

Hierarchical Data Organization using Drill Down Tables in Javascript Suitable for Web Applications

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Abstract—Drill down tables are the table structures that lets you view and organize data in hierarchical manner, it lets us group and summarize data in varying levels of details. There are many tools that lets you create and visualize data into drill down table, but this paper, the implemented system provides a tool or library in JavaScript that lets developers create drill down tables which takes data in the format of a json file and fetches results more efficiently than already existing tools. This paper includes comparative study on syncfusion library which has the provision for creating drill down tables in JavaScript and the custom-made library in JavaScript having similar functionality. Comparison is based on the performance (loading and execution times) on various internet browsers- Google chrome, Microsoft edge and Mozilla Firefox.

Index Terms— Drill-down table, Syncfusion pivotview, JavaScript, Pivot Charts, Hierarchical.

I. INTRODUCTION

Real world data can be hard to understand especially if it is large and contains periodic data. Arranging this data in hierarchy can be handy and make it easier to understand. Hierarchy allows users to understand periodic data in a way simpler format. There are several tools available for arranging data in hierarchy or in the format of drill down table. In implemented system, the JavaScript library is created which allows users to make drill down tables using json data. The drill down and drill up actions allow you to view the bound data in a detailed and abstract way. By default, the expand and collapse icons will be visible in the corresponding row/column header if the individual (columns or rows) has children. When the icon is clicked, expand or collapse actions are performed accordingly. In the meantime, the expand and collapse icons are absent from the leaf member(s). the implemented library with java-script allows users to create drilldown tables and set parameters for hierarchy and to compare efficiency of this library we have compared our library with already existing libraries like syncfusion pivot view, agGrid and flexmonster. Here Syncfusion is a JavaScript UI controls library, which has many UI components in a single package, this toolkit is very helpful in building in any web application.

The structure of this paper is as follows. Literature overview is included in Section II. Section III provides information on methodology. Section IV gives results and discussion and the last section i.e., Section V concludes this paper.

II. LITERATURE SURVEY

Jindal, Gaurav & Bali, Simmi [1] reflected in their paper about hierarchical data model, one of the earliest models

of a data model created by IBM in the 1950s. Data are viewed as a group of tables, or segments that create a hierarchical relation, in a hierarchical model. The information is arranged in a tree-like structure, with numerous children and one parent record for each record. The immediate structure can be a fan structure with several branches even if the segments are joined as a chain-like structure by logical relationships. The irrational associations are what we refer to as directed associations. This hierarchical data model concept we have used in modelling of our drill down table with the help of java script.

Victor Grech *et al* [2] elaborated for descriptive data analysis and the eventual presentation of conclusions, data must be tabulated and summarized. This activity should always come after inferential statistics. Excel's most useful and underutilized capabilities are pivot tables and pivot charts, which incorporate tabulation techniques that make using descriptive statistics simpler. Users can cross-tabulate and summarize data in real time using pivot tables. They can also generate tables in multiple dimensions, provide various summary statistics, and be interactively edited with immediate results. Without a question, the finest way for analyzing, distilling, and presenting data from many perspectives is using pivot tables because of how simple they are to use.

Kareem El Gebaly *et al.* [3] discussed the data summarization problem which is multi-dimensional Data set which have a binary attribute and also learned the factors which affects the binary attribute with the combinations of values of it. Also, it gives a detailed information about the explanation tables and hardness of it, also the theory of proposed heuristics which are based on sampling which includes the modifications of data sample. Advantages of those tables directly helps us to solve a particular problem and to compare and also the benefits about those explanation tables helps for Optimizations about it.

Sarawagi S. [4] explained about the tool for advanced discovery of OLAP data which will be easy for users, Tool continuously tracks the activity of cube in which user has visited in a time. The cube then breaks out the data to prepare a model which contains the users expected values and also the unused parts, All this process was developed by the classical maximum entropy principle also user has a freedom to ask any question about the unvisited part only the values are defined which are close to the given exact values, updating of user depends upon the parts where user had worked and the questions which were asked until the model matches the expected cube values, after all this a user can perform any action very easier and in fast manner compared to normal manual operations.

Pramod Ganjewar *et al* [5] introduces a transmission technique with data reduction using Hierarchical Fractional Least-Mean-Square (HFLMS), in WSN. The suggested HFLMS filter is a prediction technique that makes an effort to foretell the sensed data based on an estimated amount of inaccuracy. By changing the weight update of Hierarchical Least-Mean-Square (HLMS) using fractional calculus, the filter design of HFLMS extends HLMS (FC).

