

Contrivance of Digital Technology for Covid-19

presented by Mohd Aamir Khan
guided by Dr Alok Kumar Mathur

Introduction

- Covid-19 caused by SARS-CoV-2
- Transmits through droplets.
- Hydroxychloroquine – Remdesivir – Plasma Therapy.
- Rapid rate of disease spread.

Objective

To understand the use of digital technology to fight against Covid-19 at different levels

Methodology

Type of study- Descriptive study

Type of data- Qualitative data

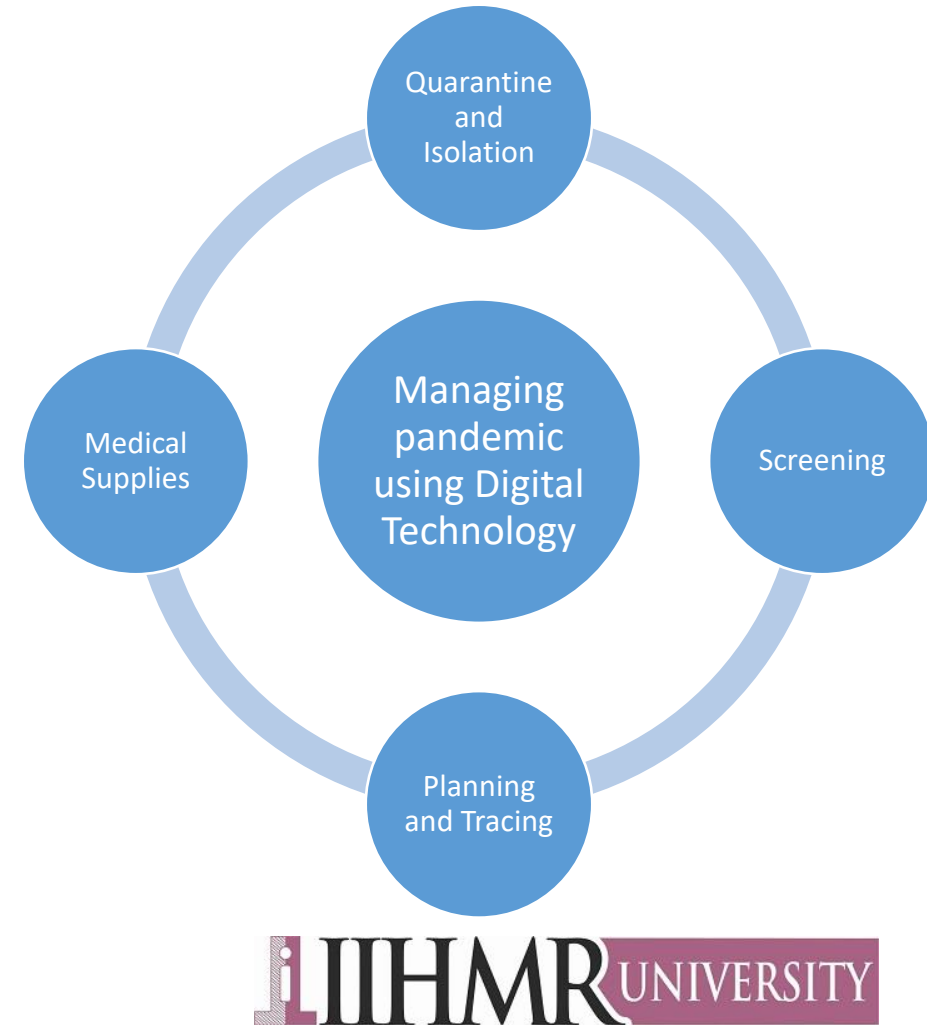
Technique- Secondary research

Data collection method- A progressive search of data, related to modern technology for Covid-19 is made, and assessed the various aspects of digital and latest available technologies which can be helpful in tackling Covid-19.

Data from Research papers and reports of universities and scholars, mainly includes data from United Nations, Sage Pub, NCBI and Lancet Digital Health

Findings

- As the research on novel Corona virus is progressing, new information's are available which lead to development of new strategies.
- Digital technology can be helpful in diagnosis of outbreak with the help of radiology images, disease tracking, forecasting the health condition of the patient, discovery of drug and generating awareness towards the outbreak.



