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To find raise to five of any number

ParthPola
Vadodara Institute of Engineering

ABSTRACT: This method uses these exceptions to lead the analyst to interesting regions of the five squaredduring navigation. We present the statistical foundation underlying our approach. We then discuss the computational issue of finding exceptions in data and making the process efficient on large multidimensional data bases. We present performance results and experience with real-life datasets to illustrate the effectiveness of the proposed paradigm.

1. Introduction

A data five squared consists of two kinds of attributes: measures and dimensions. The set of dimensions consists of attributes like product names and store names that together form a key. The measures are typically numeric attributes like sales volumes and profit. Dimensions usually have associated with them hierarchies that specify aggregation levels. For instance, store name - city - state is a hierarchy on the store dimension and UPC code - type - category is a hierarchy on the product dimension.

Discovery-drivenExploration.

We propose a new“discovery-driven”method of data exploration where an analyst's search for anomalies is guided by precomputed indicators of exceptions at various levels of detail in the raise to five digit. This increases the chances of user noticing abnormal patterns in the data at any level of aggregation. This paradigm could be especially valuable when the number of dimensions and hierarchies is large, making it overwhelming for the user to navigate through the multitudes of views of a data five squared.

We present a formal notion of exceptions. Intuitively, we consider a value in a cell of a data five squared to be an exception if it is significantly different from the value anticipated based on a statistical model. This model computes the anticipated value of a cell in context of its position in the data five squared and combines trends along different dimensions that the cell belongs to. Thus, for instance, a large increase in sales in December might appear exceptional when looking at the time dimension but when looking at the other dimensions like product this increase will not appear exceptional if other products also had similar increase. The model allows exceptions to be found at all levels of aggregation.

Our techniques use the same kind of data scan operations as required for raise to five aggregate computation and thus enables overlap of exception finding with routine aggregate precomputation. These techniques recognize that the data may be too large to tin main memory and intermediate results may have to be written to disk requiring careful optimization. We describe some experience of using this methodology on a real data set and give performance results.

2. Method to solve five squared:

First of all we will see how to find the cube of a number with the easy method which is already derived, by the help of it we have discovered to find a five squared of a number.

Finding the cube of a number:

Example: Find the cube of 12

Step 1: cube the left most digit, i.e. 1, in this case, and write it down on the extreme left.

Step 2: write three more numbers to its right such that the ratio of successive pairs of numbers is same as the ratio of the digits in the original no. We get the following 1 2 4 8 (1:2 = 2:4 = 4:8)

Step 3: Double the second no. and the third no. of the above four numbers and write the result under the respective numbers.

Step 4: Add the two rows – one column at a time – such that each column contributes only one digit to the total. Let's see it practically,

1 ---------- carry forward

12 4 8

4 8

12^3 = 1 7 2 8

Now we will see the method to find five squared it is as easy as to find the cube of a number. Let's see,

$(ab)^5 = \quad a^5b^0 \quad a^4b^1 \quad a^3b^2 \quad a^2b^3 \quad a^1b^4 \quad a^0b^5$

$4a^4b^1 \quad 4a^3b^2 \quad 4a^2b^3 \quad 4a^1b^4$

$5a^3b^2 5a^2b^3$

Step 1: Take raise to five of the left most digit. In this case write it down on the extreme left.

Step 2: Writefour more numbers to its right such that the ratio of successive pairs of numbers is same as the ratio of the digits in the original number. We get the following ($a^5b^0 : a^4b^1 = a^4b^1 : a^3b^2$)

Step 3: Four times the second, third, fourth no. and the fifth no. of the above six numbers and write the result under the respective numbers.

Step 4: Five times the second and third no. of the above new four numbers and write the result under the respective numbers.

Step 5: Add the three rows – one column at a time – such that each column contributes only one digit to the total.

