PARKINSON'S DISEASE APPLICATION

BUSINESS MODEL AND FINANCIAL REPORT

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ABSTRACT

This abstract presents a newly developed business model that focuses on addressing the widespread and incapacitating neurodegenerative condition known as Parkinson's Disease (PD). Parkinson's disease (PD), a condition that affects a significant number of individuals globally, initially manifests as neurological symptoms such as freezing of gait, impaired balance, and instances of falling. Over time, the disease progresses to encompass additional nonmotor manifestations that affect various systems within the body. The model has been specifically developed to cater to households that include elderly individuals, who are particularly affected by Parkinson's disease (PD), as well as individuals with a familial predisposition to PD, as they face an increased susceptibility to the condition.

The underlying framework of the business model is centered on a hierarchical structure of healthcare services, encompassing three distinct tiers: early detection, symptom analysis, and personalized recommendations for patients. The utilization of sophisticated machine learning and Deep Learning methodologies enables a thorough examination of gait patterns and the provision of instantaneous guidance. The utilization of technology in the provision of PD care facilitates both timely identification and continuous monitoring of symptoms, thereby playing a crucial role in the effective management of disease progression. The recommendation system offers tailored lifestyle guidance to individuals impacted by the condition, assisting them in effectively managing their circumstances.

The primary objective of this project is to provide a comprehensive service that encompasses all phases of Parkinson's disease (PD), offering substantial assistance to individuals impacted by the condition, their families, and individuals with an elevated susceptibility to developing the disorder. The integration of artificial intelligence methodologies and individualized care approaches presents a promising framework for augmenting the quality of life for individuals impacted by Parkinson's Disease.

PROBLEM STATEMENT

Parkinson's Disease (PD) is a widespread neurodegenerative disorder that affects millions worldwide, with symptoms such as freezing of gait, disordered balance, and falls, and progressively involving systemic nonmotor manifestations. This project addresses the need for early detection, continuous symptom monitoring, and personalized lifestyle advice for PD patients. Specifically, it aims to serve senior citizens and individuals with a genetic predisposition to PD, who are at a heightened risk. The challenge is to leverage advanced machine learning and deep learning techniques to create a holistic, effective, and personalized healthcare service for all stages of the disease.

AN INSIGHT INTO TARGET MARKET

The target market for a Parkinson's Disease (PD) project like the one described primarily consists of senior citizens and individuals with a genetic history of PD, due to their elevated risk. This translates into a large, global market given that PD affects millions worldwide.

Demographically, the incidence of PD increases with age, predominantly affecting individuals over the age of 60. However, approximately 4% of people with PD are diagnosed before age 50, indicating a smaller subset of younger patients. Men are 1.5 times more likely to have Parkinson's Disease than women, making them a significant demographic in this market. Geographically, PD is a global concern, but higher prevalence is observed in North America and Europe.

Individuals with a genetic history of PD form a distinct segment within the target market. Familial cases, where two or more family members are affected, account for 15-25% of all individuals with PD, underlining the significance of genetic predisposition.

In terms of treatment costs, the Parkinson's Foundation estimates that the combined direct and indirect cost of Parkinson's, including treatment, social security payments, and lost income, is nearly $52 billion per year in the United States alone. Medications can cost an individual up to $2,500 per year, and therapeutic surgery can cost up to $100,000 per person.

As the disease progresses, patients may also require physical therapy, occupational therapy, and speech-language pathology services, which increase the overall cost. Further, caregiver costs and home modifications to accommodate the patient's needs also add to the total expenditure.

Therefore, a business model like the one described in the project, which aims at early detection, symptom analysis, and providing lifestyle recommendations, has the potential to significantly reduce these costs by delaying disease progression, reducing hospitalization rates, and improving the quality of life for PD patients.

PARKINSON’S DISEASE: ITS EFFECT IN INDIA

Parkinson's Disease (PD) presents a significant public health challenge in India, with an estimated prevalence of 70-250 per 100,000 in the elderly population. The actual figure is thought to be much higher due to underdiagnosis, particularly in rural areas. Given the rapidly aging population in India, the number of PD patients is likely to increase significantly in the coming years.

The treatment of PD in India is complicated by a number of factors. Firstly, there's a shortage of trained neurologists, particularly in rural areas where the majority of the Indian population resides. This leads to delayed diagnosis and management of the disease. Secondly, India lacks a

systematic, nationwide PD registry, which hinders accurate estimation of disease prevalence and the allocation of necessary healthcare resources.