Avinash bhute *et al* [6] developed a signaling mechanism for exchanging data necessary for establishing a network that works well on most web browsers. A technology called WebRTC makes it easier for browsers to communicate in real-time. It offers services via application programming interfaces (APIs), enabling real-time video and audio stream interchange between websites and online apps.

III. METHODOLOGY

The implemented library can be imported in any web application, and can be used by passing respective parameters. First, we need to create the object of class 'DrillDownTable' and pass the parameters which are the file path and the variable for aggregation. This class has method called 'setHierarchies' which requires parameters which are column names for column hierarchies, row names for row hierarchies and filter keys for adding filters to the table. This will create the data model or the hierarchy of data.

After the data model is created, the created data model needs to be displayed at frontend. For that, the function called 'createTable' needs to be called. This function takes above- described data model as first parameter, id of the div element where the table should be visible in frontend, the object which previously has been created and the display keys. The display keys are the attributes of data which will be displayed when user selects the lowest cell of the hierarchy in the table, it will display all the entries from which that cell is aggregated from.

IV. RESULTS AND DISCUSSION

Comparative results obtained on testing for different browsers:

Data Size: 10 Lakh (Records)

Table I, table II and table III give the brief performance comparison of our library when run in different browsers and compared with the standard values, browsers used in this comparison are Google Chrome, Microsoft

TABLE I. PERFORMANCE COMPARISON ON GOOGLE CHROME

Sr. No.	Comparison Criteria	Observed Values (in Milliseconds)			
		SyncFusion Pivotview	agGrid	Flexmonster	Implemented System
1	Loading Time	213	9	34	8
2	Rendering time	107	39	232	31
3	Scripting Time	11979	7788	14943	4990
4	Overall time	13007	12124	16473	5442

TABLE II. PERFORMANCE COMPARISON ON MICROSOFT EDGE

Sr. No.	Comparison Criteria	Observed Values (in Milliseconds)			
		SyncFusion Pivotview	agGrid	Flexmonster	Implemented System
1	Loading Time	163	8	35	9
2	Rendering time	157	48	290	33
3	Scripting Time	8959	6505	14872	4963
4	Overall time	10093	13699	16036	5482

TABLE III. PERFORMANCE COMPARISON ON BRAVE BROWSER

Sr. No.	Comparison Criteria	Observed Values (in Milliseconds)			
		SyncFusion Pivotview	agGrid	Flexmonster	Implemented System
1	Loading Time	255	9	36	6
2	Rendering time	79	57	499	8
3	Scripting Time	11877	10380	17324	4184
4	Overall time	13036	13960	19144	4443

Edge and Brave Browser. In Google Chrome our library is best efficient with minimum overall time implemented by the system and in all of the above testing with different browsers our implemented library gives the maximum efficiency as compared with other libraries which were tested

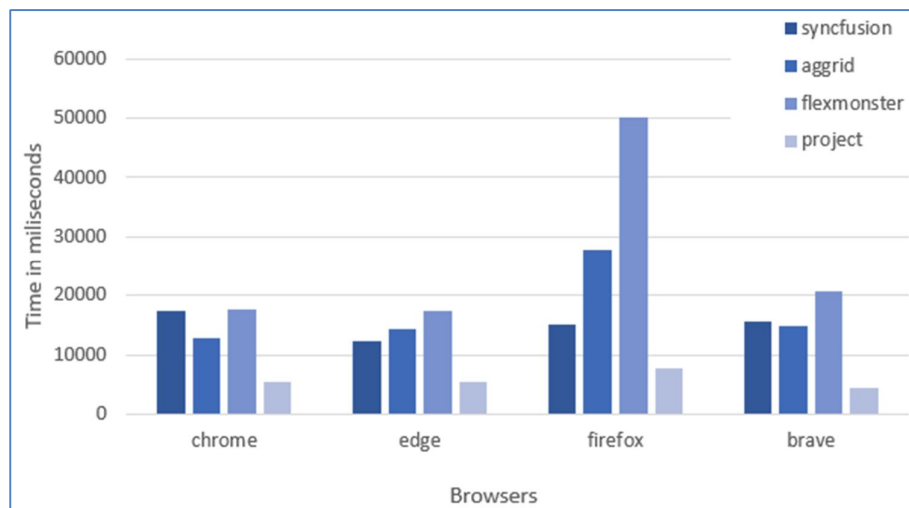


Figure 1. Overall time Comparison of libraries on different browsers

Figure 1 compares the performance of implemented system with the existing systems available to perform same action of creating drill down tables. The performance testing is done using built in performance tool available in

developer options in browsers. The comparison is done on parameters like loading time, rendering time, scripting time, and overall time, out of which scripting time is main parameter to consider. The overall time consists of other dependent parameters like time taken by system.

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