

Mobile Intelligent Shopping Guide

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Abstract- “Mobile Intelligent Shopping Guide (ISG)” system is a mobile browser based application that will give difference experience to the customers as well as the supermarket managers. This paper provides a complete description of all the functionality and specifications furthermore this document provides an in depth overview into the extensive research carried out and the collective effort put by the team to develop the system. ISG system will be give difference experience to the customers as well as the supermarket managers. The system would provide facility to upload the customer daily shopping list and provide the price lists, notifications and the sales details to the mobile. In manager’s side give different kind of trend reports to improve their business. Mobile based Intelligent Shopping Guide will make shopping more convenient by cutting down time. Furthermore it will slash away the unwanted wasteful spending which takes place while shopping. It will also make it easier to for the super market to keep track of its regular customer base. Finally for marketing firms, they can use the ISG to identify customer trends/patterns which would help in promoting new products, sales and the promotions. At present there are systems which assist shoppers and high-end retail supermarket chains but the difference with ISG as opposed to the systems mentioned earlier is that the support for the two user types are integrated into one system. Another key feature of the ISG is the intelligence it holds which the other systems don’t provide. But the most important feature of ISG is the portability of the system as it will be available to the user in every mobile browser. The document describes the background of the research project as well as providing a comprehensive analysis on its implementation various issues encountered, solutions provided as well as possible future expansions.

Index Terms- Face Detection, Feature extraction, Image Processing, Segmentation, Mask, Thresholding

1. INTRODUCTION

The next phase in wireless technology revolution, smart phones with killer applications, is certainly going to change our way of life. Ranging from online banking to home automation applications is useful and powerful. These are convenient, attractive and cost-effective as well. Mobile based Intelligent Shopping Guide (ISG) is focus on to find a solution to current complex and time wasting shopping behavior of the people. And also supermarket owners can gain the maximum use of sales data. We developed this system for the customers and the supermarket managers. The system will help to reduce their work load and makes easy day today life.

This system is a mobile browser based application that will give difference experience to the customers as well as the supermarket managers. The system would provide facility to

upload the customer daily shopping list and provide the price lists, notifications and the sales details to the mobile. In managers side give different kind of trend reports to improve their business. When a customer wants to buy their shopping list without wasting time he or she can know price list and details from anywhere. First he can log to the system and upload the shopping list. Then supermarket will response its price and where they located at the supermarket. Mainly ISG is supports to the customer to plan his or her shopping from any ware. So it means the customer can do shopping very easily from any super market branch without having any previous experience in that branch.

In managers side he can get a better idea of the business, and recover the weak areas of his business using Intelligence reports. The Business Intelligence Report is a nationally distributed, quick-read resource that provides business professionals with the latest strategies, trends, tips and news for today’s business. These reports will give,

- Help managers to do their businesses more effectively.
- Gained the maximum use from existing data for the future.
- Cutting edge trends and legislation information to keep them aware of the changing business climate.
- Help marketing persons with their promotions and new product launches.

First part of this document describes about related researches, uniqueness of the ISG team research and its problems. In body part document will describes the methodology of the project, research findings and the overall product.

In the beginning of the research ISG team focused on data cube and the mining structures for reporting generating.

But executing a mining structure to such a huge data collection would not be a good solution. So the team came up a new solution called “Temporary Tables”. This kind of tables selects the exact data for the relevant report on a relevant time. ISG is not handling the billing part of the supermarket checkout flow. But in the internal report portal is using the supermarket existing data base. So team need to have customized the mining structures according to that data base. Main research problem that related to reporting was developing the “Sales forecasting” report. Because in today world there is hundreds of forecasting technics related to sales. So the team faced difficulties on choosing a correct equitation that suite to the application and the supermarket domain.

Another critical question in terms of the project was determining the process that goes in a customer's mind before purchasing a product and factors which makes a customer choose

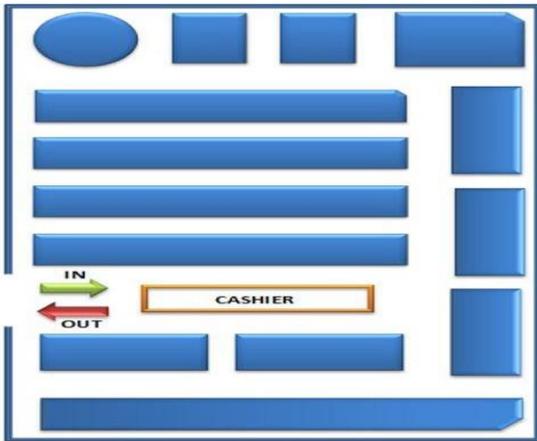


Figure 1: Supermarket map in mobile browser

a certain brand from another one of the same product. This is important as the system is more focused in predicting what the customer would do also these factors will be taken into consideration when writing the business logic for the system, therefore gaining valuable insight to customers thought process. Mainly ISG is supports to the customer to plan his or her shopping from any ware. So it means the customer can do shopping very easily from any supermarket branch without having any experience in that branch.