Thirdly, the stigma associated with neurodegenerative disorders in India can lead to social isolation of patients, compounding the physical challenges they face. Finally, long-term management of PD requires a multidisciplinary approach involving neurologists, physiotherapists, occupational therapists, and speech therapists, among others. Such teams are often absent in primary and secondary care centers in India.

As for the cost, treatment of PD can be expensive, especially given the chronic nature of the disease and the need for lifelong medication. The cost of medication can range from INR 10,000 to INR 25,000 per month ($130-$340 USD approximately as of the last conversion rate prior to my knowledge cutoff in 2021), depending on the stage of the disease and the drugs prescribed. This cost may be higher for those requiring advanced treatments like Deep Brain Stimulation (DBS). It's important to note that these costs can place a significant economic burden on patients and their families, particularly those from lower-income groups.

In summary, PD in India is a substantial concern, with numerous challenges in diagnosis, management, and treatment due to systemic healthcare issues. While some strides have been made in recent years, there is an urgent need for better awareness, infrastructure, and affordable treatment options.

TARGET MARKET SPECIFICATIONS:

1.Patients with Parkinson's Disease: The primary target market for the application would be individuals diagnosed with Parkinson's Disease. This includes people of different ages and backgrounds who are living with the condition and seeking tools to manage their symptoms effectively.

Symptom Tracking: The application allows patients to track their symptoms over time, providing insights into the progression of the disease and helping them identify triggers or patterns.

Medication Reminders: By sending timely reminders, the app ensures that patients adhere to their medication schedule, reducing the risk of missed doses and improving treatment effectiveness.

Exercise Guidance: The app provides tailored exercise routines and demonstrations to improve mobility, balance, and overall physical well-being, empowering patients to actively manage their symptoms.

2.Caregivers and Family Members: In addition to patients, caregivers and family members of Parkinson's Disease patients are also an important target market. They often play a crucial role in supporting and assisting patients in their daily activities. An application that provides information, resources, and tools for caregivers can be beneficial.

Support Network: The application facilitates connections with other caregivers and family members, providing a supportive community where they can share experiences, exchange advice, and find emotional support.

Education and Resources: Caregivers can access educational materials, tips, and resources within the app to enhance their understanding of Parkinson's Disease and learn effective caregiving techniques.

Medication Management: The app helps caregivers keep track of medication schedules, enabling them to assist patients in adhering to their treatment plan and ensuring the right medications are administered at the right time.

3.Healthcare Professionals: Healthcare professionals, including neurologists, physical therapists, and occupational therapists, are an essential target market. They can utilize the application as a supplementary tool for monitoring patients' symptoms, tracking progress, and providing personalized care recommendations.

Remote Monitoring: The application enables healthcare professionals to remotely monitor patients' symptoms and treatment progress, allowing for more frequent and efficient check-ins without the need for in-person visits.

Data Analysis: The app provides data analytics and visualizations of patients' symptom data, aiding healthcare professionals in making informed decisions about treatment adjustments or interventions.

Communication and Collaboration: The app serves as a platform for seamless communication between healthcare professionals, patients, and caregivers, facilitating information exchange, progress updates, and collaborative care planning.

4.Researchers and Scientists: Researchers and scientists working in the field of Parkinson's Disease can also benefit from an application that provides access to relevant research articles, clinical trials, and data analysis tools. Such features can aid in advancing knowledge and developing new treatments for the disease.

Access to Research: The application provides researchers with access to relevant research articles, clinical trials, and scientific literature, supporting their work in advancing knowledge and understanding of Parkinson's Disease.

Data Collection: Researchers can collaborate with the app to collect anonymous and aggregated data from a large number of patients, contributing to research studies and the development of new treatment approaches.

Real-time Insights: The app's data analytics capabilities provide researchers with real-time insights into symptom patterns, treatment responses, and demographic trends, helping them identify potential areas for further investigation.

OTHER SECTORS OF BUSINESS:

Apart from the primary target segments of patients, caregivers, healthcare professionals, and researchers, a Parkinson's Disease application can have additional business sectors and opportunities. Here are a few potential areas where the application can expand its reach:

1. Pharmaceutical Companies and Clinical Trials:

- Partnership Opportunities: Pharmaceutical companies specializing in Parkinson's Disease medications can collaborate with the application to provide information about their products, clinical trials, and treatment advancements. This can create opportunities for sponsored content, research partnerships, and increased visibility for new therapies.

- Clinical Trial Recruitment: The application can help facilitate recruitment for clinical trials by providing information about ongoing trials, eligibility criteria, and the option for interested patients to express their interest or participate directly within the app.

