AUSTRALIAN COMPUTER SOCIETY

RECOGNITION OF PRIOR LEARNING APPLICATION - 2016

This document is required to be completed for all Recognition of Prior Learning (RPL) Application types and must be attached to the online application form under the RPL tab in PDF format.

In this document there are two sections that all applicants must complete –

- The Key Areas of Knowledge – Section 1
- The Project Report Forms – Section 2

RPL applications are for those applicants who do **not** hold a recognised tertiary ICT qualification and who have a minimum of 6 years of closely related experience. Please refer to the Summary of Criteria for further information.

This document provides the opportunity for applicants to demonstrate knowledge learnt throughout their professional experience.

Applicant Name	AHMED SHEIKH
Application ID (if known)	
Applicant Date of Birth	32/13/1901

SECTION 1 – KEY AREAS OF KNOWLEDGE

INFORMATION ABOUT THE AREAS OF KNOWLEDGE

Please read the following document to assist you in completing Section 1 of this document -The ACS Core Body of Knowledge for ICT Professionals (CBOK).

Applicants must detail the relationship between the selected Areas of Knowledge and their learning from their experience and qualifications. This section of the RPL application needs to be specific as to how and where the applicant has acquired the knowledge.

The ICT Key Areas of Knowledge:

Essential Core ICT Knowledge

Topic 1. ICT Professional Knowledge
Sub Topics are -
a. Ethics
b. Professional Expectations
c. Teamwork Concepts and Issues
d. Communication
e. Societal Issues

Topic 2. ICT Problem Solving
Sub Topics are -
a. Modelling Methods
b. Processes to understand problems
c. Methods and tools for handling abstraction

General ICT Knowledge

Topic 3. Technology Resources

Sub Topics are -

a. Hardware and Software Fundamentals
b. Data and Information Management
c. Data Communications and Networking

Topic 4. Technology Building

Sub Topics are -

a. Human Factors
b. Programming
c. Information Systems Development and Acquisition

Topic 5. ICT Management

Sub Topics are -

a. IT Governance and Organisational Issues
b. IT Project Management
c. ICT Service Management
d. Security Management

You are required to select one topic from the Essential Core ICT Knowledge (Topic 1 or Topic 2) and one topic from the General ICT Knowledge (Topic 3, Topic 4 or Topic 5). Please ensure you address at least 2 subtopics from each of the topics chosen. In the following expandable typing areas, explain **how you have acquired your in-depth knowledge** in these topic areas through your professional experience.

Important:

- **Identify the Area of Knowledge topic that you have chosen to explain by entering the name of the Area of Knowledge topic in the box.**
- **Explain, in the expandable typing area, how you have acquired the knowledge and illustrate the depth of that knowledge.**
- **You should NOT address all sub topics included in the Area of Knowledge in your explanation. Address at least TWO of the sub topics. Enter the sub topic name(s) in the box.**
- **Be clear and concise in your explanation.**
- **Limit each explanation to no more than one to one and a half pages.**

Essential Core ICT Area of Knowledge: [Enter topic and 2 subtopic names relating to the chosen area]
How have you acquired this knowledge in your working environment? Illustrate your depth of knowledge. [EXPANDABLE TYPING AREA]
General ICT Area of Knowledge: [Enter topic and 2 subtopic names relating to the chosen area]
How have you acquired this knowledge in your working environment? Illustrate your depth of knowledge. [EXPANDABLE TYPING AREA]

SECTION 2 - RPL PROJECT REPORTS

A project report is a coherent written description of a project or engagement that provides you with the opportunity to show how you perform as an ICT Professional. Each report is to relate to a significant project or work episode undertaken by you during your professional career.

The purpose of these reports is to enable you to demonstrate your command and implementation of the Areas of Knowledge described in Section 1 of this application.

Please note: You are required to provide two project reports.

Of the two reports, one must pertain to a project undertaken within the last three years, and the other for a project within the last five years.

