

Statistics - Trends in Current Era

Akash Kumar Meher

Dept. of Statistics,
Ispat Autonomous College, Rourkela (India)

Abstract:

The changing demands and expectation are compelling every organization to understand consequences of its decisions basing actions or strategies on the future businesses trends or services. By control processes for summarizing data and to make data-driven decision, statistics make the daily life processes more simplifier. Today we live in the information world and much of this information's are determined mathematically by Statistics help. Statistics tell us any trends in what happened in the past and can be useful in predicting what may happen in the future. With prediction and forecasting based on data, Statistics form a key basis tool in business and manufacturing as well and can be used to understand measurement systems variability. Statistical methods are applied in all fields that involve decision making, for making accurate inferences from a collated body of data and for making decision in the face of uncertainty based on statistical methodology.

Key words: changing demands, control processes, decision making, inferences making, problems solving.

1. Introduction:

Statistics is a mathematical science pertaining to the collection, analysis, interpretation or explanation, and presentation of data. Also, with prediction and forecasting based on data, Statistics form a key basis tool in business and manufacturing as well. It is used to understand measurement systems variability. Control processes for summarizing data and to make data-driven decision. Some fields of enquiry use applied statistics so extensively that they have specialized terminology. Examples: engineering statistics, social statistics, statistics in sports etc.

1.1 Objectives:

1. Describe the concepts, definition and stages of statistics.
2. Shows the importance of statistics for our day to day life.
3. Shows the demands of statistics for the generations towards future.
4. Statistics, apply appropriately, is a powerful in the analysis of research data.
5. Understanding statistics can help us appreciate research reports better.

1.2 Statistics:

1. The word '*statistics*' and '*statistical*' are derived from the Latin word status, means "political state".
2. Today, statistics is widely employed in government, business and natural and social sciences.
3. Today, statistical methods are applied in all field that involve decision making, for making accurate inferences from a collected body of data and for making decisions in the face of uncertainty based on statistical methodology. The use of modern computers has expedited large-scale statistical computations, and has also made possible new methods that are impractical to perform manually. Statistics continues to be an area of active research, e.g.: on the problem of how to analyse big data.

1.3 Stages in statistical process:

The statistical process guides genuine study, and statisticians are exacting in their methodologies. The major steps of statistics are explained in a simplistic form as follows:

1. Planning a study

There must be a subject that requires investigation. Planning entails deciding what instruments (interviews, surveys, etc.) to use, who to speak with, and how to analyse findings. **Instruments**, in this case, are tools used in conducting a study like surveys, interviews, etc.

2. Organizing the data

The best way to obtain the valid answers is to organize the information effectively to help expose patterns and other significant relationships. There are a variety of software programs that can help with this step.

3. Interpreting the data

This is the heartbeat of statistics. Interpretations can have lasting repercussions, and it's important to make sure they are valid assumptions and supported by mathematical reasoning.