2. Assistive Device Manufacturers:

- Integration with Wearable Devices: The application can integrate with wearable devices specifically designed for Parkinson's patients, such as smartwatches or specialized motion sensors. This integration can provide additional data for symptom tracking, movement analysis, and personalized feedback, enhancing the overall functionality and user experience.

- Partnership and Promotion: The app can partner with assistive device manufacturers to promote their products within the application, offering targeted advertisements, product recommendations, or exclusive discounts to app users.

3. Telehealth and Remote Care Providers:

- Telehealth Integration: The application can integrate telehealth features, allowing patients to schedule virtual appointments with healthcare professionals, conduct remote consultations, and receive personalized care recommendations without the need for in-person visits.

- Remote Monitoring and Alerts: The app can enable real-time remote monitoring of patients' symptoms and health data, alerting healthcare providers or caregivers of any significant changes or potential emergencies. This can enhance safety and enable proactive care management.

4. Non-Profit Organizations and Support Groups:

- Partnerships and Sponsorship: The application can partner with Parkinson's Disease non-profit organizations and support groups to provide resources, fundraising opportunities, and community engagement initiatives. This collaboration can help raise awareness, access funding for app development, and contribute to research and advocacy efforts.

- Volunteer Programs and Community Events: The app can facilitate volunteer programs, allowing users to contribute their time, expertise, or personal stories to support others in the Parkinson's community. It can also promote and organize community events, such as fundraising walks, support group meetings, or educational seminars.

By exploring these additional business sectors, a Parkinson's Disease application can expand its reach, offer more comprehensive services, and establish strategic partnerships to support the diverse needs of the Parkinson's community while generating additional revenue streams.

PATENTS AND GOVT CONDITIONS

Patents:

- Novelty and Inventiveness: To obtain a patent for a Parkinson's Disease application, it must meet the criteria of novelty, meaning it should have not been disclosed or publicly available before. Additionally, the application should demonstrate inventiveness, meaning it involves a new and non-obvious technical solution or improvement compared to existing solutions.
- Patentability Search: Conducting a patentability search can help determine if there are existing patents or prior art that may affect the patentability of the application. This search helps ensure the uniqueness of the invention and avoids potential infringement issues.
- Patent Application Process: To protect the application, you would typically need to file a patent application with the relevant patent office. This process may involve drafting a detailed application, including claims, specifications, and drawings, and working closely with a patent attorney or agent to navigate the legal requirements.

Government Regulations and Compliance:

- Medical Device Regulations: If the Parkinson's Disease application includes medical device functionalities, it may need to comply with specific regulations set by government agencies responsible for medical device approval. These regulations can vary by jurisdiction and typically involve safety, effectiveness, and quality requirements for medical devices.
- Data Privacy and Security: As the application may handle sensitive health information, compliance with data privacy and security regulations is crucial. Ensure that the app adheres to applicable laws.
- Ethical Considerations: Developing a medical application requires careful consideration of ethical aspects, such as ensuring informed consent, maintaining patient confidentiality, and respecting user rights. Following ethical guidelines and obtaining necessary approvals from ethics committees or institutional review boards (IRBs) may be required.

PROTOTYPE SELECTION

Identifying and maintaining records of affected members or people at risk :

The initial step is to maintain a log of the patient, including the latest updated health parameters,

mood logs, and multiple other minor details.

Thereafter, the app redirects the user based on the category the app caters to.

Affected PD patients:

• Recommender Systems are used to give real-time notifications and tips on lifestyle of patients.

• Regulated music therapy is implemented for emotional management.

• Supervised Machine Learning is employed for automatic sleep scheduling based on previous logs of sleep and daily activity patterns.

• Mood Tracking is used with short term entries, mapping out overall patterns of behavior for diagnostic purposes.

Symptoms initially being observed in patients:

• Gait Analysis is performed using Machine Learning

• Necessary medical information is automatically suggested to consumer

• Online consultation services are provided with expert doctors

• Checkup scheduling is done for those opting for frequent examination

Patients believed to be at risk of having PD:

