

**COURSE: INNOVATION AND COMPLEXITY MANAGEMENT – HEALTH
INFORMATICS (HI), SEMESTER 3**

BY: TANMAY CHADHA

TO: DOMINIK BÖHLER

GROUP: FEEDBACKERS (PATIENT FEEDBACK)

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1. CONTEXT: DOMAIN SITUATION:

- Ease in getting feedback is a major domain of the project. Healthcare clinics, health centres, and hospitals dealing with an influx of patients are essentially the stakeholders of the whole project, alongside patients seeking care and treatment.
- Key-user for me personally is the patients seeking care and treatment, alongside healthcare clinics, hospitals etc. The goal is to empower patients with better visualisation of their own data and to provide insights into patients to the clinics and other healthcare providers.
- There were largely two main use cases for our group work. It included healthcare providers like clinics, hospitals, and care centres and secondly patients seeking care and treatment themselves. I choose patients as my use case or target group as better visualization can enable higher transparency and trust amongst users(patients). This can empower patients to choose more wisely which clinic or hospital better serves their needs making them(patients) independent in decision-making. This allows for personalized care and independence among patients. It also facilitates healthcare centres to improve their service quality and diversify those services based on proper evidence-based data visualisation of patient feedback.

2. TRANSLATION:

Tamara Munzner's book "Visualization Analysis and Design" essentially proposes a Data Visualization Framework that consists of a few basic elements:

- Abstraction: Representation of the data in a suitable way for better interpretation. To meet this requirement I used a "horizontal bar graph" to display the patient data relative to particular prompts as it provides clear visualization of the data, allows for easy comparison of multiple data points, is also very space efficient displaying larger amounts of data in a smaller area, lastly, these horizontal bar graphs are quite versatile by accommodating large or small amounts of data.
- Interaction: Providing ways for the user to interact with the data and view different aspects of it. This was achieved by allowing users to directly click on the different sets of my bar graph representation or the pie chart where users can view the percentage of agreement in relation to the feedback question.

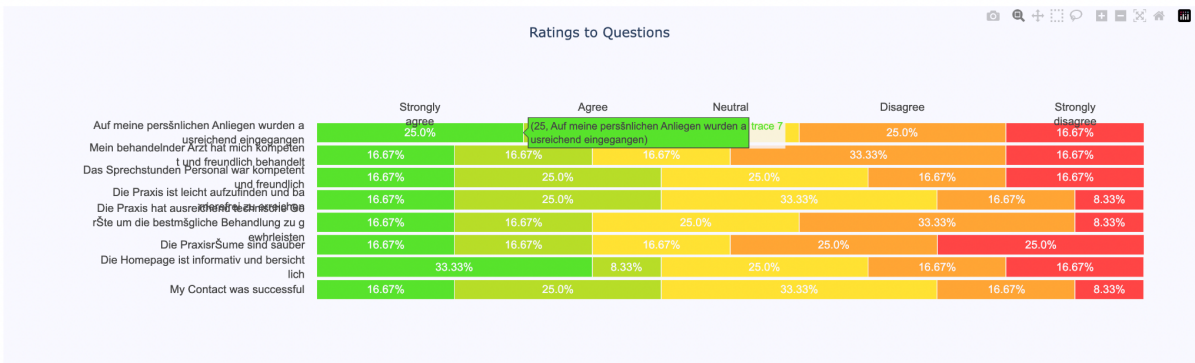
- Layout: Arrangement of the visual elements in a way that makes the data easily understandable. As discussed, in the abstraction section horizontal bar graph was used to easily interpret and understand the data.
- Visual Encoding: Usage of visual cues such as colour, shape, and size to convey any data and
+
- Marks and Channels: Marks essentially represent items or links and channels represent the changes that appear based on attributes. For meeting these requirements I am using different sets of colours in my horizontal bar graph like light green – yellow- dark red the light shades represent a higher level of agreement by the responders to that particular prompt (question) similarly the darker shades of red represent lower levels of agreement to that particular question. For the pie chart, the colour represents a particular way that a particular respondent contacted the healthcare provider, thereby, providing insights into the most and least used platforms for contact. For example in my pie chart visualization, it can be concluded that social media platforms like Facebook or WhatsApp are becoming more popular to be used for contacting the healthcare provider and Fax as a way of contact is becoming less popular.

3. IMPLEMENTATION

Displaying the description of the implementation used:

This application is a visualisation dashboard that takes input data from an excel sheet and uses Plotly Framework in Python to represent the data in the form of charts and graphs.

Feedback Form



Ich habe Kontakt wie folgt aufgenommen



Figure 1: FEEDBACK FORM

Showing the technology stack and architecture used:

- The data is being read from a CSV file which acts as input for the application.
- We are using Python as the base language.
- Plotly framework is used to create individual visualisations.
- Dash framework helps us create a web-based Dashboard to showcase all the visualisations.