Projects over two years long may be used for both reports under either of the following conditions:

- **The project has clearly-defined work efforts which took place in parallel, each with their own solution development and design activities and their own deliverables.**
- **The project had clearly-defined phases that were executed in succession, each with its own solution development and design activities and deliverables. Note that a second project phase that constructs and implements the solution developed by the first phase does not meet this requirement.**

Depending on the nature of your role in each project, the Project Report should cover an appropriate selection of factors. Appropriate factors will be determined based on the type of ICT project selected. Possible factors include:

- System Analysis and Design and Software Engineering methodologies used;
- Contribution to the processes involved in the design and implementation of enterprise-wide computing systems;
- Programming languages, design paradigms and implementation procedures adopted;
- Database and/or file design and management techniques employed;
- Network topologies, including size, distribution and security facilities installed;
- Project Management and quality assurance techniques followed;
- Internet application design, including database interactivity and security measures implemented;
- ICT managerial activities, demonstrating the nature and extent of responsibilities

Project Summary:			
	Project Name	**Start Date**	**End Date**
Project 1	**Advanced Transport Management System (ATMS)**	**mm/yy**	**mm/yy**
Project 2	**Image Based Vehicle Classification System (IBVCS)**	**mm/yy**	**mm/yy**

Instructions

The following pages provide a template for your reports.

When writing your reports please provide your own thoughts – do not just copy project documentation.

Please use the first person in your discussion, so it is clear to the assessor what you did versus what others did – say "I did X" rather than "X was done".

Diagrams from the project documentation may be helpful, but the text should be in your own words. Please ensure that diagrams are relevant, readable, and help the assessor to understand what you did as a member of the project team.

If sections of the Project Report template (see below) are not relevant to your participation in the project, then leave the section blank.

Focus on quality rather than quantity. **Each Project Report should be no more than four or five pages in length.**

SPECIAL NOTE:

By submitting this RPL Knowledge and Project Report form as a component of your ACS skills assessment application, you agree with the following statement:

The applicant confirms that the explanation of their knowledge and project reports submitted in this application truthfully and accurately describe the applicant and the applicant's personal involvement in the projects. The applicant is aware that plagiarism by the applicant will automatically invalidate this application, will jeopardise any future applications from the applicant and will be reported by the Australian Computer Society to the Australian Department of Immigration and Border Protection.

Project 1: Advanced Transport Management System ATMS

1. Project Summary

1.1. Identification

Client's Company Name	Legal Name of Entity	
Business Address	Street Address Suburb State Postcode Country	
Contact Numbers	Tel: Telephone (include country and area code)	
Web Address	Web address	
Email Address	General email address	
Nature of project		
Location of project		
Name of your employer		

1.2. Duration

	From	To
Total project duration	mm/yy	mm/yy
Your involvement	mm/yy	mm/yy

1.3. Resources

	Number
Your team size	3
Total project team size	17

1.4. Personal Involvement

Please list the phases of the project in which you were personally involved

Start	Completion	Phase Description
mm/yy	mm/yy	Project Planning Segment
mm/yy	mm/yy	Anatomization of Business Rudiments
mm/yy	mm/yy	Key plan, coding, debugging
mm/yy	mm/yy	End User Training & Technology disbarment

1.5. Describe your role(s) and responsibilities in the project.

ATMS is modular, full-featured and complies with industry standards to deliver a reliable, powerful and easyto-use transportation management system. In addition to providing deep integration of the hardware and software ATMS also offers features such as Traffic Responsive and Quick Response, which help automate responses to handle complex situations. ATMS is designed to scale needs with features and capabilities as per requirements.

Key features of the ATMS include enhanced graphics, customized reporting, advanced engineering tools, enhanced once-per-second communications, faster start-up and operation, expanded NTCIP operations, support for Transit Priority for light rail, and multilingual support. As well as presenting all standard modes of traffic control.

The web application is true **'web-based application'**, rather than a conceded 'web enabled' system - which can slow down when dealing with considerable traffic. This means that the software can be accessed from anywhere in the world - and the only requirement to view the system is an internet connection

Competences and Expertise used in the Project:

- Project Administration Plan from Scratch
- Human Resource Management
- Methodical knowledge of IT development and deployment
- Software development lifecycle
- GSM & Packet data transfer/receiving management

I was heading the project as a IT business analyst interpreting business requirements from major stakeholders into IT and vice versa.

