

Statistical Analysis of Hospital Data Using MPC

Hill Statement

Hospitals or Analysts can easily analyze different hospitals' data to gain insight into the business and take appropriate actions based on the insights, without compromising on hospitals' data privacy.

Who: Hospitals or Analysts

What: can easily analyze different hospitals' data to gain insight into the business and take appropriate actions based on the insights,

Wow: without compromising on hospitals' data privacy.

Persona

John Wesley



"Good health and good sense are two of life's greatest blessings."

Age: 34
Work: Analyst, Investor
Family: Married, kids
Location: San Jose, CA
Character: Compassionate

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition
Judging	Perceiving

Goals

- Wants to invest in a hospital.
- Wants to analyse hospital's data and invest smartly.
- Wants to make sure that every hospital provides the data for a good analysis.

Frustrations

- Not every hospital is keen to share data due to privacy issues.
- Getting confused in which hospital he should invest.
- Available solution to analyse the data does not guarantee any security on data.

Bio

I am a strong believer of the saying "Health is wealth". I have always emphasized on maintaining a good health to live a better life and have also created a page on social media to make people focus more on their health. Being an analyst, I have analysed a lot of data at work, which instigated me to invest in one of the hospitals. So I want to analyse hospital's data to know which hospital is in need of an investment or which hospital can benefit from it.

Motivation

Health
Growth
Social

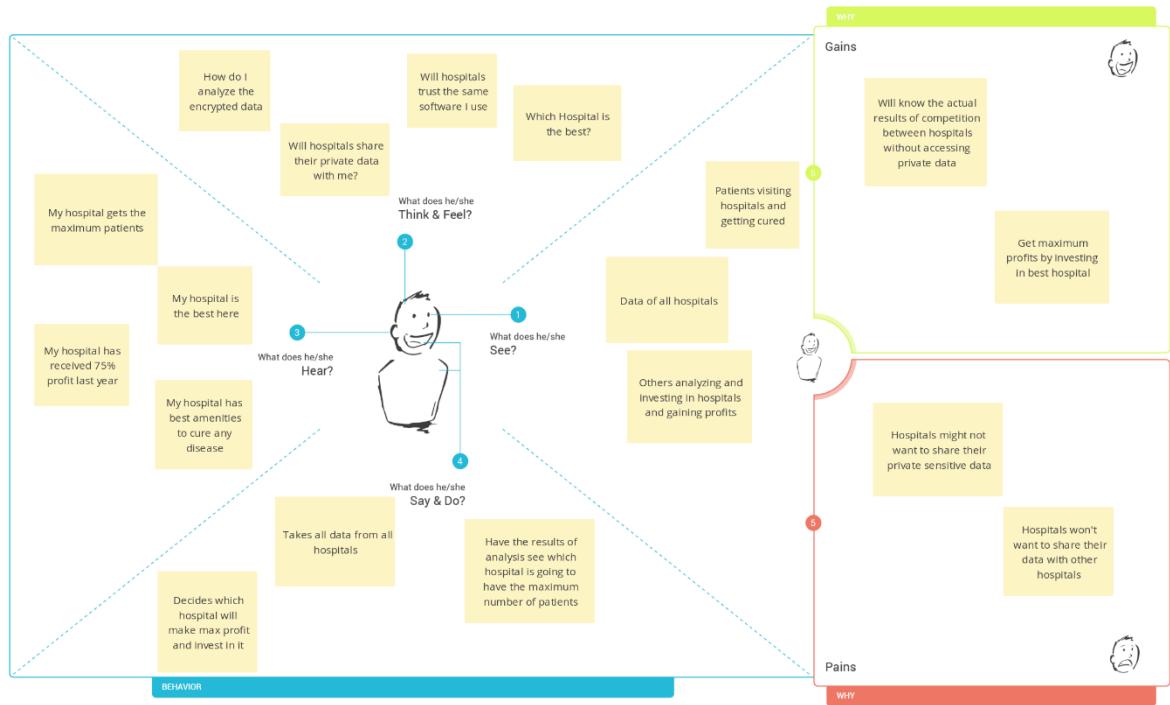
Brands & Influencers



Preferred Channels

Online & Social Media
Health Magazines
CMSWire
Movies

Empathy Mapping



The screenshot shows a landing page for "PatientAlyze". At the top left is the logo "PatientAlyze" with a blue heart rate monitor icon. The top right features navigation links: "About", "Blog", "Contact", and "Login". The main content area has a background image of a doctor's hands wearing a white coat and a stethoscope. Overlaid on this is a smartphone displaying a website for "www.h.hospital.com". The phone screen shows a navigation menu with options like "Home", "Find a Doctor", "Our Centers", and "Contact Us". Below the menu is a section about high-quality medical services and a "Hotline Center" with a phone number. To the right of the phone are three call-to-action boxes: "Keep your private data safe" (with a key icon), "Be aware of upcoming diseases" (with a magnifying glass icon), and "Lead the league of hospitals" (with a trophy icon). A blue button at the bottom left says "SEE HOW IT WORKS". A blue arrow points from this button down towards the text below.