• Analysis and Prediction using reported symptoms

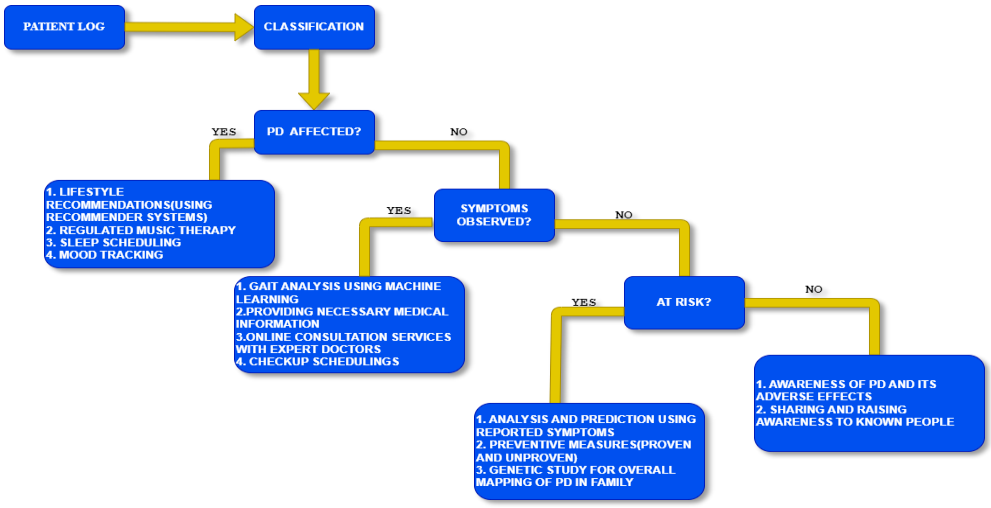
• Preventive measures (proven and unproven)

• Genetic study of overall mapping of PD in the family

Consumers who do not fall in the aforementioned categories:

• Awareness of Parkinson's Disease is raised with its adverse effects.

• Consumers are encouraged to share and raise awareness to elderly people they may know.



Prototype Description: Parkinson's Disease Prediction and Gait Analysis

The prototype aims to develop a system that combines machine learning algorithms with gait analysis techniques to predict the risk of Parkinson's disease and provide insights into gait abnormalities associated with the condition. The prototype consists of the following components:

1. Data Acquisition:

- Wearable Sensors: Utilize wearable sensors, such as accelerometers and gyroscopes, to capture motion data during walking or gait activities.

- Gait Analysis System: Incorporate a gait analysis system that can measure various gait parameters, including stride length, cadence, step time.

2. Machine Learning Models:

- Model Development: Trained a machine learning model XGBOOST. The models will learn to identify Parkinson's disease.A gait analysis is also done,it can be used in sensors.

3. User Interface and Visualization:

- Dashboard Interface: Develop a user-friendly dashboard or mobile application that allows individuals to input their gait data and receive predictions and visualizations of their gait characteristics.

- Gait Analysis Reports: Generate comprehensive reports highlighting gait abnormalities, comparisons with healthy individuals, and the predicted risk of Parkinson's disease.

The three main features that exist in this prototype are:

1. Feasibility:

Developing a prototype for Parkinson's disease prediction and gait analysis is technically feasible. There have been advancements in the field of medical research and data analysis, including machine learning and AI algorithms, that can be leveraged for this purpose. However, it is important to ensure access to relevant data sources, such as patient records and gait analysis data, to train and validate the predictive models accurately. This project can be developed and deployed within a year as SaaS (Software as a Service) to use.

2. Viability:

Parkinson's disease is a chronic neurodegenerative disorder that affects a significant number of individuals worldwide. The ability to predict and analyze gait patterns can contribute to early detection, monitoring, and personalized treatment plans for Parkinson's patients. With an aging population and increasing awareness about Parkinson's disease, there is a potential market for a prototype that focuses on prediction and gait analysis. Collaborating with medical professionals, research institutions, and Parkinson's disease foundations can help validate the viability of the prototype and ensure its relevance in the healthcare industry.

3. Monetization:

There are several monetization models that can be considered for a Parkinson's disease prediction and gait analysis prototype. These include:

a) Licensing Model: The prototype can be licensed to medical institutions, hospitals, or clinics, which can then offer the prediction and gait analysis services to their patients. The licensing fee can be based on factors such as the number of patients or the level of usage.

b) Subscription Model: The prototype can be offered as a subscription-based service, where healthcare providers or individual users pay a recurring fee to access the prediction and gait analysis capabilities. The subscription fee can be determined based on the features, usage limits, and support provided.

c) Partnerships and Collaborations: The prototype can be integrated into existing healthcare systems or platforms through partnerships with medical technology companies or healthcare service providers. This can involve revenue-sharing agreements or licensing arrangements that allow the prototype to reach a larger user base.

By considering these factors, conducting thorough market research, and seeking expert input from medical professionals and stakeholders, you can increase the feasibility, viability, and monetization potential of a prototype related to Parkinson's disease prediction and gait analysis.