The following prime tasks were attained during the conjuring up to execution:

1. Had Consistent summits & Communications with required department i.e. Capital Development Authority IT managing team for understanding, congregating business needs.
2. Did Documentation of the particular requirements of business (those may be functional/non-functional) while safeguarding documents control.
3. Monitored project health checks and publishing of headway report.
4. Training of End User for interface monitoring/control.
5. Administration of user manuals preparation & final development.
5. Had closed UAT (User Acceptance Test) sittings with required department.

2. Business Opportunity or Problem

2.1. *Describe the business opportunity or problem(s) this project addressed.*

Increasing traffic congestion coupled with improved technology, funding constraints, and increasing environmental consciousness has provided an impetus to develop cost effective systems aimed at improving the efficiency and effectiveness of the transportation system. Advanced Transportation Management Systems (ATMS) include a wide range of diverse technologies, including information processing, communications, control, and electronics. ATMS have evolved with applications, including collision warning systems, ramp meters, advanced signal control systems, transit and emergency vehicle management systems, and others. The goals of ATMS deployments include improving traveler safety, traveler mobility and system efficiency; increasing the productivity of transportation providers; and conserving energy while protecting the environment. The strain on the transportation system as a whole is thus eased through the application of modern information technology and communications.

ATMS aims to improve the safety and efficiency of the transportation system. ATMS themselves offer opportunities for new methods of evaluation and continuing assessment.

ATMS typically attempt to take advantage of information that can be provided by roadside traffic sensors. These systems typically attempt to use available traffic information to develop optimal traffic control strategies addressing traffic needs at a single intersection, along an arterial or freeway, along a given corridor, or throughout a given area. Real-time solutions capable of automatically adjusting to changes in traffic conditions.