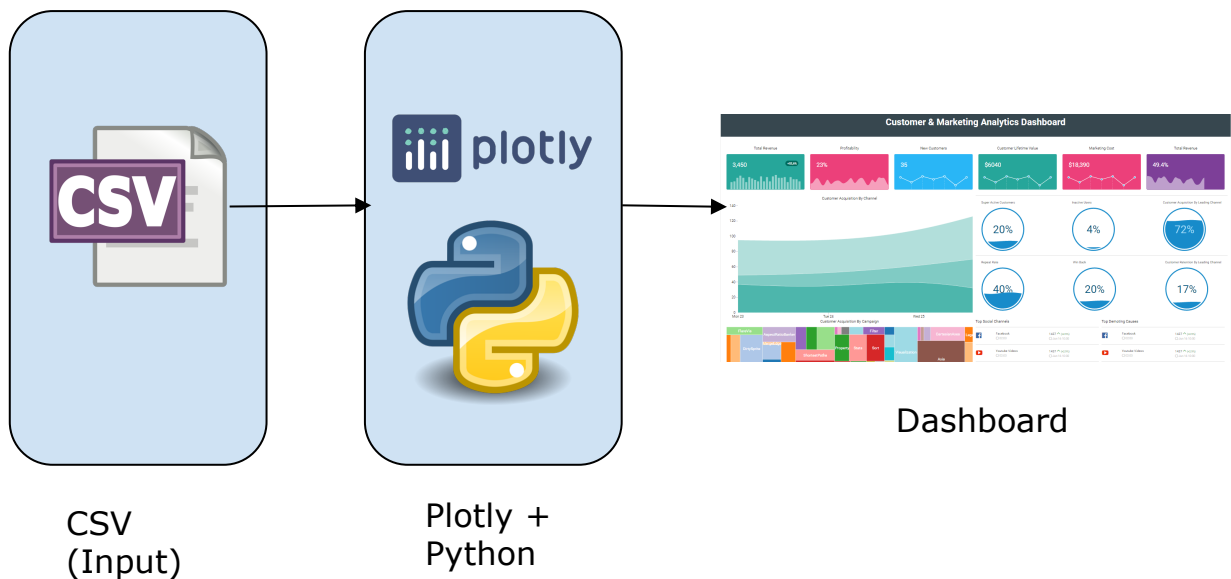


Figure 2: Technology stack

Describing the design choices for each element in detail:

The following are the design choices considered for this project:

1. We are reading CSV data supplied by FHIR
2. This CSV data file is being opened and read using Python Programming Language
3. The CSV data is converted into Python Data Frames
4. Making use of Plotly to create the below set of visualisations:
 - a. Horizontal Bar Graph to display the scores (1-5) for score-based questions - horizontal bar graph" to display the patient data relative to particular prompts as it provides clear visualization of the data, allows for easy comparison of multiple data points, is also very space efficient displaying larger amounts of data in a smaller area, lastly, these horizontal bar graphs are quite versatile by accommodating large or small amounts of data.
 - b. Pie Chart is being used to display the various contact types that the patients have used for contact. I used a pie chart to visualise the contact information data by individual respondents as this provides a quick overview of the relative proportions of each category in contrast to a whole data
5. Dash framework is being used to create a web-based dashboard by making use of HTML and the above Plotly-based charts

AutoSave OFF

TANMAY CHADHA_PATIENT FEEDBACK -- Saved

Home Insert Draw Page Layout Formulas Data Review View Automate Tell me

Paste Calibri (Body) 12 A+ B I U Conditional Formatting Format as Table Cell Styles Insert Delete Sort & Filter Find & Select Analyse Data Sensitivity

Possible Data Loss Some features might be lost if you save this workbook in the comma-delimited (.csv) format. To preserve these features, save it in an Excel file format. Save As...

	B	C	D	E	
1	Ihr Feedback betrifft	Ich habe Kontakt wie folgt aufgenommen	(My Contact was successful)	Die Homepage ist informativ und übersichtlich (The homepage is informative and clear)	Die Praxisräume
2	Praxis (Doctor Practice)	eMail	4		1
3	Praxis	Facebook	3		1
4	Wartezimmer (Waiting Time)	Facebook	4		2
5	Personal	Instagram	2		2
6	Praxis	Whatsapp	2		3
7	Personal (Staff)	Telephone	3		3
8	Personal	Fax	3		3
9	Homepage und digitale Angebote (Homepage and digital offers)	Telephone	5		4
10	Personal	Whatsapp	1		5
11	Personal	eMail	3		5
12	Freies Feedback (nur mit Kontaktangaben möglich) [Free feedback (only possible with contact details)]	Website	4		5
13	Personal	Website	5		5
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15					
16					
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TANMAY CHADHA_PATIENT FEEDBACK

Ready Accessibility: Unavailable

Figure 3: Snapshot of the excel sheet feedback form

Showing the final product in Screenshots of the most important user interactions:

Feedback Form



Figure 4: Snapshot of the most important user interactions

Quality Criteria:

Minimum: Data Visualization of non-real-time data with a custom data structure.

4. TESTING

No tests were performed (e.g., functional, memory, load) as it was not feasible.

5. Roadmap Ahead**Reflecting on the development process and its outcomes: What went well, and what to change.**

- I was able to understand the data given in CSV and with the help of Python and Plotly library, was able to create basic Data Visualisations.
- This helped me enrich my basics of Python and gave me an opportunity to explore open-source frameworks such as Plotly and Dash.
- I would wish to change certain aspects of the data collection like using more professional tools to collect data and diversify the sample.

What are the immediate next steps?

The next set of steps that I can foresee are:

1. Making use of all the data pointers given as input in the excel sheet.
2. Making the dashboard user-interactive by introducing elements such as selectors, date range etc so that Dashboard users can play around with the data over some scale.

What is the vision for the product and its architecture?

The vision of the product is to enable users (i.e. healthcare providers, clinics, hospitals, etc.) to visualise the feedback given by the patients and take better, evidence-based and more informed decisions quickly. The vision also includes using other programming languages and increasing the sample size and diverse selections of questions for the data collection to improve the accuracy of data visualisations.