Our main goal is to design and develop a mobile solution that will guide the customer to plan grocery items and speed up the system the current systems. Mainly the Mobile based Intelligent Shopping Guide (ISG) will have the following characteristics compared to other existing supermarket system.

- We use two techniques as data mining techniques. First one is the temporary table technique. This is very useful one to speed up the system because there are no any physical tables. Tables are created in run time and give the output within short period of time. Finally tables are destroyed after execution. Data are extracted from the physical table to prepare the temporary tables.
- Another technique we use as data mining technique is MDX queries. At present people are familiar with supermarkets therefore transaction of the supermarket will be exceeded. For this kind of data store, most fruitful data store technique is data warehousing. MDX queries are the technique use to extract data from a data warehouse.
- This system guide to customer to plan their shopping list. Once customer login to the system user navigate to the “My Profile” page and here user is supported to prepare the shopping list and customer can view their previous shopping lists. Once the customer prepared the shopping customer can submit the list then customer is received the minimum price list associated to the submitted primary price list. At this moment customer is able to finalize the shopping list examining minimum price list, previous price lists and submitted price list. Once customer finalized the shopping list and he can submit the finalized shopping list. As the

response to the submitted finalized list system will be sent map of the supermarket which containing details of the submitted finalized shopping list.

- ISG provide set of reports that will be useful for supermarket owners, managers to take their organizational decisions and be aware of business. These reports are RDLC reports this is high level technique.
- We send notifications to the customer informing the customer about special offers and discounts.

2. RESEARCH REVIEW

There is lot of researches gone through this research area. But lots of them are failed due to various reasons. But ISG system will be a unique one than those projects. In the wide spread of the internet, online shopping became one of famous shopping type. But still there are lots of problems that the customers faced. Mostly online shopping facility is provided to high level products for rich people.

According to our research we found different projects done in all over the world. In 2005 Fujitsu introduced a revolutionary shopping concept with the advent of their U-Scan Shopper. The U-Scan Shopper which was developed by Fujitsu was wireless, trolley-mounted computer that gives shoppers information and scan-as-you-shop convenience as they move through a store. This alerts shoppers to specials and reminds them what they bought on their last visit.

With built-in scanners, digital store directories and wireless communication has been around a while, but hasn't really caught on in a big way. For one thing, the carts tend to be pretty expensive. For another, there hasn't exactly been a huge demand for this from consumers. It was cost nearly \$1,200 per-cart. IBM came up with "Wireless web page" that allowed users to upload their shopping lists from home and view them at the store using the device- mounted shopping cart. The cart would assist consumers in locating the items by the means of a map displayed upon the specialized display unit.

Notably these systems despite their high costs were in fact rendering the simple but useful service of displaying product related information and location of products. Assistance for the shoppers, in the form of suggestions, and decision-making support was not found on the above mentioned systems. The more feasible solution for the above mentioned smart shopping cart problem was to develop a system that bypassed the biggest obstacle in the existing systems eliminate the use of special hardware. In other words the display and barcode readers had to be replaced with cheaper alternatives. The most feasible option was to develop a system that would run on a device that belonged to the customer so this will not effect to the business and the supermarket owners. In this research project we focus on mobile phones. It is the uniqueness of the “Mobile based Intelligent Shopping Guide” system. At present there may be a large number of mobile phones that support web browsing. So implementing a mobile-based system seems to be a cost effective and feasible solution.

