PROPOSED SOLUTION DOCUMENT

NOVELTY

Compared to the conventional method that requires the patient to visit the doctor's office physically to test for chronic kidney disease, this solution using machine learning helps notice any patterns present once information regarding the patient is given. It is not a replacement to a doctor, however, it gives the opportunity for more patients to check if they are likely to have CKD since they can access this tool online. There many symptoms and features that effect the likeliness of having CKD, so using a ml tool that can track these said symptoms for a large crowd can help establish which symptoms are stronger indicators.

FEASIBILITY OF IDEA

Considering that there is already a large dataset on the internet for chronic kidney disease, it is very feasible to implement this solution. Having a reliable dataset to work with makes it easier to implement a model and train it. There are multiple online tools and virtual GPUs that make it even more easier to compute large volumes of data during the training of the model. Since the data is labelled as well, the testing and validation process will not be very long. Along with the onlines support tools to use ml models, it is feasible to make the product given the allocated time and resources.

BUSINESS MODEL

Business Model Canvas for Chronic Kidney Disease Predictor

<table>
<tr>
<td rowspan="2">Key Partners

- Renowned medical institutions to check accuracy
- Multiple medical centres sharing information regarding CKD (to train the model)
- Experts in the field to help verify the information on website is up to date</td>
<td>Key Activities

- Predicts percentage likelihood of having CKD taking in inputs such as BP, age, bmi etc.
- Uses ml models to train the model that helps prediction</td>
<td rowspan="2">Value Propositions

- To predict the likeliness a person suffers from chronic kidney disease (CKD)
- Convenience to check for CKD from home - increases awareness in a sense.
- Used by medical professors, can help do further tests in case diagnosis of CKD is missed</td>
<td>Customer Relationships

- Friendly UI which will make the customer not be vary
- Partnership with renowned instituitions mentioned in website to increase reliability
- Concise and expert- level advise on what to do with the results optained so customers not intimidated to use site.</td>
<td rowspan="2">Customer Segments

- General people who are worried about symptoms
- Person with CKD history in the family
- Hospital staff can use the model too to consider CKD a possibility in case it isn't suspected.</td>
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<td>Key Resources

-Server to handle requests from multiple clients
- GPU to train a large dataset</td>
<td>Channels

- Online website
- Inbuilt tool to be used by medical institutions</td>
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<td colspan="3">Cost Structure

- Money spent to get a GPU. Might require more GPU power with time so the cost may vary
- Cost of establishing a server that can host the website. This is another varied cost.
- The fixed cost of buying datasets if required.
- Cost to pay experts who will give advice</td>
<td colspan="2">Revenue Streams

- Main revenue will be from advertisers on the website.
- Donations
- Government aid
- Hospitals if they want to buy the model and implement it into their system</td>
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SOCIAL IMPACT

It comes in handy for those who find it difficult to visit the doctor and schedule an appointment and also those who are hesitant to visit hospitals due to covid. One can determine the likelihood of a user having a certain chronic disease based on the input provided. With early detection of chronic disease, people can start taking preventive measures to diagnose themselves. To make it more convenient, recommendations and treatments from a neighborhood doctor are also provided.

SCALABILITY OF SOLUTION

Since this is an ML-based solution, scalability can be achieved by combining Statistics, and Data Mining into flexible, scalable tec hniques. Since the CPUs are not ideal for large-scale machine learning, and they can quickly turn into a bottleneck because of the sequential processing nature, GPUs, which contain hundreds of embedded ALUs, are a very good choice to benefit by leveraging parallelized computations. Using a hyperparameter optimization strategy to select the best (or approximately best) hyperparameters to minimize the loss function is also another way to improve scalability.