PROJECT DESIGN PHASE – 1 TEAM ID:PNT2022TMID52366

Project Title - Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy

PROBLEM SOLUTION FIT

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| **Deﬁne CS, ﬁt into CC** | **1. CUSTOMER SEGMENT(S) CS**  Who is your customer?   * People with diabetic issues * Clinics * Hospitals | **6. CUSTOMER CONSTRAINTS CC**  What constraints prevent your customers from taking action or limit their choices  of solutions?   * Unawareness of the seriousness of the issue * The diabetic retinopathy may cause no symptoms at In its earliest stages, They initial symptoms may be barely noticeable or mild. But as time goes on it causes blurry vision and loss of eyesight | **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?   * To identify the disease by retinal eye exam, diabetic eye screening | **Explore AS, differentiate** |
| **Focus on J&P, tap into** | **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.   * + Should provide a fundus image of the patient as input   + The model will provide the stage level of disease of the patient too if they are diagnosed as infected, otherwise they will be declared as normal   + This model can detect the infection of diabetic retinopathy from early-to-late stages with all clinical grades of the customer | **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.   * Diabetic retinopathy is a state which is due to the damage of blood vessels of the retina. Considering the fact that Retina is the sensitive part it can result in blurry, less intense eye sight and it can also result in disappearing of eye sight. The diabetic retinopathy may cause no symptoms at In its earliest stages, They initial symptoms may be barely noticeable or mild. As time goes on, the state of this issue can worsen and lead to partial and then complete blindness to the individual which must be taken care of beforehand to get better at early stages. Thus early detection of the diabetic retinopathy is highly recommendable. | **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. Greenpeace)   * Visit eye doctors * Search in internet about the symptoms they face | **Focus on J&P, tap int C** |
| **Identify strong TR & EM** | **3. TRIGGERS TR**  What triggers customers to act? i.e., seeing their neighbors installing solar panels, reading about a more efﬁcient solution in the news.   * High blood sugar due to diabetes * Blurriness in vision | **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.  To avoid complication due to late identification of the disease, we develop a deep learning system that can detect early-to-late stages of diabetic retinopathy by using Fundus images as dataset for training and testing the model. The deep learning models like Resnet-50, Alexnet , VGG16, Google-Net, U-Net are under study as of now. After completion of data pre-processing, the model will be trained and tested using the dataset Images | 1. **CHANNELS OF BEHAVIOUR CH**     1. **ONLINE**   What kind of actions do customers take online? Extract online channels from #7   * Searching about the symptoms the face * Remedies on websites   1. **OFFLINE**   What kind of actions do customers take ofﬂine? Extract ofﬂine channels from #7 and use them for customer development.   * Visiting eye doctors * Undergoing eye exams | **Extract online & ofﬂine CH of BE** |
| **4. EMOTIONS: BEFORE / AFTER EM**  How do customers feel when they face a problem or a job and afterwards?    Emotions Before: Blurriness of vision and the fear of loss of eyesight might be experienced causing the person to lack in confidence  Emotions After: knowing the reason and the stage of infected level  of the disease helps in right treatment for the patient and help in moving on |

i.e. lost, insecure > conﬁdent, in control - use it in your communication strategy & design.