ANALYSIS CENSUS DATA

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Objective:

In this project we are working on census data to provide guidance and presentation of descriptive data to an organization and policy-makers. And this information makes it possible to plan better services, improve the quality of life and solve existing problems. Census analysis information, which serves as the basis for constructing planning forecasts, procedure of systematically acquiring and recording information about the members of a given population.

Scope:

I. This census data analysis project provide data collection and production of information for government ministries and local authorities for budgeting purposes.

II. This production of information which serves bodies, organizations and various other elements in the fields of education, the economy, business, research, etc.

Examples:

1. **Government Ministries**
2. **Local authorities**
3. **Bodies of research**
4. **Private and public companies**
5. **Journalists**
6. **The general public**

Sample Data Set for Analysis: (Census_Records.json)

Age	Education	Marital Status	Gender	Tax filler status	Income	parents	Citizenship	Week Worked

Project Description -

i) We are provided with certain use-cases to get the required data. For all the use-cases we will be using a Map-reduce approach. The Map Reduce Approach totally works on Key-Value pair as Input and Output. There will be a Driver Class, Mapper Class and a Reducer Class.

ii) We have used pig Latin language to get required output because Pig tends to create a flow of data: small steps where in each you do some processing Hive gives you SQL-like language to operate on your data, so transformation from RDBMS is much easier.

iii) Every use case implemented the Hive Query Language (HiveQL or HQL) for Map Reduce to process structured data using Hive. HiveQL is similar to SQL for querying on schema info on the Metastore. It is one of the replacements of traditional approach for Map Reduce program. Instead of writing Map Reduce program in Java, we can write a query for Map Reduce job and process it.

TECHNOLOGY USED:

1. Apache Hadoop
2. Map-Reduce Programming in java.
3. PIG
4. HIVE
5. Sqoop

SOFTWARE USED:

1 Eclipse IDE
2 Oracle Virtual Machine
3 Cloudera
4 JDK 1.7

Secondary Tables:

We have created two or more secondary tables by splitting census record table into sub tables for performing join operation between multiple tables. This functionality can be achieved with the help of sqoop ecosystem tool of hadoop

1. Tax analysis:

In this table we have taken fields like minimum amount, maximum amount, gender, percentage.

2. Pension:

In this table we have taken fields like minimum amount, maximum amount, and pension.

3. Scholarship:

In this table we have taken fields like like age, gender, amount, parents for storing scholarship amount according to their age criteria

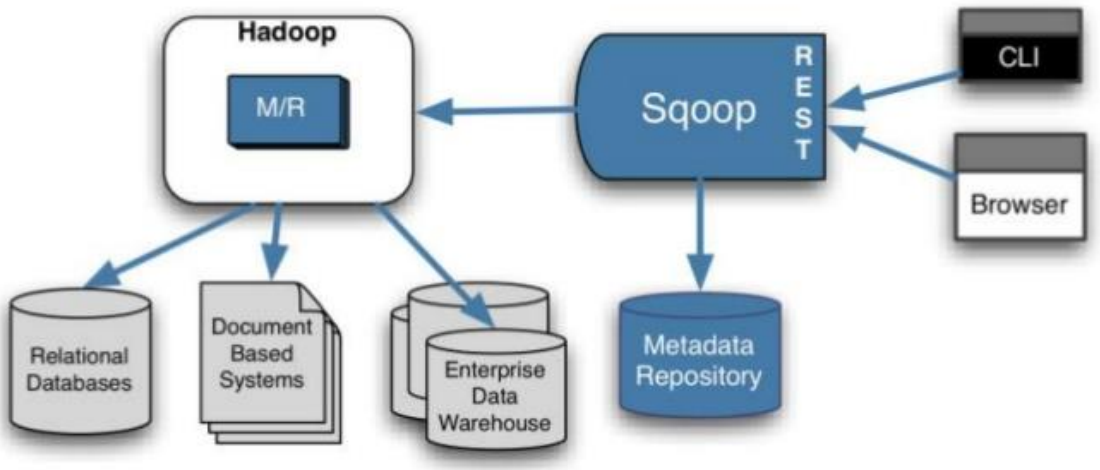
Where is Sqoop used in Project?

I. Relational database systems are widely used to interact with the traditional business applications. So, relational database systems has become one of the sources that generate Big Data.

II. As we are dealing with Big Data, Hadoop stores and processes the Big Data using different processing frameworks like Map Reduce, Hive, HBase, Cassandra, Pig etc and storage frameworks like HDFS to achieve benefit of distributed computing and distributed storage. In order to store and analyze the Big Data from relational databases, Data need to be transferred between database systems and Hadoop Distributed File System (HDFS). Here, Sqoop comes into picture.