Our team found another related research was done by “Computer and Information Science and Engineering Department” of University of Florida, USA. This application is bit similar to our research as well. It calls as “iGrocer”, a mobile application that runs on a Smartphone equipped with a bar-code reader. Customers can use the bar code reader to scan item barcodes and allows the customer to view the product information. Importantly it has a list of useful features such as nutrition profiling, personalized product categories etc. “iGrocer” architecture is a classic example of the client-proxy server architecture with the proxy server handling all the intermediate communication. Users can create a profile on “iGrocer” from either the phone client or the through the iGrocer website. The new user information is then sent to the proxy, which then stores the information in the database. Also stored in the customer database are nutrition profile, wish list, recipes, expense history and the shopping list. So this is the point “iGrocer” gave new idea to use data mining and warehousing techniques to our project. This will be the main research part of ISG system. Another such project was the Mobile Shopping Assistant this too is a mobile application that uses XML for data transfer between the mobile device and the server, whilst displaying promotions, product descriptions, and providing product search and location. These applications however lack a sound framework to assist customers in the more intricate process of selecting which product to buy according to their own standard. Furthermore there is a certain amount of binding as the systems can be implemented on a certain section of mobile devices only. Decision making support for customers was available in another form though in e-commerce; suggestions for customers having purchased a particular product were generated very much in the same way as an employee of a food outlet recommends another item to a customer based on the purchase. Macy’s is one of a huge company which use the concept “users who bought x also bought “y” to suggest items to their customers, by using techniques such as item to item correlation and person to person correlation. However collaborative filtering can be seen as a feature that could be extremely useful when applied to the brick-and-mortar shopping domain. This creates recommendations by computing similarities in personal preferences. A large group of people's preferences are registered and using a similarity metric, a subgroup of people is selected whose preferences are similar to the preferences of the person who seeks advice. In the simplest of terms it emulates the scenario when a shop owner, knowing what type of customers she/he has promotes products that people with a similar background. This can be seen as an automated version of “word-of-mouth” promotion of products. Other than implementing a device mounted shopping cart is economically not feasible, so mobile based solutions are cost effective ones.

3. METHODOLOGY

Mobile based Intelligent Shopping Guide (ISG) is a system mainly has two components. But these two parts will not handle the checkout and the billing parts. Main thing is that the internal report portal is using existing supermarket data base for report generating. Customer mobile web applications also refer the same data base and the tables which is having customer registration details, products and promotion etc...

ISG team research is focus on enhancing the performance of reporting portal. Teams used data mining techniques and introduce new methodology for data mining. ISG is a shopping planning mobile browser based web application which is a new concept to the world. Before going to the supermarket customer can know the cost of his or her shopping list and the least cost that he can buy all the items in the shopping list.

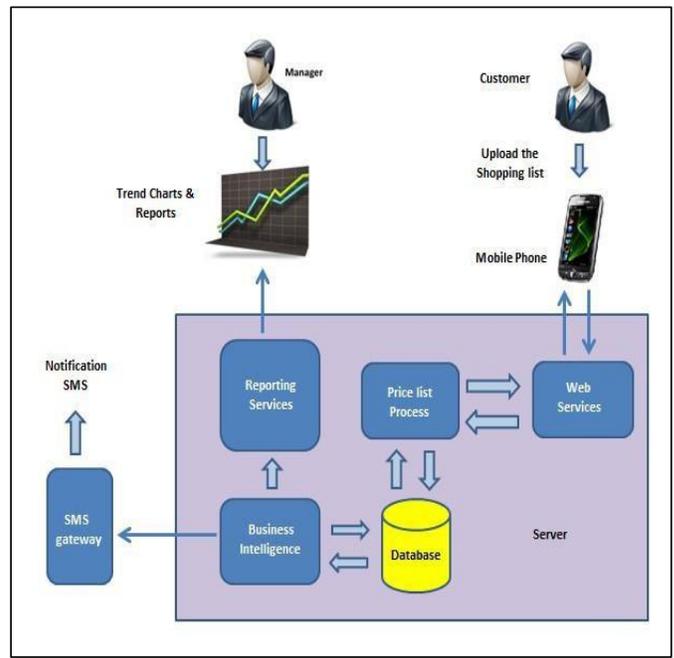


Figure 2: Overall Systems

Another facility that the ISG provide to the customer is supermarket map. It will help them to shop any branch of the all over the country. Actually this kind of feature is very useful for supermarkets which have huge scale. (E.g.: Macy’s, Walmart (USA) and TESCO (UK))

3.1.1 Customer Application

- Customer registration

When new customers want to use this application that person want to register in the application using mobile browser. This registration will include personal details(such as First name, Last Name, Address, age, email address, Mobile number, Gender, Number of family members, Mutual status)His or her mobile number will be the user name.
- Login to the system on entrance

Customer can log in to the system by giving their username and the password through the mobile phone. Then these details are sent to the server for validation and if they are valid, the customer can start shopping with the help of ISG.
- Uploading shopping list

The customer can upload his/her shopping list using mobile phone. After filling all the names and the quantity of the shopping list customer can upload it to the supermarket server. This shopping list must be in correct format and the correct

spellings. It is a must to mention quantity if not ISG will provide a relevant error messages.