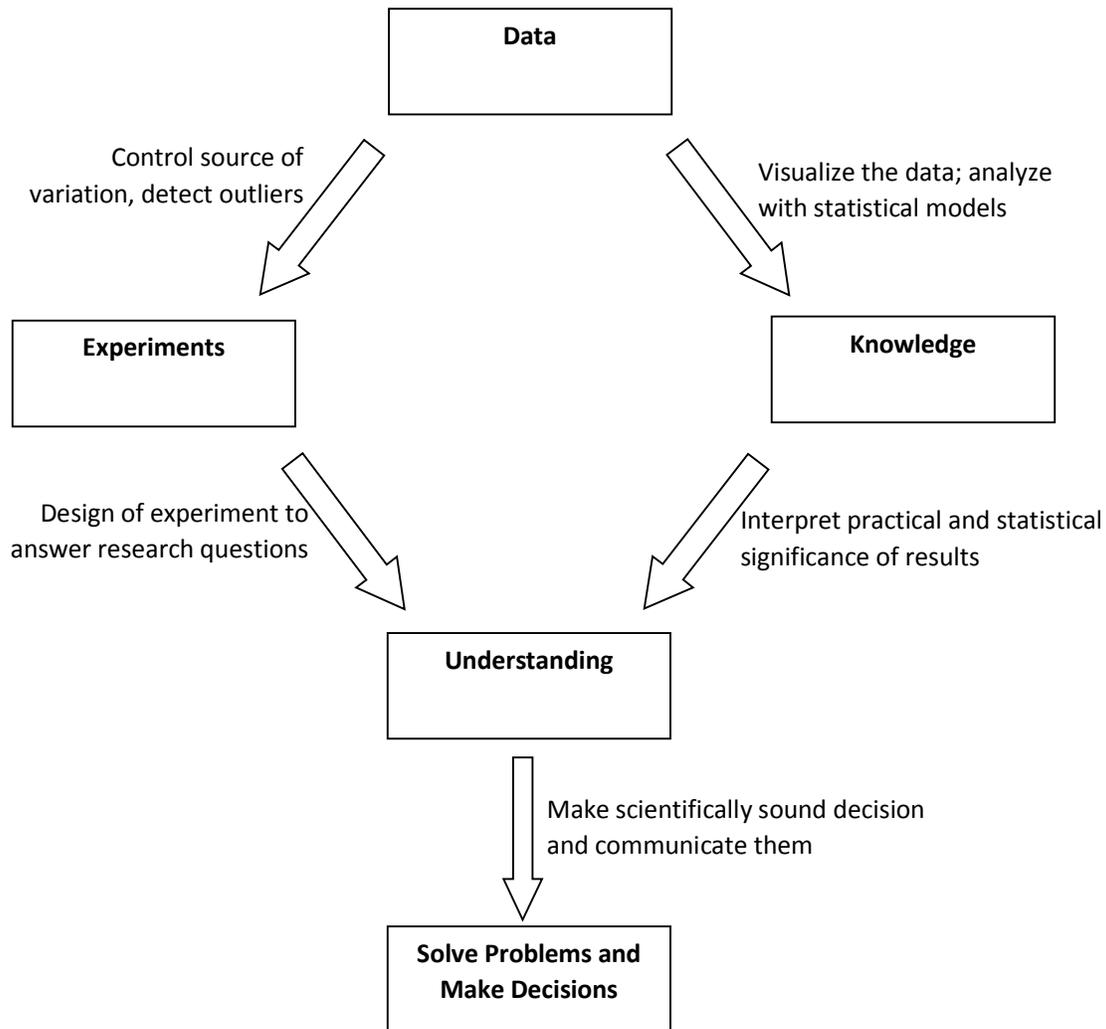
4. Presenting the data

The methods you chose to present the data can make findings more interesting or powerful. People use graphs, tables, and various diagrams to show relationships between data.

1.4 Scope of Statistics:

1. Simplifying complex data.
2. Conversion of data into information and make it more useful in decision making.
3. Quantifies and measures uncertainty and variability and so helps in measuring risk.
4. Discovers past and emerging patters in a data. It helps in forecasting.
5. Helps in estimation and validating assumptions.

1.5 Problems solving and decision making:



(Figure. 1: Problems solving and decision making)

1.6 Some Statistical techniques and their applications:

Techniques	Field	Specific application
Binomial distribution	Quality assurance	Sampling inspection
Normal distribution	Equity research finance marketing	Risk management performance appraisal
Correlation Regression	Financial risk marketing	Cross market analysis
Testing of hypothesis	Agriculture, paramedical, pharmaceutical	Testing a fertilizer, testing a drug, testing of drug, clinical trial

Sampling	Market research	Consumer survey
Index number	Economics	Wholesale and consumer price index
cluster analysis	Target marketing	Marketing planning
Decision theory	Finance	Investment and portfolio selection
Discriminates Analysis	Finance, Marketing	Credit risk, analysis, customer profile

1.7 Importance of Statistics in daily life:

Why statistics are important in our life? Statistics are the sets of mathematical equations that we used to analyze the things. It keeps us informed about, what is happening in the world around us. Statistics are important because today we live in the information world and much of this information's are determined mathematically by **Statistics Help**. It means to be informed correct data and statics concepts are necessary. To be more specific about the importance of statics in our life, here are 10 amazing reasons that we have heard on several occasions.

1. Everybody watches weather forecasting. Have you ever think how do you get that information? There are some computers models build on statistical concepts. These computer models compare prior weather with the current weather and predict future weather.
2. Statistics mostly used by the researcher. They use their statistical skills to collect the relevant data. Otherwise, it results in a loss of money, time and data.
3. What do you understand by insurance? Everybody has some kind of insurance, whether it is medical, home or any other insurance. Based on an individual application some businesses use statistical models to calculate the risk of giving insurance.
4. In financial market also statistic plays a great role. Statistics are the key of how traders and businessmen invest and make money.
5. Statistics play a big role in the medical field. Before any drugs prescribed, scientist must show a statistically valid rate of effectiveness. Statistics are behind all the study of medical.
6. Statistical concepts are used in quality testing. Companies make many products on a daily basis and every company should make sure that they sold the best quality items. But companies cannot test all the products, so they use statistics sample.
7. In everyday life we make many predictions. For examples, we keep the alarm for the morning when we don't know that we will be alive in the morning or not. Here we use statistics basics to make predictions.