III. Sqoop acts like a intermediate layer between Hadoop and relational database systems. You can import data and export data between relational database systems and Hadoop and its eco-systems directly using sqoop.

Sqoop 2 Architecture (proposed)



Use Cases: Scenario 1

Objective:

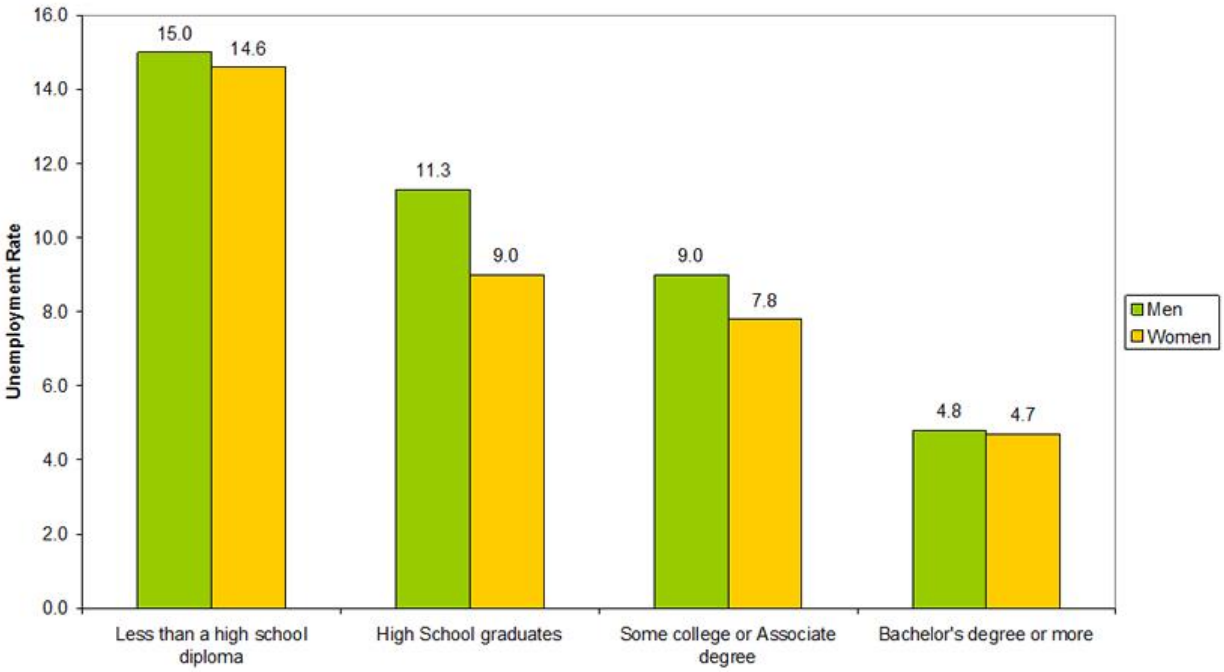
i) To generate employment opportunities in rural as well as urban areas of the country through setting up of new self-employment ventures / projects / micro enterprises.

ii) To bring together widely dispersed traditional artisans /rural and urban unemployed youth and give them self-employment opportunities to the extent possible, at their place.

1. **Education Statistics Based On Administrative Data:**

   In this use case, we are fetching records of all the male and female from census data. For example at the state level, some states have consistently even rates across the public and private educational sector.

   For example, Rajasthan is the only state with more males than females in its public colleges, and it is very close to a 50-50 split in its private colleges. On the other hand, Rajsamand district typically has among the lowest percentage of males across all types of colleges.



Task1: Total count of male/female based on education

Output: Hive

```
Total MapReduce CPU Time Spent: 22 seconds 610 msec
OK
10th grade      Female 12187
10th grade      Male   10384
11th grade      Female 10815
11th grade      Male   9690
12th grade no diploma   Female 2970
12th grade no diploma   Male   3304
1st 2nd 3rd or 4th grade        Female 2764
1st 2nd 3rd or 4th grade        Male   2591
5th or 6th grade        Female 4992
5th or 6th grade        Male   4761
7th and 8th grade       Female 12609
7th and 8th grade       Male   11518
9th grade       Female 9780
9th grade       Male   8755
Associates degree-academic program      Female 7684
Associates degree-academic program      Male   5266
Associates degree-occup /vocational     Female 9225
Associates degree-occup /vocational     Male   6733
Bachelors degree(BA AB BS)      Female 29557
Bachelors degree(BA AB BS)      Male   29680
Children        Female 69827
Children        Male   71669
Doctorate degree(PhD EdD)       Female 1099
Doctorate degree(PhD EdD)       Male   2714
High school graduate    Female 80977
High school graduate    Male   63857
Less than 1st grade     Female 1279
Less than 1st grade     Male   1133
Masters degree(MA MS MEng MEd MSW MBA)  Female 9493
Masters degree(MA MS MEng MEd MSW MBA)  Male   10150
Prof school degree (MD DDS DVM LLB JD)  Female 1530
Prof school degree (MD DDS DVM LLB JD)  Male   3828
Some college but no degree      Female 45012
Some college but no degree      Male   38690
Time taken: 156.749 seconds
hive>
```

