Project Design Phase-I - Solution Fit Template

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

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1. CUSTOMER SEGMENT(S) CS

Who is your customer?

Our potential customers include Doctors,radiologists and nurses.

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions?

Hardware complexity, Budget, Time consuming process in training the model
are the constraints that prevent customers from making actions.

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem or need to get the job

Artificial neural networks (ANNs) :

Pros: Good fault tolerance and ability to parallel processing

Cons: Require lots of computational power and lesser accuracy of 90.6%

Support vector machines (SVMs) :

Pros: Best algorithm when classes are separable and suitable for extreme case binary classification

Cons: Training time is higher and does not perform well when target classes re overlapping

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

Which jobs-to-be-done (or problems) do you address for your customers?

To deal with patients suffering from Cardiovascular diseases (CVDs) such as Tachycardia, Bradycardia , Diabetes, High BP, Hyperthyroidism etc.

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?

To improve accuracy. Feed-forward neural network has an accuracy of 96.95%, 1-D CNN model has an average accuracy of 97.03% but our proposed model has an accuracy of 98.06%.

7. BEHAVIOUR BE

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

Our customer opt for efficient algorithm to address the problem and get the job done.

3. TRIGGERS TR

What triggers customers to act?

Prompts other doctors to use by seeing their fellow doctors using it in their hospitals.

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?

The customers feel unreliable and time consuming which is overcome in our model which makes them feel reliable and satisfied thereby saving their time

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 behavior.

1. Spectrograms (2-D images) are employed, which are generated from the 1-D ECG signal using STFT. In addition, data augmentation was used for the 2-D image representation of ECG signals.

2. A state-of-the-art performance was achieved in ECG arrhythmia classification by using the proposed CNN-based method with 2-D spectrograms as input.

Our solution is to perform fine tuning with large database to achieve higher accuracy and robustness

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE

What kind of actions do customers take online?

Mobile app and website.

8.2 OFFLINE

What kind of actions do customers take offline and use them for customer development?

Newspaper advertisement .