The prototype aims to provide individuals with early detection and risk prediction for Parkinson's disease based on gait analysis. It can serve as a screening tool for individuals at risk or support healthcare professionals in diagnosing and monitoring the condition. The gait analysis component provides valuable insights into specific gait characteristics associated with Parkinson's disease, aiding in treatment planning and monitoring disease progression.

SMALL SCALE CODE IMPLEMENTATION

CLASSIFICATION

This Parkinson's dataset comprises biomedical voice measurements from 31 individuals, 23 of whom have Parkinson's disease (PD). The dataset consists of 195 voice recording instances, each represented by a row in an ASCII CSV file format. Each row holds data from one voice recording, with about six recordings per patient. The 'name' column represents the ASCII subject name and recording number, serving as an identifier for the patient and recording instance.

The parameters within the dataset are various voice measures. These include 'MDVP:Fo(Hz)', 'MDVP: Fhi(Hz)', and 'MDVP:Flo(Hz)', which represent the average, maximum, and minimum

vocal fundamental frequency, respectively. There are several measures of variation in the fundamental frequency, including 'MDVP: Jitter(%)', 'MDVP:Jitter(Abs)', 'MDVP:RAP', 'MDVP:PPQ', and 'Jitter:DDP'. The dataset also includes measures of variation in amplitude such as 'MDVP:Shimmer', 'MDVP:Shimmer(dB)', 'Shimmer:APQ3', 'Shimmer:APQ5', 'MDVP:APQ', and 'Shimmer:DDA'. The ratio of noise to tonal components in the voice is represented by 'NHR' and 'HNR'. The 'status' column indicates the health status of the subject, with 1 for PD and 0 for healthy. Two nonlinear dynamical complexity measures are included as 'RPDE' and 'D2', along with the signal fractal scaling exponent 'DFA'. Finally, 'spread1', 'spread2', and 'PPE' are three nonlinear measures of fundamental frequency variation.

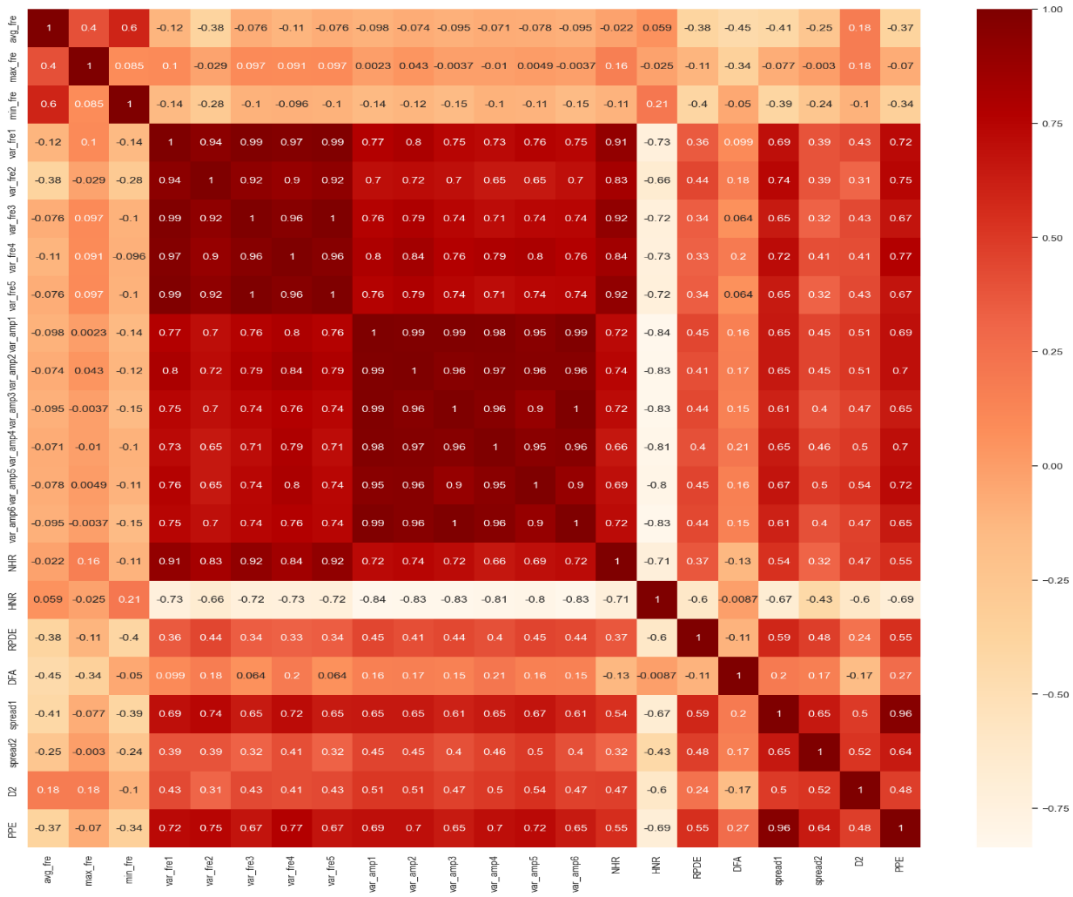
The data, after cleanup and preprocessing, is as follows:

