Project Design Phase-I - Problem-Solution Fit

Project Title: Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation **Team ID: PNT2022TMID37351**

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

- Patients
- Having sign of irregular heartbeat

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

- Need of experts
- Reliability of technology
- Budget issues

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem
or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

The algorithms used for arrhythmia classification incorporate deep learning features where classification becomes complicated when class overlap or imbalances occur together.

Explore AS, differentiate

Focus on J&P. tap into BE. understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

Detection alone requires some time along with that classification needs too much time in manual detection. Requires efficient cardiac specialist even for detection of irregular rhythm.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

WHO states that cardiac diseases are number one cause of death today. Arrhythmia means irregularity in the rhythm of heartbeat which leads to fatal issues in form of sudden cardiac arrest.

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?

i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. G

The problem of arrhythmia is directly connected to patients. When the patients feel irregularity in the rhythm or any other discomfort he or she should consider the impact and take measures.
Since it is related to health they must approach faster and accurate detection methods by searching thoroughly.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS

TR

What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.

The point that triggers the customers are that there is no need for anyone's assistance and handy approach.

4. EMOTIONS: BEFORE / AFTER

EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Before: Anxious, helpless, Seeking assistance.
After: Secured, Relief from time constraints, affordable.

10. YOUR SOLUTION

SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

ECG test is a simple and cost effective method, therefore for detection purposes we use trending technology which is deep learning methods such as 2D Convolutional neural network model with 8 common classes of classification. It was developed with more accuracy, reliability and faster in application.

8. CHANNELS of BEHAVIOUR

CH

8.1 ONLINE

What kind of actions do customers take online? Extract online channels from #7

8.2 OFFLINE

What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

Offline: Customers need to take ECG test to obtain the waveform of heart rhythm.
Online: Need to upload those waveform images in the developed model to find out the presence of arrhythmia and its classification.

Identify strong TR & EM