrected for the text testing steps**.**

* **System testing**

System testing is the stage of implementation that is aimed at ensuring that the system works accurately and efficiently for live operation commences. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, then goal will be successfully achieved.

* **Validation Testing**

At the conclusion of integration testing software is completely assembled as a package, interfacing errors have been uncovered and corrected and a final series of software tests begins**,** validation test begins**.** Validation test can be defined in many ways**.** But the simple definition is that validation succeeds when the software function in a manner that can reasonably expected by the customer. After validation test has been conducted one of two possible conditions exists.

One is the function or performance characteristics confirm to specifications and are accepted and the other is deviation from specification is uncovered and a deficiency list is created. Proposed system under consideration has been tested by using validation testing and found to be working satisfactorily.

* **Output Testing**

After performing validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated by the system under consideration. Here the output format is considered in two ways, one is on the screen and other is the printed format. The output format on the screen is found to be correct as the format was designed in the system designed phase according to the user needs.

For the hard copy also the output comes as the specified requirements by the users. Hence output testing does not result any corrections in the system.

* **User Acceptance Testing**

User acceptance of a system is the key factor of the success of any system. The system under study is tested for the user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required.

**ADVANTAGES OF PROJECT**

* Can enhance traffic signal performance.
* System reduces traffic jams.
* Convenient way to control traffic problems.

**Disadvantages:**

* Cannot traffic rule breakers.

**Applications:**

* The system is proposed to be used in road traffic signals.
* Can be enhanced to be used for 5 way and 8 way road junctions.

**System is:**

1. Load Balancing:

Since the system will be available only the admin logs in the amount of load on server will be limited to time period of admin access.

1. Easy Accessibility:

Records can be easily accessed and store and other information respectively.

1. User Friendly:

The system will be giving a very user friendly approach for all user.

1. Efficient and reliable:

Maintaining the all secured and database on the server which will be accessible according the user requirement without any maintenance cost will be a very efficient as compared to storing all the customer data on the spreadsheet or in physically in the record books.

1. Easy maintenance:

Traffic Signal Management plus Control System is design as easy way. So maintenance is also easy.

**CONCLUSION**

**BIBLIOGRAPHY**

* **Websites**
* en.wikipedia.org
* Microsoft Developer Network (MSDN): http://msdn2.microsoft.com/en-us/default.aspx: This is a valuable online resource, and is a must for any developer using Microsoft tools.
* http://www.asp.net/: This is the official Microsoft ASP.NET web site. It has a lot of: tutorials, training videos, and sample projects.
* http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=6757757&queryText%3DEmail+Client
* http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=4404586&queryText%3DEmail+Client
* http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=6640549&queryText%3DCreating+Email+Client