Out[13]:

	avg_fre	max_fre	min_fre	var_fre1	var_fre2	var_fre3	var_fre4	var_fre5	var_amp1	var_amp2	...	var_amp6	NHR	HNR	status	RPDE	DFA	spread1
0	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
1	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
2	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
3	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
4	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
190	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
191	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
192	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
193	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True
194	True	True	True	True	True	True	True	True	True	True	...	True	True	True	True	True	True	True

195 rows × 23 columns

We correlate between all features to obtain a heatmap as follows:



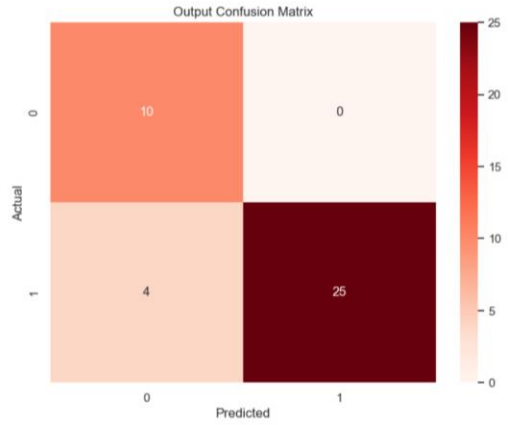
Data features are scaled between -1 and 1 to centralize the data, and is split into test and train dataset by standard 0.8-0.2 division.

XGBoost is trained thereafter:

```
In [26]: # Train the model
         from xgboost import XGBClassifier


         model=XGBClassifier()
         model.fit(xtrain,ytrain)
         predict=model.predict(xtest)

In [29]: print(accuracy_score(ytest,predict)*100)

         89.74358974358975
```

We receive an accuracy of 89.74%,thus showing that XGBoost works very efficiently in handling multiple features for classification of this disease. This is further shown in the confusion matrix as follows:

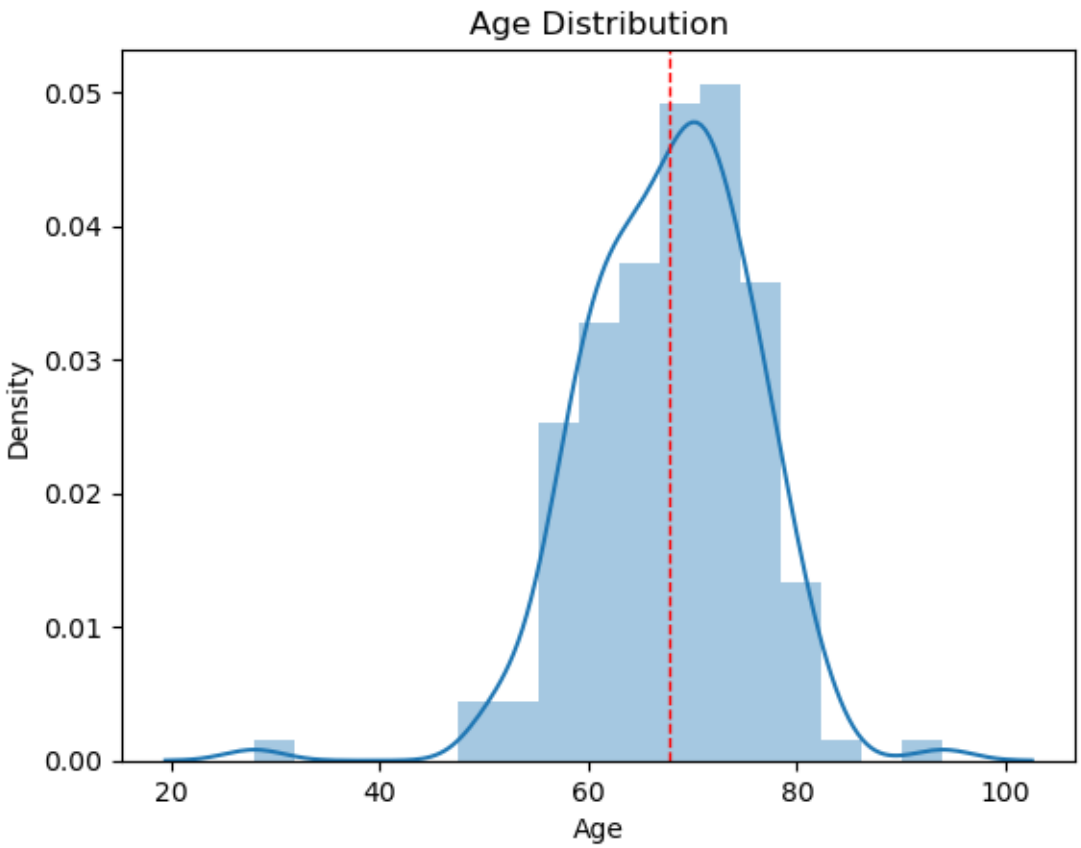
```
In [30]: from sklearn.metrics import confusion_matrix
         cm=confusion_matrix(ytest,predict)
         plt.figure(figsize=(8,6))
         fg=sns.heatmap(cm,annot=True,cmap="Reds")
         figure=fg.get_figure()
         plt.xlabel('Predicted')
         plt.ylabel('Actual')
         plt.title("Output Confusion Matrix")
Out[30]: Text(0.5, 1.0, 'Output Confusion Matrix')
```