Analysis

- **Tracking and Tracing-**
- Arogya Setu
- Gives details of nearby active cases.
- It also suggests best practices to stay healthy
- Identification is based on signs and symptoms provided by user and, also data of active cases provided by health centers.
- **Artificial Intelligence-**
- Intelligence demonstrated by machines
- Capability to copy Human Intelligence process.
- Useful in detecting and forecasting outbreaks.
- Helps in patient management system.



Analysis

Blockchain-

Type of diary or spreadsheet.

Contains information related to transactions.

Transaction approved by a majority of the nodes then it is written into a block.

Each block refers to the previous block and together forms a Blockchain.

Protects data.

Provides traceability.

Helps in management of patients, hospital records and supplies.

Drones-

Unmanned aircraft or ship.

Navigate autonomously.

Useful in surveillance, tracking and observing the suspects.

Used to enforce social distancing by filming public areas and ordering people back to their homes during lockdown.

Announcements and food delivery in the area which is hotspot of an outbreak.

Analysis

Internet of Things (IoT)- Scheme of Interconnecting computing tactics

Digital, and mechanical devices

Possessing the capability of transmission of data over the defined network without having any human involvement at any level,

Helpful in a proper monitoring system

Less chances of mistakes

Enhanced diagnosis

Less expensive

Effective control

Superior treatment



Analysis

- **Virtual Reality-**

Developing simulated expertise which is somewhat similar to the real-time situation.

Functions of VR- Decrease cost, Increase efficiency, Increase performance, Better learning and many more.

- **Deep learning-**

Class of machine learning algorithms.

uses multiple layers to progressively extract higher level features from the raw input.

- **Big Data-**

Describes the large volume of data.

Big data can be analyzed for insights that lead to better decisions and strategic business moves.

- **Facial Recognition-**

Verifying a person from a digital image or a video frame from a source.

Involves the processing of biometric data for the purposes of uniquely identifying an individual.

Analysis

Robots-

Disinfection process.

In many hospitals, robots were also performing diagnosis and conducting thermal imaging.

Cloud Computing-

On-demand availability of computer system resources, especially cloud storage and computer power, without direct active management by the user.

Example includes Gmail, Google Photos, iCloud Photos, Netflix.

Tuesday, March 2, 2021



Results

Presently, various technologies are being used or going to be used in healthcare sector. These includes-

Use of Robots, Protective gear and advanced ventilators in Hospitals.

Remote monitoring, Telehealth, Sensors to provide healthcare in remote area.

Disinfectants, Masks and Air Filtration System as preventive measures.

Smart Surveillance System, Medicine delivery through Drone, Mobile Support Applications for Public Safety during pandemic.

Conclusion

- With the availability of technologies, Covid-19 as well as other diseases can be eliminated by-
- Fighting misinformation,
- Finding drugs,
- Increasing traceability and transparency by sharing data,
- Tracking people with facial recognition and big data,
- Contactless movements and deliveries through autonomous vehicles,
- Drones and robots,
- Technology supported temperature monitoring,
- Remote working technologies to support social distancing and maintain business continuity,
- Helpful in reducing inequalities,
- minimizing the risk of virus spread,
- Easy access to public services during the pandemic crisis.

Recommendation

- Surveillance.
- Careful balance between data privacy and public health in AI.
- More use drones in rural.
- Increase efficiency and creativity with blockchain.
- Cloud Computing should have Increased security, Optimized storage environment, Optimized end-user experience making the platform more user-friendly.
- Remote healthcare.
- Remote working with cloud networking.
- Online learning through e-learning platforms like Edx, Coursera and Swayam.
- mapping and real-time supply-chain monitoring with navigation based system and technologies.

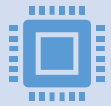
Data Analytics for Lean Six Sigma

presented by Mohd Aamir Khan

About Course



Course Description- This course helps in data analytical techniques which are useful in lean six sigma projects with the help of data analytical tools and various interpretation methods.



Course Objective- To learn about data analysis and lean six sigma, understanding and visualizing data, probability distribution and testing.



Learning Methodology- Whole course consists of video lectures, projects, cases, reading material and some data files for practice exercise, all of them have some weightage in learning the course. It also provides learning through Minitab, although, other methods can also be used.