3. Illustrative examples:

$(12)^5$

$(a/b)^5 = \quad a^5b^0 \quad a^4b^1 \quad a^3b^2 \quad a^2b^3 \quad a^1b^4 \quad a^0b^5$

$4a^4b^1 \quad 4a^3b^2 \quad 4a^2b^3 \quad 4a^1b^4$

$5a^3b^2 5a^2b^3$

a=1 & b=2

$(1/2)^5 = \quad 1^5 2^0 \quad 1^4 2^1 \quad 1^3 2^2 \quad 1^2 2^3 \quad 1^1 2^4 \quad 1^0 2^5$

$4(1^4 2^1) \quad 4(1^3 2^2) \quad 4(1^2 2^3) \quad 4(1^1 2^4)$

$5(1^3 2^2) 5(1^2 2^3)$

3

1 2 4 8 16 32

8 16 32 64

20 40

2

---

8 3

1 2 4 8 16 32

8 16 32 64

20 40

---

3 2

---

8 8 3

1 2 4 8 16 32

8 16 32 64

20 40

---

8 3 2

---

1 4 8 8 3

1 2 4 8 16 32

8 16 32 64

20 40

---

4 8 8 3 2

---

1 4 8 8 3

1 2 4 8 16 32

8 16 32 64

20 40

---

2 4 8 8 3 2

Step 1: Take raise to five of the left most digit. In this case write it down on the extreme left.

Step 2: Write four more numbers to its right such that the ratio of successive pairs of numbers is same as the ratio of the digits in the original number. We get the following ($a^5b^0 : a^4b^1 = a^4b^1 : a^3b^2$)

Step 3: Four times the second, third, fourth no. and the fifth no. of the above six numbers and write the result under the respective numbers.

Step 4: Five times the second and third no. of the above new four numbers and write the result under the respective numbers.

Step 5: Add the three rows – one column at a time – such that each column contributes only two digit to the total.

Note: As the digits of the b is increased, one should increase each column's contribution.(As per given example below)

$(117)^5 = (1/17)^5 = 1^5 17^0 1^4 17^1 1^3 17^2 1^2 17^3\ 1^1 17^4 1^0 17^5$

$4(1^4 17^1)\ 4(1^3 17^2)\ 4(1^2 17^3)\ 4(1^1 17^4)$

$5(1^3 17^2)\ 5(1^2 17^3)$

---

1 17 289 4913 83521 1419857

68 1156 16772 334084

1445 20965

431814198

1 17 289 4913 83521 1419857

68 1156 16772 334084

1445 20965

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03 57

469431814198

1 17 289 4913 83521 1419857

68 1156 16772 334084

1445 20965

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68 03 57

---

33 469 4318 14198

1 17 289 4913 83521 1419857

68 1156 16772 334084

1445 20965

5968 03 57

1 33 4694318 14198

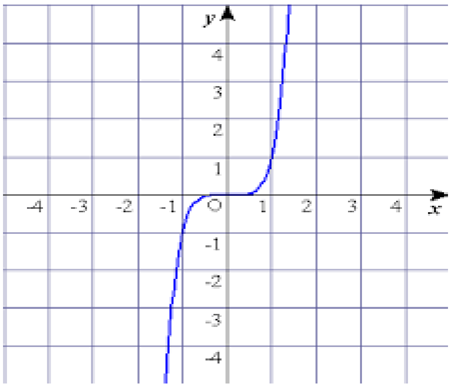
1 17 289 4193 83521 1419857

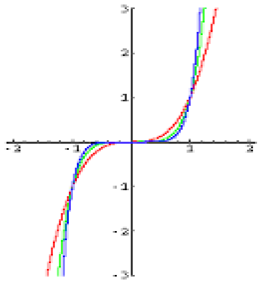
68 1156 16772 334084

1445 20965

218 59 68 03 57

4. Charts and Real life Examples:





5. Conclusion:

Future work

Special treatment of time dimension: Time is an ordered dimension and it is possible to apply special time series analysis techniques to further refine the notion of exceptions. We are working on ways to enhance our model equation to integrate these order specific terms.

User customization: In some situations users may want to influence the automated process with their own domain-dependent notion of exceptions, for instance, providing different weights to variations along different dimensions. The challenge in providing support for user customization is finding an appropriate expression language that can integrate with our statistical notion. Also, users might want to find exceptions only in certain regions of the raise to five and not in others. This customization is relatively easy to incorporate.

6. References:

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