Output: Pig

```
(( Children, Male),71669)
(( Children, Female),69827)
(( 9th grade, Male),8755)
(( 9th grade, Female),9780)
(( 10th grade, Male),10384)
(( 10th grade, Female),12187)
(( 11th grade, Male),9690)
(( 11th grade, Female),10815)
(( 5th or 6th grade, Male),4761)
(( 5th or 6th grade, Female),4992)
(( 7th and 8th grade, Male),11518)
(( 7th and 8th grade, Female),12609)
(( Less than 1st grade, Male),1133)
(( Less than 1st grade, Female),1279)
(( High school graduate, Male),63857)
(( High school graduate, Female),80977)
(( 12th grade no diploma, Male),3304)
(( 12th grade no diploma, Female),2970)
(( 1st 2nd 3rd or 4th grade, Male),2591)
(( 1st 2nd 3rd or 4th grade, Female),2764)
(( Doctorate degree(PhD EdD), Male),2714)
(( Doctorate degree(PhD EdD), Female),1099)
(( Bachelors degree(BA AB BS), Male),29680)
(( Bachelors degree(BA AB BS), Female),29557)
(( Some college but no degree, Male),38690)
(( Some college but no degree, Female),45012)
(( Associates degree-academic program, Male),5266)
(( Associates degree-academic program, Female),7684)
(( Associates degree-occup /vocational, Male),6733)
(( Associates degree-occup /vocational, Female),9225)
(( Masters degree(MA MS MEng MEd MSW MBA), Male),10150)
(( Masters degree(MA MS MEng MEd MSW MBA), Female),9493)
(( Prof school degree (MD DDS DVM LLB JD), Male),3828)
(( Prof school degree (MD DDS DVM LLB JD), Female),1530)
```

Output: Map Reduce

```
[cloudera@localhost Desktop]$ hadoop fs -cat  /user/cloudera/edcu/part-r-00000
10th grade      Male 10384
10th grade      Female 12187
11th grade      Male 9690
11th grade      Female 10815
12th grade no diploma   Male 3304
12th grade no diploma   Female 2970
1st 2nd 3rd or 4th grade        Male 2591
1st 2nd 3rd or 4th grade        Female 2764
5th or 6th grade        Male 4761
5th or 6th grade        Female 4992
7th and 8th grade       Male 11518
7th and 8th grade       Female 12609
```

2. Sustainable Employability

In this use case, we are fetching all the records of employed and unemployed people from census data. For example The PMRY has been designed to provide employment to more than a million Person by setting up of 7 lakhs micro enterprises by the educated unemployed youth. It relates to the setting up of the self-employment ventures through industry, service and business routes. The scheme also seeks to associate reputed non-governmental organizations in implementation PMRY scheme especially in the selection, training of entrepreneurs and preparation of project profiles.

Task: Total count of employed/unemployed based on education.

Output: Hive

```
OK
10th grade     EMployed-->     12044.0 UnEMployed-->   10527.0
11th grade     EMployed-->     8798.0  UnEMployed-->   11707.0
12th grade no diploma  EMployed-->     2681.0  UnEMployed-->   3593.0
1st 2nd 3rd or 4th grade       EMployed-->     3339.0  UnEMployed-->   2016.0
5th or 6th grade       EMployed-->     5511.0  UnEMployed-->   4242.0
7th and 8th grade      EMployed-->     17234.0 UnEMployed-->   6893.0
9th grade      EMployed-->     11430.0 UnEMployed-->   7105.0
Associates degree-academic program     EMployed-->     2094.0  UnEMployed-->  1
0856.0
Associates degree-occup /vocational    EMployed-->     2820.0  UnEMployed-->  1
3138.0
Bachelors degree(BA AB BS)     EMployed-->     9615.0  UnEMployed-->   49622.0
Children       EMployed-->     141496.0        UnEMployed-->   NULL
Doctorate degree(PhD EdD)      EMployed-->     530.0   UnEMployed-->   3283.0
High school graduate   EMployed-->     44342.0 UnEMployed-->   100492.0
Less than 1st grade    EMployed-->     1678.0  UnEMployed-->   734.0
Masters degree(MA MS MEng MEd MSW MBA) EMployed-->     2937.0  UnEMployed-->  1
6706.0
Prof school degree (MD DDS DVM LLB JD) EMployed-->     666.0   UnEMployed-->  4
692.0
Some college but no degree     EMployed-->     19037.0 UnEMployed-->   64665.0
Time taken: 135.667 seconds
hive>
```