8. Doctors predict disease on based on statistics concepts. Suppose a survey shows that 75%-80% people have cancer and not able to find the reason. When the statistics become involved, then you can have a better idea of how the cancer may affect your body or is smoking is the major reason for it.
9. News reporter makes a prediction of winner for elections based on political campaigns. Here statistics play a strong part in who will be your governments.
10. Statistics data allow us to collect the information around the world. The internet is a devise which help us to collect the information. The fundamental behind the internet is based on statistics and mathematics concepts.

1.8 Demands of statistics in recent trends:

Statistics are sets of mathematical equations that are used to analyze what is happening in the world around us. You've heard that today we live in the Information Age where we understand a great deal about the world around us. Much of this information was determined mathematically by using statistics. When used correctly, statistics tell us any trends in what happened in the past and can be useful in predicting what may happen in the future.

1.8.1 There are many demands of statistics in different fields, such as:

1. Weather Forecasts

Do you watch the weather forecast sometime during the day? How do you use that information? Have you ever heard the forecaster talk about weather models? These computer models are built using statistics that compare prior weather conditions with current weather to predict future weather.

2. Emergency Preparedness

What happens if the forecast indicates that a hurricane is imminent or that tornadoes are likely to occur? Emergency management agencies move into high gear to be ready to rescue people. Emergency teams rely on statistics to tell them when danger may occur.

3. Predicting Disease

Lots of times on the news reports, statistics about a disease are reported. If the reporter simply reports the number of people who either have the disease or who have died from it, it's an interesting fact but it might not mean much to your life. But when statistics become involved, you have a better idea of how that disease may affect you.

For example, studies have shown that 85 to 95 percent of lung cancers are smoking related. The statistic should tell you that almost all lung cancers are related to smoking and that if you want to have a good chance of avoiding lung cancer, you shouldn't smoke.

4. Medical Studies

Scientists must show a statistically valid rate of effectiveness before any drug can be prescribed. Statistics are behind every medical study you hear about.

5. Genetics

Many people are afflicted with diseases that come from their genetic make-up and these diseases can potentially be passed on to their children. Statistics are critical in determining the chances of a new baby being affected by the disease.

6. Political Campaigns

Whenever there's an election, the news organizations consult their models when they try to predict who the winner is. Candidates consult voter polls to determine where and how they campaign.

7. Insurance

You know that in order to drive your car you are required by law to have car insurance. If you have a mortgage on your house, you must have it insured as well. The rate that an insurance company charges you is based upon statistics from all drivers or homeowners in your area.

8. Consumer Goods

Wal-Mart, a worldwide leading retailer, keeps track of everything they sell and use statistics to calculate what to ship to each store and when. From analyzing their vast store of information, for example, Wal-Mart decided that people buy strawberry Pop Tarts when a hurricane is predicted in Florida! So they ship this product to Florida stores based upon the weather forecast.

9. Quality Testing

Companies make thousands of products every day and each company must make sure that a good quality item is sold. But a company can't test each and every item that they ship to you, the consumer. So the company uses statistics to test just a few, called a sample, of what they make. If the sample passes quality tests, then the company assumes that all the items made in the group, called a batch, and are good.

10. Stock Market

Another topic that you hear a lot about in the news is the stock market. Stock analysts also use statistical computer models to forecast what is happening in the economy.

1.9 Some simplest method of representing Statistical data:

One goal of statistics is to present data in a meaningful way. Nowadays graphs are used almost everywhere. Good graphs convey information quickly and easily to the user. Graphs highlight salient features of the data. In stock market, graphs are used to determine the profit margins of stock. There is always a graph showing how price have changed over time. Unemployment figures, inflation, exchange rates, NASA space stories, global warming stories, house price comparison, inflation, budget forecasts, price in dices, and how they have changed over time to time etc.

1.9.1 Types of Graphs:

1. Bar Graph

A bar graph is a way to visually represent qualitative data. Data is displayed either horizontally or vertically and allows viewers to compare items, such as amounts, characteristics, times, and frequency. The bars are arranged in order of frequency, so more important categories are emphasized. By looking at all of the bars, it is easy to tell at a glance which categories in a set of data dominate the others. Bar graphs can be single, stacked, or grouped.