GAIT ANALYSIS USING LOWER BACK SENSORS

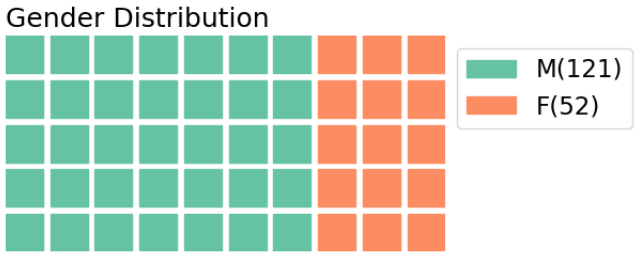
This dataset is designed to facilitate the prediction of the progression of Parkinson's disease (PD) through the analysis of protein abundance data obtained from mass spectrometry readings of cerebrospinal fluid (CSF) samples. These samples were collected from several hundred patients over multiple years, alongside PD severity assessments. The dataset is utilized in a time-series code competition format, with predictions made via Kaggle's time-series API.

The dataset comprises four distinct CSV files. 'train_peptides.csv' offers peptide-level data, where peptides are protein subunits, including details about the peptide's amino acid sequence and frequency. 'train_proteins.csv' offers aggregated protein expression frequencies from the peptide-level data. 'train_clinical_data.csv' provides the patient's score for different parts of the Unified Parkinson's Disease Rating Scale, along with information about medication usage during assessment. Lastly, 'supplemental_clinical_data.csv' provides clinical records without associated CSF samples, offering additional context about Parkinson's progression. The dataset also includes example test files and files enabling the API, plus a python script, 'public_timeseries_testing_util.py', to assist with offline API testing.

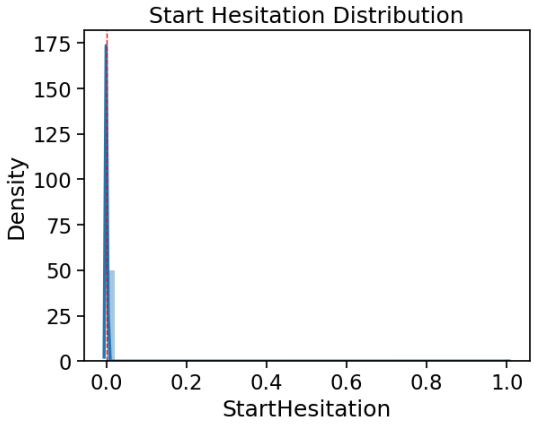


The disease manifests generally in the age range of 60-80.

A gender distribution study also shows that males are more affected than females.