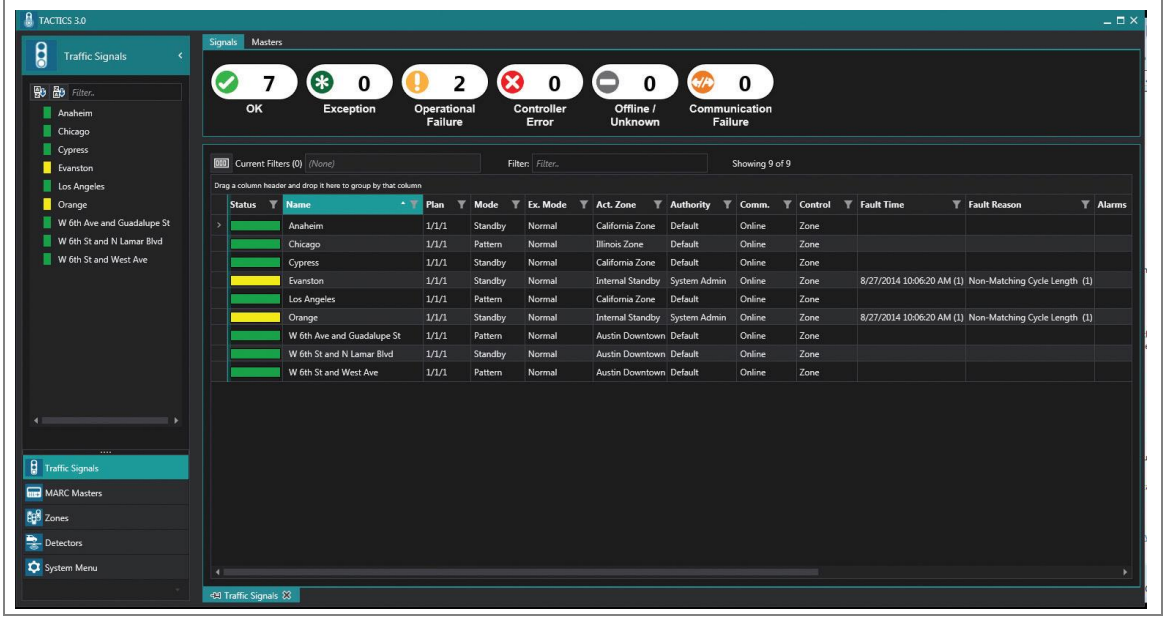
3. Solution

3.1. Discuss your contribution to the solution, project or engagement.

As defined previously that it was becoming dreadful to manage over 175 Traffic Signals, 69 major cross sections, 6 intersections of Diplomatic inclave within Islamabad Capital Territory individually and control its subsequent cost, the management envisioned to develop and implement Advanced Transportation Management System (ATMS)

Business Analysis was a very critical step in this scenario so that the development team can understand the requirements of prime stakeholder properly and provide a solution that is adequate for the respective end user.

1) Engross business user and pertinent stakeholders for attributes gathering & enhancement.
2) Development of respective BPM (Business Process Model)
3) Advanced Transportation Management System was required by client, but keeping in view their need and requirement such a solution was proposed which otherwise made business case more precise and operational for the client.
4) In order to ensure 100% functionality of system prior test cases were developed.



3.2. ***Describe any design or problem solving methods you used on this project.***

I followed proper SOPs in order to offer ATMS to our valuable client in two separate option packages that can be tailored to fit the needs of capital city. Packages were designed to be scalable to the next level allowing the system to grow as the city needs grow.

ATMS View

It is designed for use on notebook computers and provides upload/download capabilities for a single controller at a time.

Designed as an upload/download utility to manage intersection timing data and controller database editing, View is an ideal solution for consultants and engineers supporting larger ATMS systems.

Controller database editing features are identical to the controller database editing features in Marc, Central and Enterprise systems allowing for the intersection timing data to be transferred to or from server to ATMS system.

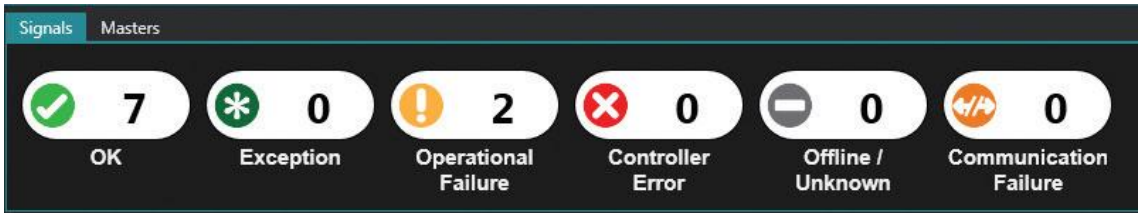
ATMS Marc

ATMS Marc is the closed-loop offering within the ATMS. Support for field masters utilizing ATMS firmware allows for the system to connect with master nodes on the street for uploading and downloading of data as well as simple analysis features and map displays.

PDCA (Plan, Do, Check, Act) method was used to evaluate the initial aspects of sytem while keeping in view the risks and opportunities. This was the key method to identify the problem, seek opportunity and bring out the best solution.

At planning stage entire data of city was gathered and simulated in a real time interface for easy presentation to customer. After approval necessary hardware was imported and installed.

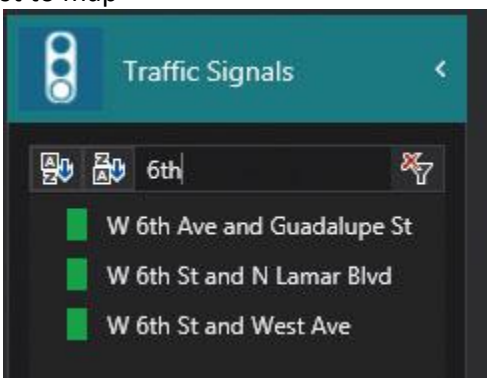
The need of web application was raised for which functional/non-functional requirement was then shared with IT team. After the development the functionality was test to check if it met the desired user need and upon successful results it was deployed.