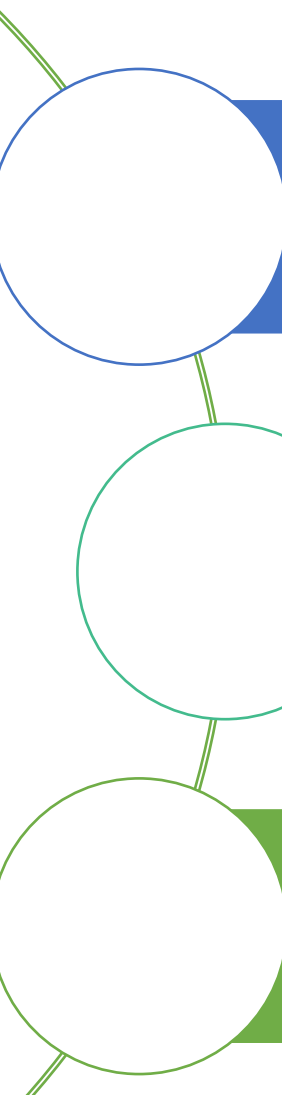
Course Contents- It includes Process improvement, lean six sigma as a process improvement method, DMAIC, critical to quality (CTQ), descriptive statistics, visualization of data, sampling, estimation, causality and data analysis. These contents are discussed in upcoming slides.

1. Data and Lean Six Sigma

- **Processes and Process Improvement-** Used to make a product with involvement of series of action. Processes can be improved with the help of Lean Six Sigma. Lean Six Sigma is based on process data and on evidence.
- **DMAIC-** D stands for Define, M stands for Measure, A for Analyse, I for Improve and C stands for Control.
- **Critical to Quality-** A CTQ or critical to quality is a property of a product or a service

Y variable- Dependent Variable- Outcome Variable
- **Sampling-** Selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population.

2. Understanding and Visualising the data



Types of data- Numerical and Categorical

Types of graphs and charts- Histogram and a Boxplot

Other techniques includes- Pie chart and Bar Chart

3. Probability Distribution



Estimation and Confidence Interval-

An educated guess

Calculate two boundaries in-between which clearly shows that the actual population mean will lie and this is called the confidence interval.

The most often selected confidence level is 95%.



Probability Plot-

To determine which distribution fits best

To find a theoretical distribution that fits best to data

Poor Fit and Good Fit



Empirical CDF-

To calculate probabilities and percentages

Used to determine how many percent of the cases meet our specifications.

4. Data Analysis, Testing and Causality

Data Analysis-

Determine which variable is the influence factor

Whether our variables are categorical or numerical.

Tree Diagram.

Hypothesis Testing- Procedure to arrive at a decision as objectively as possible

constructing our hypothesis

collect data

draw conclusion.

Causality-

cause and effect relationships. This means when we change our X variable and nothing else, Y variable will change as a result.

5. Testing: Numerical Y and Categorical X

ANOVA-

ANOVA stands for analysis of variance.

Suitable statistical method when comparing means across various groups.

Steps involve Organize data, performing the ANOVA, performing residual analysis

Kruskal-Wallis Test-

Performed when the underlying assumptions of the ANOVA analysis are not met.

To interpret the output, look at the medians for each group, add the P-value to see if this difference is statistically significant.

Two Sample T-Test-

Method to compare means of two groups.

The p-value can be used to calculate whether the differences of the two means is coincidental, or truly significant. Especially for small samples this is very useful.

Very old test

Forms the building block of many other tests.

6. Testing: Numerical Y and Numerical X

- **Correlation-**

- Index that expresses how strong a relationship between two numerical variables is.
- Zero correlation.
- A positive correlation.
- A negative correlation.

- **Regression-**

four steps- First, we make a fitted line plot to visualize the data.

The actual calculations or performing the main regression analysis is the second step.

The third step is about performing a residual analysis.

Fourth step, we can calculate the prediction interval. This step is optional.

7. Testing: Categorical Y

- **Chi-Square Analysis-**

If Categorical Y and Categorical X.

First step is to make a cross tabulation.

The second step is to take a look at the p-value. The p-value shows, the effect you found is significant or not.

- **Logistic Regression-**

If Categorical Y and Numerical X variable.

First step, we may need to convert data to the correct format.

Second step, we make a fitted line plot and evaluate the quality of the fit.

Final step, we analyse the p-value and see if we have found a significant relationship.

Key Learnings

Analysis of data and interpretation of data using various techniques and
Brief about lean six sigma.

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