- **Your price list and lowest price list**

After uploading the shopping list the supermarket server will provide two types of item lists. First one is “Your price list” and the other one is “Lowest price list”. In your price list section customer can know the exact cost for his/her shopping list. And also this will include all the prices item by item, total and the availability of those items. The second list is a kind of a suggest list for the customer and it will helps to manage their budget. As an example if a product is too expensive in his price list he can change his choice and buy the cheap product from the lowest price list. So is would be a grate support to customers to buy all the items from money in hand.

If that particular customer does not want to change his/her list simply can check out the list. If he wants to buy the lowest price list then also customer can simply check out it. If customer wants to buy items in both lists he/she has to create the final list.

- **Final shopping list**

This is the final list that the customer creates with the help of above mentioned two lists. Customer can add items form both lists to the final list. Application will provide “Add” and “Remove” features to do this. So customer can manage the budget with the help of this feature. At last this will be the final shopping list the customer going to check out.

- **Daily offers**

Customers can view any special offers and sales for items that they usually buy using the mobile application. This can be access by date drop down. So the customer can get the details of the offer on that day. This will be helpful to the customers as well as the supermarket managers. Customer never misses offers, special discounts, promotions that are in the supermarket. And supermarket staff does not need to put additional effort for advertising about the offer.

3.1.2 Internal Report portal

- **Report generation**

Mobile based Intelligent Shopping Guide (ISG) is produced number of valuable reports to manager and owners of the business. These are very helpful to take administration decisions and administration can design business future goals. We use SSIS, data mining, cube and profiling technologies. To create data cube following are the main steps,

- Create Data Source
- Create Data Source View
- Create Cube Dimensions
- Create OLAP Cube

After creating the cube the reports are generated based on it. Basically four reports are providing by the ISG system. Those are,

- Product Interest by age
- Revenue report
- Sales forecasting report

But with the use of data cube it is possible to provide existing data to make new knowledge. Above mentioned reports are can view in any time periods. As an example Revenue report can view for a month, quarter or a year. The time period can be customized according to the user interest. And also these reports can be exported to excel format to farther analysis. This exported data sheets containing data table and the data plotted chart.

The next method of the report generation is using temporary tables. Because executing mining structure for a huge data collection is not a good solution. So ISG team decided to create temporary tables according to the relevant report. Then the mining structure is focus on that table and generates reports more efficiently.

- **Product Interest by age report**

In customer registration part system will profile them according to various measures. One of them is age. “Product Interest by age” report will give the information to the managers who are the interested people to every product specifically. As an example “X” brand beer is popular in men below 23. So this kind of knowledge is very useful to managers to hold sales, launch new product and sponsor to a correct activity.

- **Revenue report**

The income of the each product is providing against the time period. Time is a dimension that can be selected for OLAP date cube. Selectable time periods are Year, Half Year, Quarter, Month, Ten Days, Week and Date. So manage can change the time period according to their preference. This report is help to know the sales in different time period of the year. This knowledge is very useful to expand the business limits.

- **Sales Forecasting report**

This report is generated using aggregated average sales in each product. This information is plotted against the time. The time period is very large one. To get maximum use of this report it is a must having huge time period. Using this report manager can predict the future sales. Managers can plan their buying patterns according to the time. In that time period focus on those products.

3.1.3 Main Server

ISG system uses the supermarket main server as its main server. Mobile browser based client application and the internal report portal is host on this server. ISG is also can host in a single server if it accesses the chain of branches in a same supermarket. Client will register on the server remotely using ISG mobile web application. Those registration data will use for customer profiling and the SMS notification functionality. If a customer buy the uploaded item list from the supermarket those are saved in the data base under his or her profile. So analyzing this kind of checkouts in long period of time ISG can select the exact potential customers for the SMS notification list. SMS’s are generated for daily offers, special offers, Promotions, new product launches and etc. But these short messages are not going to send for every customer, those are send to the relevant customers whose names are selected from above analysis.