Landing page, giving information and quick run about the product.

What if your hospital wanted to compare its performance with other hospitals and predict its future...
...but at the same time avoid revealing the private data of the patient.

First, you enter the data in into PatientAlyze in an encrypted form.

Your Data

	Patient's Name	Disease Name	Diagnosed On	Completely Cured On	Doctor's Name	Medicines
1	Harry Potter	Diabetes	12/12/99	1/1/02	Voldemort	XYZ
2	Ron Weasely	Lung Cancer	22/03/94	15/12/97	Dumbledore	ABC
3	Hermione Granger	Heart Attack	19/09/07	20/08/08	Black	PQR

Walking through the
instructions

The screenshot shows a web application interface for "PatientAlyze". At the top, there's a navigation bar with links for "About", "Blog", "Contact", and "Login". On the left side, there are vertical labels: "Your Data", "Hospital B", and "Hospital C". Each label corresponds to a table of patient data. The tables have columns for "Patient's Name", "Disease Name", "Diagnosed On", "Completely Cured On", "Doctor's Name", and "Medicines". In "Your Data", there are 3 rows labeled 1, 2, and 3. In "Hospital B", there are also 3 rows labeled 1, 2, and 3. In "Hospital C", there are 3 rows labeled 1, 2, and 3. A blue button labeled "WHAT HAPPENS NEXT?" is visible in the center.

	Patient's Name	Disease Name	Diagnosed On	Completely Cured On	Doctor's Name	Medicines
1	John Doe	Diabetes	12/12/2017	12/12/2017	Dr. Smith	Metformin
2	Jane Doe	Cancer	22/12/2017	22/12/2017	Dr. Johnson	Treatment A
3	Bob Smith	Heart Attack	13/12/2017	13/12/2017	Dr. White	Aspirin

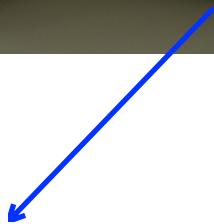
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You cannot see the data of other hospitals and they cannot see yours.

The real values are invisible to PatientAlyze, since the data remains encrypted.

WHAT HAPPENS NEXT?



Walking through the
instruction

The screenshot shows the PatientAlyze dashboard. At the top, there's a navigation bar with links for About, Blog, Contact, and Login. On the left, under 'Analysis', there's a table comparing average patients across three years:

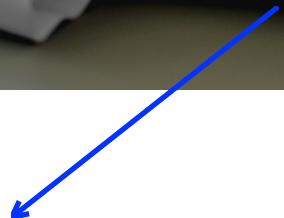
Year	Average Patients	Your Hospital
2016	44563	45234
2017	49876	48643
2018	53125	52789

Below the table is a bar chart titled 'Hospital Analysis' comparing 'Average Patients' (blue bars) and 'Your Hospital' (orange bars) for the years 2016, 2017, and 2018.