Output: Pig-Employed

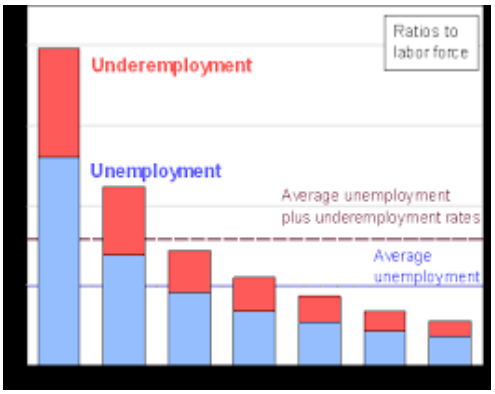
```
2016-11-20 22:20:21,279 [main] INFO  org.apache.pig.backend.hado
( 9th grade,7105)
( 10th grade,10527)
( 11th grade,11707)
( 5th or 6th grade,4242)
( 7th and 8th grade,6893)
( Less than 1st grade,734)
( High school graduate,100492)
( 12th grade no diploma,3593)
( 1st 2nd 3rd or 4th grade,2016)
( Doctorate degree(PhD EdD),3283)
( Bachelors degree(BA AB BS),49622)
( Some college but no degree,64665)
( Associates degree-academic program,10856)
( Associates degree-occup /vocational,13138)
( Masters degree(MA MS MEng MEd MSW MBA),16706)
( Prof school degree (MD DDS DVM LLB JD),4692)
[cloudera@localhost ~]$
```

Output: Pig-Unemployed:

```
( Children,141496)
( 9th grade,11430)
( 10th grade,12044)
( 11th grade,8798)
( 5th or 6th grade,5511)
( 7th and 8th grade,17234)
( Less than 1st grade,1678)
( High school graduate,44342)
( 12th grade no diploma,2681)
( 1st 2nd 3rd or 4th grade,3339)
( Doctorate degree(PhD EdD),530)
( Bachelors degree(BA AB BS),9615)
( Some college but no degree,19037)
( Associates degree-academic program,2094)
( Associates degree-occup /vocational,2820)
( Masters degree(MA MS MEng MEd MSW MBA),2937)
( Prof school degree (MD DDS DVM LLB JD),666)
[cloudera@localhost ~]$
```

3. Employability: The Ongoing Process of Finding the Right Job After Graduation

In this use case we are collecting data of people in a range for example A recruiting agency, also referred to as a staffing or temporary agency, searches for, interviews and screens applicants for job placement. The goal of a recruiting agency may be to fill temporary job openings, permanent vacancies or both.



Task 3.Total count for people in age range of 18-25 based on education.

Output: Hive:

```
OK
Education-->     10th grade     Total Count-->  2411
Education-->     11th grade     Total Count-->  5310
Education-->     12th grade no diploma  Total Count-->  1824
Education-->     1st 2nd 3rd or 4th grade       Total Count-->  275
Education-->     5th or 6th grade       Total Count-->  871
Education-->     7th and 8th grade      Total Count-->  989
Education-->     9th grade      Total Count-->  1486
Education-->     Associates degree-academic program     Total Count-->  1414
Education-->     Associates degree-occup /vocational    Total Count-->  1558
Education-->     Bachelors degree(BA AB BS)     Total Count-->  5714
Education-->     Doctorate degree(PhD EdD)      Total Count-->  15
Education-->     High school graduate   Total Count-->  18966
Education-->     Less than 1st grade    Total Count-->  187
Education-->     Masters degree(MA MS MEng MEd MSW MBA) Total Count-->  358
Education-->     Prof school degree (MD DDS DVM LLB JD) Total Count-->  27
Education-->     Some college but no degree     Total Count-->  20311
Time taken: 29.134 seconds
hive>
```