So the main server is containing main database, internal report portal, customer web application and the SMS gateway. A large amount of customer and product related information as well as purchase history is stored on the database of the main Server. Microsoft SQL Server 2008 is used for database management.

3.1.4 Data Mining Module

At the beginning of the project it was decided that only Data cube should be used as the only method of making reports and selecting customers. But executing mining structure on huge data collection spends lot of time. To overcome this problem team decided to do mining using temporary tables. However digging deeper to create a data cube to get the different view-points from data, dimension and measure tables were needed to be created. Even though these tables can be created through SQL Server Integration Services best method was to create data cube according to a cube schema such as star. Data cube can be made using the existing tables which were available in the database.

In our system, we use two techniques to mine data and speed up the system. One of them is temporary table technique. Temporary Tables are short-lived tables, only exists for the duration of a database session. When a database session terminates, its temporary tables are automatically destroyed. Temporary tables are only visible to the session that creates them. They remain invisible to other users. In fact several users can create Temporary tables under the exact the same name, but each user will only see his or her version of the table. Temporary tables are used widely in a situation where queries become more complex because when queries become more complex the system performance will be go down.

One of the major advantages of temporary tables is the decrease the amount of locking and logging. It is because the current user is the only user that interacting with the table. Table gets cleared up automatically when current procedure goes out of scope, but you should manually clean-up the data when you are done with it. Temporary

Tables are ideal for holding intermediate data used by the current SQL session and it also creates a temporary index on temporary table.

Another technique we use is data CUBE concept. This is multi-dimensional structure called the data cube. It is a data abstraction that allows one to view aggregated data from a number of perspectives. Conceptually the cube consists of a core or base cube id surrounded by a collection of sub-cubes that represent the aggregation of the base cube id along one or more dimensions. We refer to the dimension to be aggregated as the measure attribute while the remaining dimensions are known as the feature attributes. Thus far in the report generation and notification sections, we have written informally about a multi-dimensional structure called the data cube. In short we have described it as a data abstraction that allows one to view aggregated data from a number of perspectives. Conceptually, the cube consists of a core or base cube id, surrounded by a collection of sub-cubes that represent the aggregation of the base cube id along one or more dimensions. We refer to the dimension to be aggregated as the measure attributes.

The following figure depicts a small, practical data cube example from our Mobile based Intelligent Shopping Guide (ISG). This particular data cube has three feature attributes Price,

Quantity and Date and a single measure attribute sales. (Sales are computed with the sum function). By selecting cells, planes, or sub cubes from the base cube id, we can analyze sales figures at varying granularities. Such queries form the basis of OLAP functions like roll-up and drill-down. In total, a d-dimensional base cube is associated with 2d cuboids. Each cube id represents a unique view of the data at a given level of granularity. Not all these cuboids need actually be present, however, since any cube id can be computed by aggregating across one or more dimensions in the base cube id. Nevertheless, for anything but the smallest data warehouses, some or all of these cuboids may be computed so that users may have rapid query responses at run time.

One final note is in order at this point. We have described the data cube as a conceptual model. This is certainly true. However, in the case of a MOLAP server, it is also the physical model, as MOLAP stores the cube structure directly as a multi-dimensional array. Conversely, ROLAP servers must map this representation to a relational design. Customer profiling categorized customer by using any important field (e.g. customer shopping list, age of the customer, etc.). These details are very valuable when sending notifications to the customer and generating reports to the administration.