3.3. List the major deliverables of the project that you were responsible for or contributed to.

• Customizable list displays with sorting, filtering, and grouping features
• Integrated Detailed Intersection Status Display
• Dashboard showing overall system status
• GIS-Based Mapping
• Standards-based Center-to-Center Support
• Enhanced Status Features
• Enhanced Quick Response
• Traffic Responsive
• Multiple communication protocol support
• Comparison of multiple controller databases
• Tempo Ramp Meter support
• Parameter History and Rollback
• Database Change Annotations

The ATMS enhanced status features quickly and easily provide a detailed overview of traffic signal system, so client know exactly what the system is doing at any given point in time. Status features available include:
• Dashboard to show a summary of system status
• Hide/show/reorder each field in the status list
• Powerful search features to find devices easily
• Sort and filter lists
• Standard filters to locate problem intersections fast
• Quick navigation from list to map



4. Results

4.1. *Was your solution implemented? If so, describe the role, if any, you had in the implementation.*

- The execution of the project eventually resulted in impressive PKR 172 million saving into the total annual net operational cost.
- More flexibility and scalability, free network form. Controls are send using Power Line Communication -method.
- Reliable GSM/GPRS and SMS as a backup communication was established with advanced communication functions.
- In addition to real time monitoring, during bad weather, according to the data from the intelligent control terminal situation analysis, take corresponding emergency measures to avoid the occurrence of major accidents.

4.2. *Assess the overall success or failure of the project*.

The development and deployment of ATMS technologies offered a wide variety of opportunities for local, regional, and state agencies to improve the capacity, reliability, and efficiency of Islamabad transportation systems. Due to many factors, the quantification of ATMS benefits and costs has been difficult using traditional transportation planning and analysis methods because traditional transportation planning models lack necessary sensitivity to many benefits derived from ATMS technologies.

- The project was not only completed in given time of 7 months but was also implemented successfully in the aforesaid timeframe.
- The realistic quite optimistic approach towards savings in operational cost were projected at around PKR 135 million however actual cost saved by this project was quite above PKR 172 million
- It was envisaged to reduce repair & maintenance cost @ 9 % BUT after successful project execution the budget was reduced by 12.8 %.
- One-Window/Single Operation portal was being set-up resulting in human resource optimization.
- Continuous power supply to control units enabled implementation of other applications such as the powering of WiFi terminals and video surveillance cameras.
- Allowed Remote traffic lights control so that they can be easily controlled ON/OFF on special situations.
- Pseudo-Expenses in any form were reduced fairly.

4.3. Lessons Learned

In retrospect, what you might have done differently on this project?

Due to lack of precious time and painstakingly short project completion deadline for the development of Advance Transportation Management System ATMS, the development of Smart Phone Application for the project was neglected. Later on it was astutely realized that it was a gaffe. We could have easily developed the aforesaid smart phone app of this System if started working on the same in parallel to master web application. This was realized immediately after development and respective deployment of ATMS.

Project 2: Image Based Vehicle Classification System (IBVCS)

5. Project Summary

5.1. Identification

Client's Company Name	Legal Name of Entity	
Business Address	Street Address Suburb State Postcode Country	
Contact Numbers	Tel: Telephone (include country and area code)	
Web Address	Web address	
Email Address	General email address	
Nature of project		
Location of project		
Name of your employer		

5.2. Duration

	From	To
Total project duration	01/11	05/11
Your involvement	01/11	04/11

5.3. Resources

	Number
Your team size	3
Total project team size	14

5.4. Personal Involvement

Please list the phases of the project in which you were personally involved

Start	Completion	Phase Description
mm/yy	mm/yy	Business Requirement & Scope Analysis
mm/yy	mm/yy	Solution design document, Fit Gap Analysis, Sequencing of tasks
mm/yy	mm/yy	Maintain communications, Resolve conflicts, Execution and tendering project
mm/yy	mm/yy	Respective Trainings

5.5. Describe your role(s) and responsibilities in the project.

Electronic toll collection (ETC) system has been a common trend used for toll collection on toll road nowadays. The implementation of electronic toll collection allows vehicles to travel at low or full speed during the toll payment, which help to avoid the traffic delay at toll road. One of the major components of an electronic toll collection is the automatic vehicle detection and classification (AVDC) system which is important to classify the vehicle so that the toll is charged according to the vehicle classes.