(Figure 2: Bar graph)

2. Pie Chart or Circle Graph

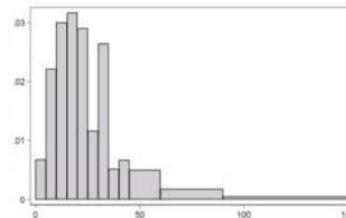


(Figure 3: Pie chart)

Another common way to represent data graphically is a pie chart. It gets its name from the way it looks, just like a circular pie that has been cut into several slices. This kind of graph is helpful when graphing qualitative data, where the information describes a trait or attribute and is not numerical. Each slice of pie represents a different category, and each trait corresponds to a different slice of the pie; some slices usually noticeably larger than others. By looking at all of the pie pieces, you can compare how much of the data fits in each category, or slice.

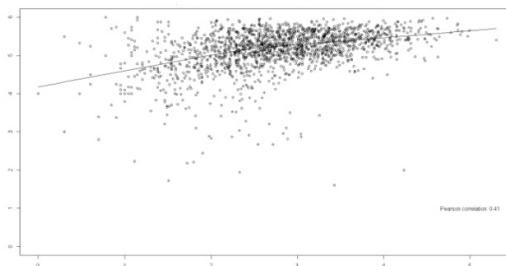
3. Histogram

A histogram is another kind of graph that uses bars in its display. This type of graph is used with quantitative data. Ranges of values, called classes, are listed at the bottom, and the classes with greater frequencies have taller bars.



(Figure 4: Histogram)

4. Scatter plots

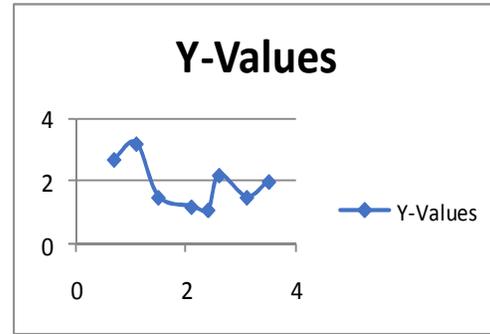


(Figure 5: Scatter plots)

A scatter plot displays data that is paired by using a horizontal axis (the x-axis), and a vertical axis (the y-axis). The statistical tools of correlation and regression are then used to show trends on the scatter plot. A scatter plot usually looks like a line or curve moving up or down from left to right along the graph with points "scattered" along the line. The scatter plot helps you uncover more information about any data set.

5. Time-Series Graph

A time-series graph displays data at different points in time, so it is another kind of graph to be used for certain kinds of paired data. As the name implies, this type of graph measures trends over time, but the timeframe can be minutes, hours, days, months, years, decades, or centuries. For example, you might use this type of graph to plot the population of the United States over the course of a century. The y-axis would list the growing population, while the x-axis would list the years, such as 1900, 1950, 2000.



(Figure 6: Time-series graph)

1.10 Findings:

1. Statistics or numerical data that has been collected, organized and interpreted in some way, exist on a wide variety of subjects, including health, weather, crime, population characteristics, labor and employment, to name only a few. This pathfinder will help you find statistical information that is available in print publications and on the Web, with a focus on locating statistical information produced by the United States Government.
2. The United States government is the largest producer and publisher of statistical information. Federal Government agencies produce statistics in the course of research, program management, making forecasts and projections, and as a daily part of their administrative functions. Government produced statistics are used by government agencies and the public at large.
3. **A word of caution about using statistics:** In order to understand the meaning of the statistics you have found, and use them appropriately, you should check several things: from where the numbers came (the "source"); how the numbers were collected (sometimes given in a footnote); what date range the statistics cover (usually different than the date the statistics were published); and who collected the data (how reliable is the agency or group who collected and analyzed the numbers in order to come up with the statistics).

1.11 Conclusion:

Statistics does play a very important role as discussed but it has to be implemented by well defined objectives, scientific collection of data, appropriate assumptions and analysis. Scarcity of any of the above may leads to wrong conclusion. Today, statistical methods are applied in all fields that involve decision making, for making accurate inferences from a collated body of data and for making decision in the face of uncertainty based on statistical methodology. The use of modern computers has expedited large-scale statistical computations and has also made possible new methods that are impractical to perform manually. Statistics continues to be an area of active research.

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