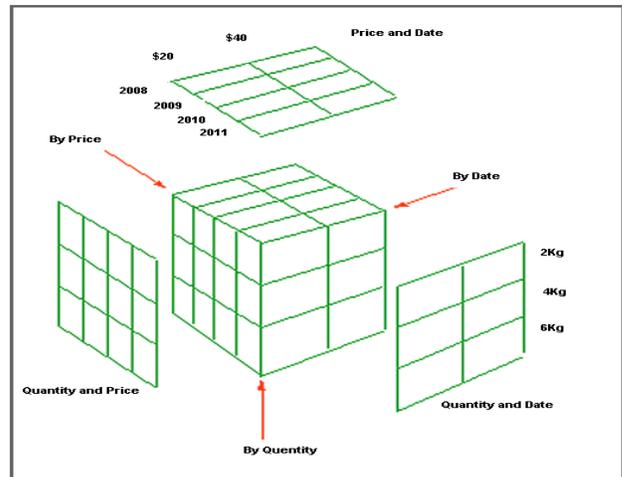


Figure 3: Data cube concept

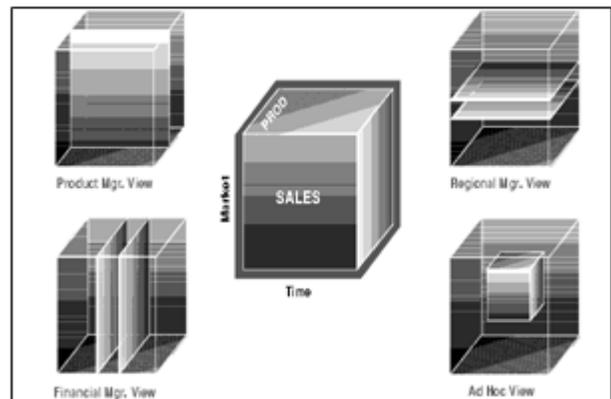


Figure 4: Logical cubes and views by different users

3.2 Research findings

Conducted research was make huge impact on implementing this kind of a shopping technique. To address a real world problem from our research is not an easy task. . The facts gathered were very interesting and useful for future developments in this area. Our research focused on introducing such kind of a mobile based shopping planning and guidance method and report portal to supermarket management. Remarkable amount of literature survey was done using techniques like research papers, relevant books, web resources, expert human resources. Students and lectures are also set as important shareholders of the research as their information was vital.

According to our customer profiling part we found that lot of facts are affected to their buying patterns. After carrying out some research on marketing and advertising we came to the conclusion that factors that predominant than others in deciding customer buying patterns are budget, age, gender and marital status. Most of the rules in the business intelligence module are based on these factors. But in ISG report portal team only focus on age of the customers. Analyzing huge data collection of past checkout of the customers ISG Reporting and SMS portal select the details of the interested customers. Actually that data will help to the marketing managers to launch a new product or a promotion. To gain this kind of knowledge it is a must to analyze the existing data. Data cube and warehousing is the methods that the people use for this kind of an analysis. The real advantage of data warehousing is when the database has records in the range of 10000 records in its tables which are un-related yet with warehousing it would be possible to derive relations between the fields of the tables which are known as dimensions in a cube.

Product	Province		Total
	Central	Western	
Milk	9,597	124,224	133,821
Biscuits	61,202	638,201	699,403
Total	70,799	762,425	833,224

Table 1: Simple report for province product sales

At the planning stages of the system it was decided that only Data Mining should be used as the only method of making reports and selecting customers. However digging deeper to create a data cube to get the different view- points from data, dimension and measure tables were needed to be created. Even though these tables can be created through SQL Server Integration Services best method was to create data cube according to a cube schema such as star. Data cube can be made using the existing tables which were available in the database.

You can retrieve slices of data from the cube. These correspond to cross-tabular reports such as the one shown in Table. Regional managers might study the data by comparing slices of the cube applicable to different markets. In contrast, product managers might compare slices that apply to different products. An ad hoc user might work with a wide variety of constraints, working in a subset cube.

Answering multidimensional questions often involves accessing and querying huge quantities of data, sometimes in millions of rows with in small time period. Because the flood of detailed data generated by large organizations cannot be interpreted at the lowest level, aggregated views of the information are essential. Aggregations, such as sums and counts, across many dimensions are vital to multidimensional analyses. Therefore, analytical tasks require convenient and efficient data aggregation.

- **Optimized Performance**
 Not only multidimensional issues, but all types of processing can benefit from enhanced aggregation facilities. Transaction processing, financial and manufacturing systems and all of these generate large numbers of production reports needing substantial system resources. Improved efficiency when creating these reports will reduce system load. In fact, any computer process that aggregates data from details to higher levels will benefit from optimized aggregation performance.

- These extensions provide aggregation features and bring many benefits.
- Simplified programming requiring less SQL code for many tasks.
- Quicker and more efficient query processing.
- Reduced client processing loads and network traffic because aggregation work is shifted to servers.

Nevertheless there are some opportunities for caching aggregations because similar queries can leverage existing work.