Output – Map Reduce

```
Enter the minimum age
18
Enter the maximum age
16
Maximum age range limit can't be less than minimum age range limit set by you
Enter valid Maximum age limit
Enter the maximum age
14
Enter the maximum age
25
```

```
[cloudera@localhost Desktop]$ hadoop fs -cat /user/cloudera/etask3/part-r-00000
10th grade      2411
11th grade      5310
12th grade no diploma   1824
1st 2nd 3rd or 4th grade        275
5th or 6th grade        871
7th and 8th grade       989
9th grade       1486
Associates degree-academic program      1414
Associates degree-occup /vocational     1558
Bachelors degree(BA AB BS)      5714
Doctorate degree(PhD EdD)       15
High school graduate    18966
Less than 1st grade     187
Masters degree(MA MS MEng MEd MSW MBA)  358
Prof school degree (MD DDS DVM LLB JD)  27
Some college but no degree      20311
```

Use Cases: Scenario 2

Objective:

1. Income tax assessments for New Scheme:

Post Office Saving Account

It is quite easy to open this scheme and caters to the small investors. The account can be opened with only Rs 20. A minimum balance of Rs 50 is required to be maintained in such account. It is however required that the account should have at least one transaction in a period of three financial years. Interest rate of 4% is given in this scheme.

Task1: Tax analysis total and gender wise

Output: Hive

```
 Female 1710.1663736369826
 Male   1772.7254616592884
Time taken: 28.998 seconds
hive>
```

2. Per Capita Income at current prices and corresponding percentage change

Monthly Income Deposit

What a monthly income fixed deposit is basically a fixed deposit that can be created and earns an interest in much the same way a regular fixed deposit does with a few differences. The being that with a monthly income plan the investors either have access to the amount deposited or are paid the interest earned on a monthly basis. Some banks even let depositors withdraw the interest every month from regular fixed deposits at discounted interest rates. The monthly income plans are generally linked to a bank account and the interest earned is credited into that account.

Task: Per Capita Income (PCI) analysis consolidated, gender wise and category wise

Output: Hive: Category wise

```
age group-->    Teenager        sum of income-->        1689.5446269570016
age group-->    adult   sum of income-->        1813.7500828047719
age group-->    elderly sum of income-->        1662.5739941670317
age group-->    infants sum of income-->        1667.2678898605448
age group-->    middle-aged     sum of income-->        1737.4900611355397
age group-->    senior citizen  sum of income-->        1708.379683926455
Time taken: 66.15 seconds
hive>
```

Output: Hive: Total PCI:

```
TotalPCI-->      1740.0260960934236
Time taken: 29.013 seconds
hive>
```

Use Cases: Scenario 3

Objective:

Government is providing pension scheme and number of scholarships for students to pursue higher studies. Although Government of India, foreign countries and private institutions offer the international scholarships to academically outstanding students.

1 Amount dispensed on pension

Task: Total amount dispensed on pension in x year(s)

Output: Map Reduce

```
[cloudera@localhost Desktop]$ hadoop jar TotalPension.jar /user/cloudera/CensusData /user/cloudera/outsocials5
Pension in Year : Enter Year
2014
```

```
[cloudera@localhost Desktop]$ hadoop fs -cat /user/cloudera/outsocials5/part-r-00000
16455420
```

2. Schemes for student scholarships, awards and loans:

The State Governments/Union Territory Administrations shall constitute a committee of the Departments implementing such scholarship schemes to ensure that the student from the minority community, who may also belong to children of those engaged in unclean occupation and OBC do not avail scholarship from other sources for the same purpose and avail only one source.

<u>Task 7</u> - Total amount dispensed on scholarship in current year

Input: Secondary table: Pension

```
Father only present,500
Mother only present,700
Neither parent present,700
Not in universe,1000
```

Output: Pig

```
a = load '/user/cloudera/Census_Records.json' using JsonLoader
('Age:int,Education:chararray,MartialStatus:chararray,Gender:chararray,TaxFilerStatus:chararray,Income:float,Parents:chararray,
CountryOfBirth:chararray,Citizenship:chararray,WeeksWorked:chararray');
b = load '/user/cloudera/scholar2' using PigStorage(',') as (status:chararray,schamt:int);
c = join a by Parents,b by status;
d = foreach c generate $6 as parent,$11 as Schamt;
e = group d by $0;
f = foreach e generate group,SUM(d.Schamt);
dump f;
```

```
cloudera@localhost:~
File  Edit  View  Search  Terminal  Help
2016-11-27 02:33:02,425 [main] INFO  org.apache.pig.backend.hadoop.executionengi
ne.mapReduceLayer.MapReduceLauncher - Success!
2016-11-27 02:33:02,429 [main] INFO  org.apache.pig.data.SchemaTupleBackend - Ke
y [pig.schematuple] was not set... will not generate code.
2016-11-27 02:33:02,436 [main] INFO  org.apache.hadoop.mapreduce.lib.input.FileI
nputFormat - Total input paths to process : 1
2016-11-27 02:33:02,436 [main] INFO  org.apache.pig.backend.hadoop.executionengi
ne.util.MapRedUtil - Total input paths to process : 1
( Not in universe,431452000)
( Father only present,2781500)
( Mother only present,26821900)
( Neither parent present,3411100)
[cloudera@localhost ~]$ d
```