Vision-based vehicle classification system is one type of vehicle classification system which adopt camera as the input sensing device for the system. This type of system has advantage over the rest for it is cost efficient as low cost camera is used. The implementation of vision-based vehicle classification system required lower initial investment cost and was very suitable for the toll collection on Lahore Islamabad Motorway from single ETC system to full-scale multi-lane free flow (MLFF).

This project included the development of an image-based vehicle classification system as an effort to seek for a robust vision-based vehicle classification system. The techniques used in the system included scale-invariant feature transform (SIFT) technique, Canny's edge detector, K-means clustering as well as Euclidean distance matching. In this project, a unique way to image description as matching medium was proposed. The system was evaluated on open datasets and returned promising results.

The system was developed by the software team hired for the project and steered by the resident technology connoisseurs. Project plan was established, risk scrutiny was conducted, resource allocation strategy was developed according to which the resources were assigned such that resource surplus was diminished and cost shall be controlled.

Testing and operational orchestration was done at the final stage of the project.
I performed the following major task from start till end:

- Proposed project feasibility report taking up all possible constrictions.
- Organized all required business & functional documents of Image Based Vehicle Classification System.
- As per business need, monitored performance of system development phase wise.
- Assimilated any new requirements (requested by stakeholders) in IBVCS in parallel to system stability.
- Worked in liaison between requesting department for understanding, gathering business needs of IBVCS & being interactive with Information Technology Project Manager.

6. Business Opportunity or Problem

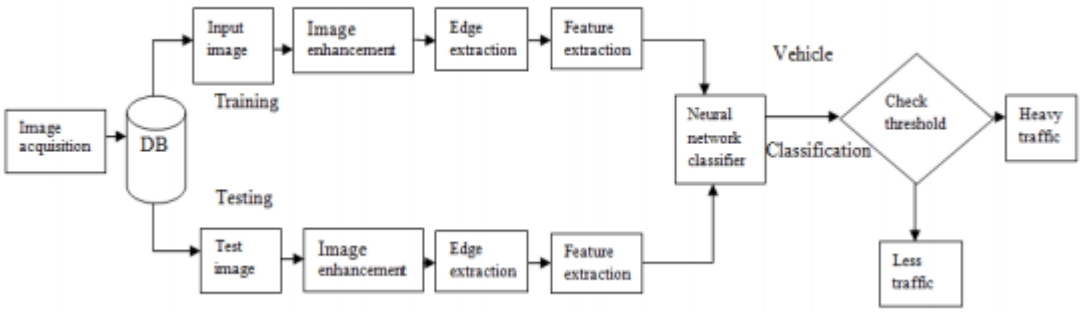
6.1. Describe the business opportunity or problem(s) this project addressed.

Electronic toll collection (ETC) has been a common trend in road pricing system all over the world. The technology aims to eliminate the delay on toll roads by collecting tolls electronically. More sophisticated setting allows vehicles to travel at full speed. This directly eliminates the delay on toll roads which may lead to traffic jam. Among the advantages of the implementation of electronic toll collection is the independence of man involvement in toll collection system, high efficiency, the implementation of criminal vehicle tracking into the traffic management system, and serves as part of the components in intelligence transport system.

Vision based AVDC system uses single or various cameras to capture the two-dimensional image or image sequences of vehicles as the input for the system. Vision-based AVDC system requires lower start-up expenses.

In this project, an image-based vehicle classification system was developed as an effort to find out the solution to the challenges of MLFF implementation on Lahore-Islamabad Motorway.

The project presented a system that identifies, classifies and tracks vehicles. The system was enough to detect, track and classify vehicles while requiring only minimal scene specific knowledge. We developed and used feature based object detection and classification techniques, The benefit of using this technique was that it is fast , compared to all older techniques.