4. RESULTS AND DISCUSSION

4.1 Evidence

The progressions of the achievement of the objectives of this project are going to prove by analyzing the quantitative and qualitative measurements. Quantitative measurements are objective measurements to understand about unknown criteria. Qualitative measurements are the subjective measurements that depend on the person. The quality and the accuracy of the system are concerned in order to ensure the performance. To achieve this objective we conduct the testing process. The software testing phase was carried out in order to ensure that the system conforms to its specification and meets the needs of the user there for software testing was done to validate and verify the software system. This testing process focuses on both logical internals of the software, ensuring that all statements have been tested and on the functional externals, to uncover errors and ensure that defined input test data will produce expected results.

4.1.1 Peer evaluation

To proof that our project meet specification, should do some testing parts. For that we followed set of testing methods like unit testing, integration testing and system testing.

4.1.2 User evaluation

Our Team hopes to deploy this product on a supermarket existing server and give the opportunity to customers and the

managers to use ISG application. In this case, we tried to improve the simplicity and user friendliness of the system.

4.1.3 System Evaluation

ISG is a web application that interacts with customers (Via mobile phone) and supermarket managers. Therefore the system availability, accuracy, efficiency, reliability is very important. For that at any time and any location, multiple users can access the ISG system to plan and get the guidance for shopping. Managers should be able to view reports according to various time periods and export them to local PCs. This section will describe the testing performed to measure the accuracy of the implementation. The testing was completed according to the main modules in the application. Only several test cases were included here that show the main functionalities working as expected.

5. CONCLUSION

Mobile based Intelligent Shopping Guide (ISG) system is a mobile browser based application that will give a different experience to the customers as well as the supermarket managers. In customers' perspective ISG is shopping planning and guidance application. But in managers' point of view the internal report portal is business managing and decision making application. When the team was about to start the project the members went through many existing researches done on developing ISG and Smart Shopping Carts, where most of them were unsuccessful due to various issues pointed out below,

- Need high technical knowledge.
- Systems will not be able to change according to the technological changes.
- Most systems are tightly bound to the user front end.
- Overall costs of the systems were high due to hardware resources used etc.

Therefore it is hard to reuse such systems when new technologies are available or when technology becomes cheaper in future. The Mobile based Intelligent Shopping Guide has been developed to grip the control tactic by accessing the consumer preferences and buying patterns in cooperating corresponding functionalities. The entire system issuing a one data base which is located at the supermarket, so mining, profiling and report generating are depending on this.

Furthermore security of the customer information is ensured since the central database will contain confidential information on the customers. As far as our concern is to accommodate any front end application on a specific mobile device if the technology becomes cheaper since we have used XML and web services to communicate between server and client web. However the implementation of this kind of an application is an additional functionality to the existing checkout system. So ISG can attach to the existing checkout system and can refer the same data base for its use. So it makes the supermarket owners' life easier.

With the proper application of software engineering methodologies we were able to develop an efficient system in the given time duration. The team members acquired various skills in

constructing the artifacts that made up the final system. The success of any system lies in the completion of tasks assigned to each individual. Thus we were privileged to work in a team where each individual took up the burden assigned to them and completed each task in a satisfactory manner. Furthermore we were able to obtain thorough understanding of various new technologies through the background researches conducted. All these activities taken together facilitated in the development of a successful system.

5.1 Anticipated Benefit

- Customers allow knowing the price list and ordering remotely using their own mobile phone.
- Shopping list plotted supermarket map help to save the time and encourage the customer to shop in any branch if he had an experience there or not.
- SMS notifications inform customer about special offers, new products.
- Help to customer to manage their budget and give high customer satisfaction in minimum cost.
- Help management and Owner to easily take decisions by referring reports generated by the system.
- Research on the common issues faced by mobile phone users regarding the portability of browser.
- Giving the programmers the choice of developing in their preferred programming language, other than being concerned of how to make the application available for multi platforms.
- These systems help customers to save their time. Make the daily shopping activities an enjoyable task by minimizing the time spent on making shopping lists and comparing items. The system assists to make most suitable and cheapest shopping lists.
- Aid customers to purchase the most suitable goods and minimize unnecessary purchases, while reminding to purchase essential products.
- Alerts will remind customers to find out discounts and special offers. Assist the customer in cost cutting by notifying low cost alternatives. Allow customers to plan their buying process.
- Avoids the major disadvantage of the developed shopping systems. Tight coupling to devices are the major disadvantage of all earlier implementations of mobile shopping systems by having a highly independent back end powered by web services, the system provides a higher degree of freedom and is supported over multiple platforms.

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