2 Housing scheme for widows, divorcees

i) The Department of Minority Welfare is constructing 250 houses across the State for widows belonging to minority religions such as Muslim, Christian, Sikh, Buddha, and Parsi, and divorcee women who have not remarried.

ii) The department proposes to give Rs.2 lakh a house as financial assistance, which need not be repaid.

iii) Applicants should not have remarried within three years of submitting the application form and should have a minimum of three cents of litigation-free and liability-free land in their own name. Those who have received housing aid from the government or similar agencies earlier are not eligible to apply.

Task: For given age range employable female widowed and divorced count

Output: Map Reduce

```
[cloudera@localhost ~]$ hadoop jar FemaleDivorceWidow.jar /user/cloudera/CensusData /user/cloudera/results
Enter Minimum Age
34
Enter Maximum Age
45
Divorced        7134
Widowed 580
```

Use Cases: Scenario 4

1. Use of vote counting for meta-analysis:

i) In this use case we are fetching total vote count for literature research. As Vote counting is a simple but limited method for synthesizing evidence from multiple evaluations, which involves simply comparing the number of positive studies (studies showing benefit) with the number of negative studies (studies showing harm).

ii) It does not take into account the quality of the studies, the size of the samples, or the size of the effect.

Task: Voter(s) count in x year(s)

Output: Hive

```
OK
Total_Voters Count-->    437549
Time taken: 31.156 seconds
hive>
```

2. Senior citizen Free Computer Classes:

Many local and state governments offer computer classes to senior citizens through libraries and community centers. These classes can range from essential skills to advanced skills, such as coding. Libraries in larger municipalities will often have more extensive programming.

Community colleges offer a variety of computer classes, from beginning programming to learning how to use software products such as Word and Excel. Learning annexes -- educational facilities often attached to high schools, community colleges or libraries -- also offer computer classes.

Task 2. Senior Citizen(s) count in x year(s)

Output: Hive

```
OK
 Total_Senior_Citizen in given year-->  100079
Time taken: 30.949 seconds
hive>
```

3. Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) planning

These schemes are designed to be pro poor and promise to provide protection against the risks of dying too early (Pradhan Mantri Jeevan Jyoti Bima Yojana) or living too long (Atal Pension Yojana) or unable to work & earn due to partial or full disability (Pradhan Mantri Suraksha Bima Yojana).

Task: Total number of Male/Female

Output:Hive

```
OK
gender-->         Female Total count-->  311800
gender-->         Male   Total count-->  284723
Time taken: 29.985 seconds
hive>
```

Task 4.Citizens and immigrants count for employed lot

Output: Hive

```
OK
CitizenShip-->  Immigrants      Total Count-->  67265
CitizenShip-->  Native Born United States       Total Count-->  529258
Time taken: 26.96 seconds
hive>
```

Task1: .Degree wise count for Employability

Output:MapReduce:

```
hduser@ubuntu64server:~$ hadoop fs -cat /kk1/p*
 10th grade      10527
 11th grade      11707
 12th grade no diploma   3593
 1st 2nd 3rd or 4th grade        2016
 5th or 6th grade        4242
 7th and 8th grade       6893
 9th grade       7105
 Associates degree-academic program      10856
 Associates degree-occup /vocational     13138
 Bachelors degree(BA AB BS)      49622
 Children        0
 Doctorate degree(PhD EdD)       3283
 High school graduate    100492
 Less than 1st grade     734
 Masters degree(MA MS MEng MEd MSW MBA)  16706
 Prof school degree (MD DDS DVM LLB JD)  4692
 Some college but no degree      64665
hduser@ubuntu64server:~$
```