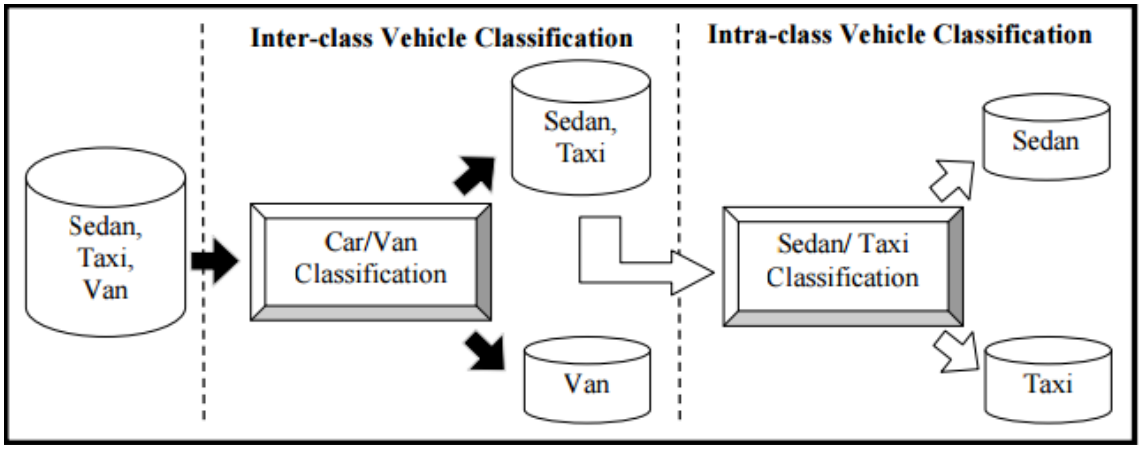
7. Solution

7.1. Discuss your contribution to the solution, project or engagement.

- Worked with key project stakeholders & business people to assess Business requirement of IBVCS. Every activity was evaluated at lower level to formulate & communicate the corporate vision for the project, map out initial requirement & scope of the project.
- During the project a bottle neck of obtaining multiple functions data, which was not being recorded at any level apart which was a challenge due to the sensitivity of running operation and was done harmoniously as soon as it was highlighted by the respective requesting department.
- Timely resolved Query resolution raised by development team after getting comprehensive material from business user.
- Nine months deadline was framed by Executive Management for the entire project development and implementation. The documentation was given honest approach so that every possible aspect including risk management was well managed. This intellectual tactic resulted project completion in only 7 months.

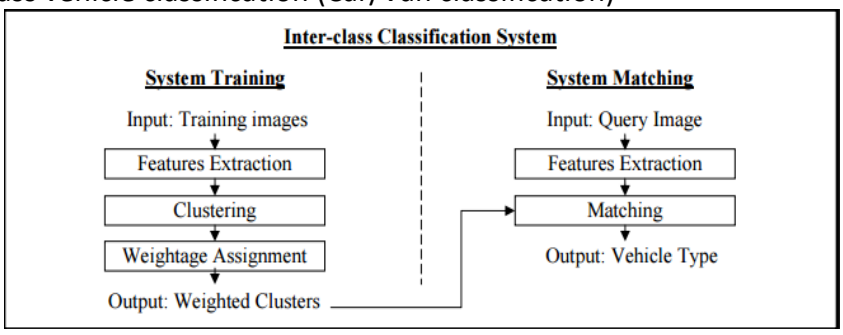
7.2. ***Describe any design or problem solving methods you used on this project.***

I proposed two vehicle classification systems in order to carry out two vehicle classification tasks:
Inter-class vehicle classification (Car/Van classification) and
Intra-class vehicle classification (Sedan/Taxi classification)