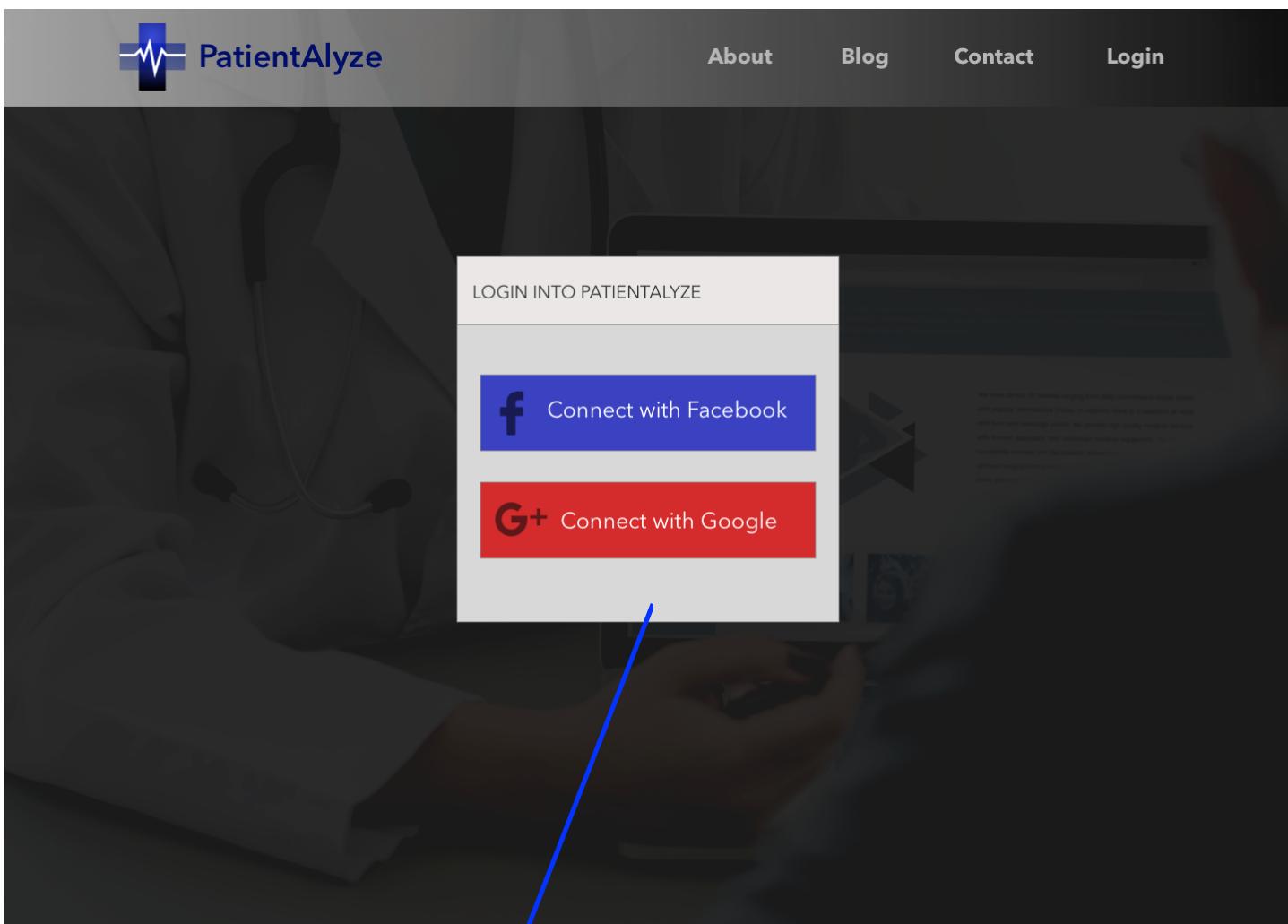
On the right, under 'Future Predictions', is a heatmap showing patient counts by month and age group. The color scale ranges from light purple (representing lower values around 800) to dark red (representing higher values around 2400). The heatmap shows a general trend where patient counts increase over time and are highest in the 30-39 age group.

Even though the data remains unseen to humans and machines,
PatientAlyze was able to analyse the data and present the results.

GET STARTED



Completed the
tutorial, get started
will navigate to login
page.



Connect with
Facebook or Google

The screenshot shows the PatientAlyze dashboard. At the top, there is a navigation bar with links for 'About', 'Blog', 'Contact', and 'Log Out'. On the left, a vertical sidebar contains three options: 'Upload Data' (highlighted in light gray), 'Verify Data', and 'Analyze Data'. The main content area features a large, friendly message: 'Welcome to PatientAlyze. Please upload your hospital's private data to get started.' Below this message is a central upload interface. It features a large cloud icon with an upward arrow, followed by the text 'Drop csv files to upload'. Below this, in a separate box, is the text 'or click here'.

Navigation Bar:

1. Upload Data: Here user can upload csv files.
2. Verify Data: Here user can verify which files he/she has uploaded on what dates.
3. Analyze Data: Here user can see the results of multi party computing.

The screenshot shows the PatientAlyze web application interface. On the left sidebar, there are three buttons: 'Upload Data', 'Verify Data', and 'Analyze Data'. The 'Analyze Data' button is highlighted with a dark grey background. The main content area has a dark background with a faint medical-themed illustration. A large blue arrow points from the bottom of the page towards the heatmap in the center.

Results.

Year	Average Patients	Your Hospital
2016	44563	45234
2017	49876	48643
2018	53125	52789

Hospital Analysis

A bar chart titled 'Hospital Analysis' comparing 'Average Patients' (blue bars) and 'Your Hospital' (orange bars) across the years 2016, 2017, and 2018. The Y-axis represents the number of patients, ranging from 40,000 to 54,000. The X-axis shows the years. In all three years, the average patients are slightly higher than the hospital's count.

Heatmap

A heatmap showing patient distribution by month (Y-axis, from Jan to Dec) and age group (X-axis, from 0-9 to 90-100). The color scale indicates the number of patients, ranging from light purple (low) to dark red (high). The highest patient counts are generally seen in the 30-39 and 40-49 age groups across most months, with a notable peak in May.

Analysis of the data
and predictions for
future which is done
by machine learning.