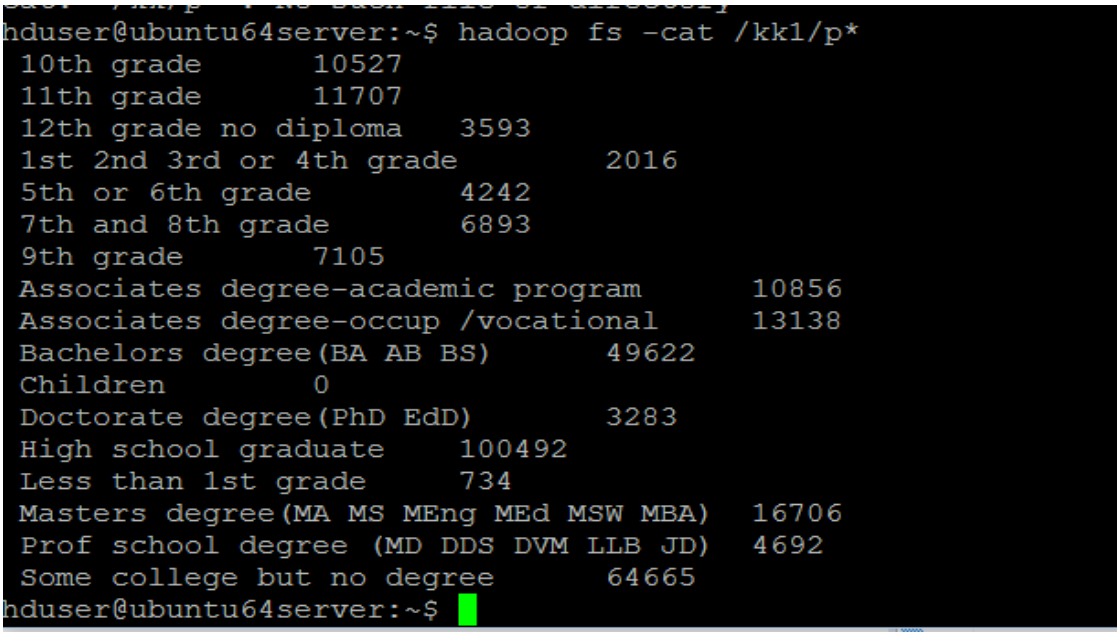
```
hive>
    > select 'Education-->',edu,'Total Count-->',count(*) from final_census where ww=0 group by edu;
```

Output: Hive

```
OK
Education-->     10th grade     Total Count-->  12044
Education-->     11th grade     Total Count-->  8798
Education-->     12th grade no diploma  Total Count-->  2681
Education-->     1st 2nd 3rd or 4th grade       Total Count-->  3339
Education-->     5th or 6th grade       Total Count-->  5511
Education-->     7th and 8th grade      Total Count-->  17234
Education-->     9th grade      Total Count-->  11430
Education-->     Associates degree-academic program     Total Count-->  2094
Education-->     Associates degree-occup /vocational    Total Count-->  2820
Education-->     Bachelors degree(BA AB BS)     Total Count-->  9615
Education-->     Children       Total Count-->  141496
Education-->     Doctorate degree(PhD EdD)      Total Count-->  530
Education-->     High school graduate   Total Count-->  44342
Education-->     Less than 1st grade    Total Count-->  1678
Education-->     Masters degree(MA MS MEng MEd MSW MBA) Total Count-->  2937
Education-->     Prof school degree (MD DDS DVM LLB JD) Total Count-->  666
Education-->     Some college but no degree     Total Count-->  19037
Time taken: 28.947 seconds
hive>
```

t1 (~/Desktop/mydata) - gedit

Output: Adv Map Reduce



2. Entrepreneurship & Vocational Training

(Ministry of Skill Development and Entrepreneurship)

The Ministry aims to Skill on a large Scale with Speed and high Standards in order to achieve its vision of a 'Skilled India'. 10 Creating awareness amongst college and university teachers and students about entrepreneurship has been one of the focus areas of the Institute. The Institute organized one faculty development programme in entrepreneurship for school, college and university teachers in which 18 teachers participated. During the year, the Institute organized 10 awareness camps for the students of colleges and 2 such programmes for polytechnic students.

Task .Customer base analysis

Input:

```
a = load '/user/cloudera/Census.json' using
JsonLoader('age:int,edu:chararray,mar:chararray,gen:chararray,tax:chararray,income:long,parent:
chararray,country:chararray,citizen:chararray,ww:int');
b = foreach a generate age,gen,income;
d = filter b by ((gen==' Male' and income>1500) and (age>14 and age<31)) ;
j = group d by age;
k = foreach j generate group,COUNT(d.age);
dump k;
```

Output: Pig

```
(15,2549)
(16,2295)
(17,2381)
(18,2085)
(19,2230)
(20,2099)
(21,2071)
(22,2198)
(23,2435)
(24,2560)
(25,2565)
(26,2360)
(27,2452)
(28,2403)
(29,2515)
(30,2634)
```

3. **Income tax assessments**

Task 3.Non-US citizen(s) tax filer status

```
ıive> select age,edu,gen,'TaxFilerStatus-->', tax,'CitizenShip-->',citizen ,income,ww from final_census where citizen not in(' Native- Born in the United States');
'otal MapReduce jobs = 1
```