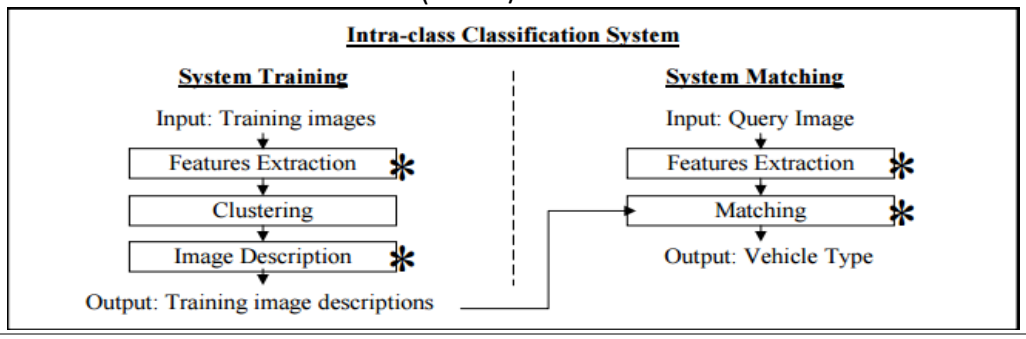


The framework of each system was divided into two parts: training scheme and matching scheme. In the training scheme, the system was trained with training image to be intelligent. The output from the training serves as the input for the matching scheme. The training scheme was meant for offline performance, which means it only occurs one time in the system prior to any real time task. In matching scheme, the system takes in a query input. Based on the output obtained from the training scheme, the query input is processed to find out the vehicle type. This is done on instant real time basis after the system training.

a) Inter-class vehicle classification (Car/Van classification)



b) Intra-class vehicle classification (Sedan/Taxi classification



7.3. List the major deliverables of the project that you were responsible for or contributed to.

Contributed at all stages of development and worked as a key contributor between requirements and implementations. Had multiple meetings with stakeholders and design team in order to sum up any core issues.

- Since the system was computerized, I made it look easy to maintain & regulate or control for the customer
- Detailed all members regarding ease of information availability regarding any issue
- Computerized maintenance scheduling was also highlighted
- Effective use of maintenance staff was one of the key project nutshell
- Early detection of minor problems was a concern of respective customer & was addressed adequately
- System integration was checked and verified at each phase of project

8. Results

8.1. Was your solution implemented? If so, describe the role, if any, you had in the implementation.

- Guided IT team for user manual documentation.
- Headed an extensive training program which was carried out by involving 60 trainers for the implementation of IBVCS to support engineers which took two weeks.

The system was tested with the open source dataset and returned promising result. The dataset was made up of 530 images of vehicle segmented from vehicle detection system, 200 images of sedan car, 200 images of van and 130 images of taxi. The images were captured from a midrange surveillance camera and thus the lower quality and resolution.

This project does not solely serves as the effort in finding an economic and efficient solution, it has also broaden the room for research in related field. The system developed can also serve as the framework for any vehicle classification system. All in all, the project has been a success.

8.2. *Assess the overall success or failure of the project*.

Project was a prodigious success because now a single system can control air temperature, lighting, and building security. A manager sitting at home can use his personal computer to tell whether the temperature is too cold on the fifth floor of an office building. Using the same system, a technical staff can pin point any short circuits or fire alarm issues.

After project implementation it was observed that now the management need fewer technicians to carry out regular maintenance of building. For example, the building previously had 100 fire extinguishers. In the traditional approach, a guard would check each extinguisher once a month, verifying that the equipment was functioning. But with a computerized IBMS, the extinguishers can be monitored remotely. When a valve indicates the pressure level has fallen, maintenance will be notified.

The control centers of IBMS can determine when the building is too warm or when the lights in a parking lot have been turned on prematurely. Since utility companies charge the highest rates during periods of peak usage — such as summer afternoons. In turn it was proposed that project will save 200,000 PKR when it comes to smart lighting control but soon after implementation the IBMS saved 350,000 PKR only in lighting bills in first months.

More than PKR 1.5 million was saved from the total revenue thus making this project one of the most successful.

8.3. Lessons Learned

In retrospect, what you might have done differently on this project?

It took two month to hire & train resource to get up and be at part for this project due to the unforeseen resignations of engineers at site.
Along with automation and one window operation of almost all building controls only one major aspect was left. It was security surveillance control integration with IBMS. If the same was addressed properly in Project planning phase than the aforesaid project may be one of the most advanced building control in Pakistan.