

Project Design Phase-I Problem – Solution Fit Template

Date	1 October 2022
Team ID	PNT2022TMID00644
Project Name	Project – Classification of Arrhythmia using Deep learning with 2D ECG spectral image representation
Maximum Marks	2 Marks

Problem – Solution Fit :

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why

Purpose:

- ☐ Solve complex problems in a way that fits the state of your customers.
- ☐ Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- ☐ Sharpen your communication and marketing strategy with the right triggers and messaging.
- ☐ Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.
- ☐ Understand the existing situation in order to improve it for your target group.

Template:

Project Title: Classification of Arrhythmia using Deep Learning with 2-D ECG Spectral Image Representation

Project Design Phase-I - Problem Solution Fit

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Define CS, fit into CC	1. CUSTOMER SEGMENT(S) <small>Who is your customer? i.e. working parents of 0-5 y.o. kids</small> <div style="text-align: center;">Patients are customers here</div>	6. CUSTOMER CONSTRAINTS <small>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.</small> <ul style="list-style-type: none"> Need of experts Budget problem 	5. AVAILABLE SOLUTIONS <small>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</small> The algorithms used for arrhythmia classification incorporate preprocessing, feature extraction, and classification. Classification becomes complicated when class overlap and class imbalance problems occur together	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS <small>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.</small> The problem here is classification of arrhythmia takes more time and requires experts. It can't be done anytime by anyone	9. PROBLEM ROOT CAUSE <small>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.</small> Arrhythmia means heart is not beating properly. This can cause anything to form cardiac arrest to death.	7. BEHAVIOUR <small>What does your customer do to address the problem and get the job done? (Directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)</small> The problem of arrhythmia is directly connected to patient. When he/she feels irregular heartbeat or any breathing issues he can address the issue.	
Identify strong TR & EM	3. TRIGGERS <small>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</small> The point that triggers the customers to use this is that it doesn't require anyone's assistance.	10. YOUR SOLUTION <small>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.</small> The ECG signals can capture the heart's rhythmic irregularities, commonly known as arrhythmias. We propose a two-dimensional (2-D) convolutional neural network (CNN) model for the classification of ECG signals into eight classes; namely, normal beat, paced beat, right bundle branch block beat, left bundle branch block beat, atrial premature contraction beat, ventricular flutter wave beat, and ventricular escape beat.	8. CHANNELS OF BEHAVIOUR 8.1 ONLINE <small>What kind of actions do customers take online? Extract online channels from #7</small> 8.2 OFFLINE <small>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</small> <ul style="list-style-type: none"> Users need to upload of image of the ECG. Patients need to undergo scan to get images of the heartbeat. 	Identify strong TR & EM

<div>4. EMOTIONS: BEFORE / AFTER</div> <div>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.</div> <div>EM</div> <div><p>Before: The patients need to take an appointment with the doctor and wait for long time.</p><p>After: It is not required for the patients to wait for long time. If they have their ECG report, the work is almost done.</p></div>		
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