Output:Hive

```
37      Bachelors degree(BA AB BS)      Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     624.68  0
3       Children        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1205.3  0
25      Some college but no degree      Male   TaxFilerStatus-->        Single CitizenShip-->   Foreign born- Not a citizen of U S     3442.4  52
28      Bachelors degree(BA AB BS)      Female TaxFilerStatus-->        Single CitizenShip-->   Foreign born- U S citizen by naturalization    1741.48 52
53      1st 2nd 3rd or 4th grade        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1370.33 28
38      7th and 8th grade       Female TaxFilerStatus-->        Head of household      CitizenShip-->   Foreign born- Not a citizen of U S     1219.11 0
14      Children        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     677.03  0
2       Children        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     862.44  0
3       Children        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1804.74 0
46      5th or 6th grade        Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    2688.61 52
43      Some college but no degree      Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     2239.83 52
41      5th or 6th grade        Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     938.99  52
26      11th grade      Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1199.34 52
22      Some college but no degree      Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Native- Born abroad of American Parent(s)      1900.14 52
12      Children        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- U S citizen by naturalization    1532.61 0
52      12th grade no diploma   Male   TaxFilerStatus-->        Nonfiler       CitizenShip-->   Native- Born in Puerto Rico or U S Outlying    1140.64 0
25      Some college but no degree      Male   TaxFilerStatus-->        Single CitizenShip-->   Foreign born- Not a citizen of U S     1740.9  52
46      Some college but no degree      Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1031.19 52
48      High school graduate    Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    740     52
35      High school graduate    Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1584.92 0
26      9th grade       Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1171.52 52
28      12th grade no diploma   Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1140.07 52
43      Some college but no degree      Male   TaxFilerStatus-->        Single CitizenShip-->   Native- Born abroad of American Parent(s)      1019.25 36
24      High school graduate    Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    852.49  52
31      High school graduate    Male   TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    648.87  26
39      12th grade no diploma   Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1432.86 0
53      High school graduate    Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    2590.42 26
19      5th or 6th grade        Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     1329.61 0
49      High school graduate    Female TaxFilerStatus-->        Single CitizenShip-->   Native- Born in Puerto Rico or U S Outlying    1198.34 52
23      High school graduate    Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- Not a citizen of U S     2632.78 52
38      Some college but no degree      Female TaxFilerStatus-->        Joint both under 65    CitizenShip-->   Foreign born- U S citizen by naturalization    1386.91 52
32      Some college but no degree      Male   TaxFilerStatus-->        Single CitizenShip-->   Foreign born- Not a citizen of U S     1230.37 0
46      1st 2nd 3rd or 4th grade        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     762.63  0
37      7th and 8th grade       Male   TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1195.92 0
24      High school graduate    Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1761.07 0
24      7th and 8th grade       Male   TaxFilerStatus-->        Single CitizenShip-->   Foreign born- Not a citizen of U S     2938.54 52
51      Masters degree(MA MS MEng MEd MSW MBA)  Male   TaxFilerStatus-->        Single CitizenShip-->   Foreign born- U S citizen by naturalization    672.59  52
5       Children        Male   TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     649.07  0
26      5th or 6th grade        Female TaxFilerStatus-->        Nonfiler       CitizenShip-->   Foreign born- Not a citizen of U S     1287.85 0
Time taken: 38.064 seconds
ıive>
```

4. **Naturalization Trends:**

Task .Country of birth wise count for US citizenship by naturalization

Output: Hive:

Country of birth wise count for US citizenship by naturalization

Hive

```
OK
 ?      3113
 Cambodia       75
 Canada 770
 China  430
 Columbia       397
 Cuba   1251
 Dominican-Republic     379
 Ecuador        192
 El-Salvador    227
 England        496
 France 87
 Germany        1054
 Greece 300
 Guatemala      98
 Haiti  144
 Holand-Netherlands     28
 Honduras       87
 Hong Kong      99
 Hungary        187
 India  384
 Iran   141
 Ireland        206
 Italy  793
 Jamaica        342
 Japan  152
 Laos   82
 Mexico 2218
 Nicaragua      110
 Panama 38
 Peru   202
 Philippines    1220
 Poland 577
 Portugal       248
 Scotland       106
 South Korea    472
 Taiwan 283
 Thailand       53
 Trinadad&Tobago        62
 Vietnam        371
 Yugoslavia     141
Time taken: 27.363 seconds
hive>
```

Conclusion:

All Use cases are based on government scheme and future plan predictions using data to help it work more efficiently how to extract meaning, turning big data into advanced analytics. Estimates that by digitizing information, disseminating public data sets, and applying analytics to improve decision making, government agencies can act as catalysts