We then observe the freezing of gait events over time in three stages: start hesitation,walking and turning. They are as follows:


Start Hesitation Distribution
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175
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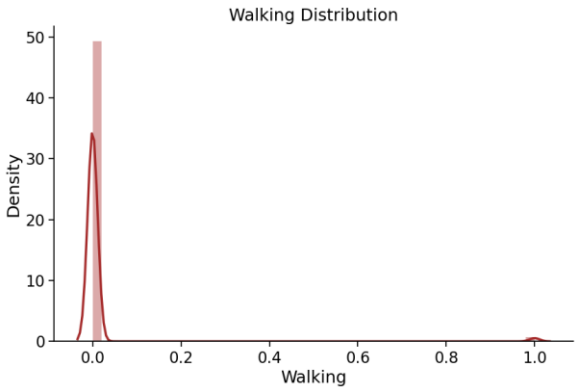
Walking Distribution
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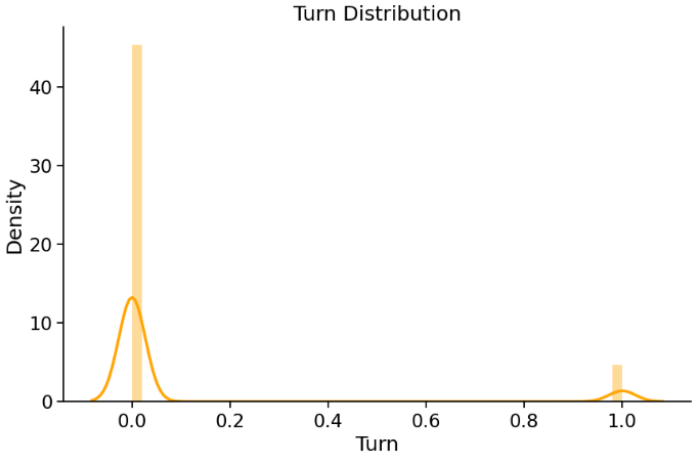
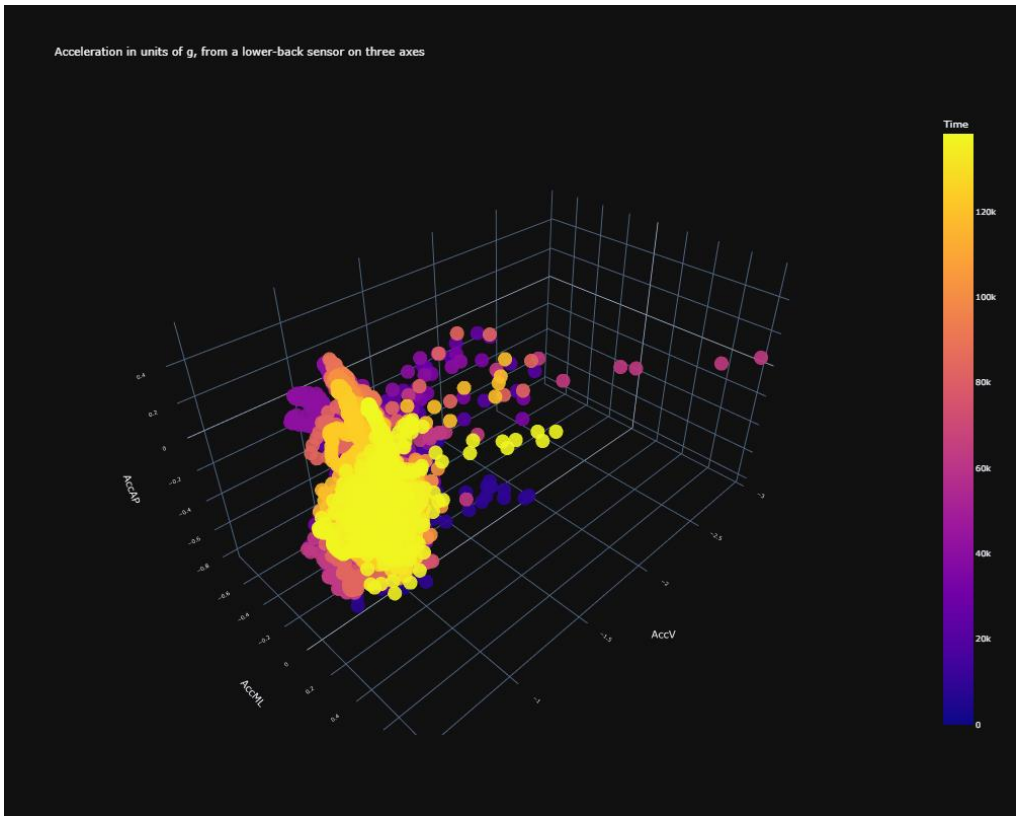
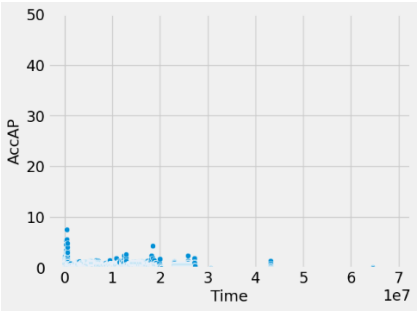
1.0

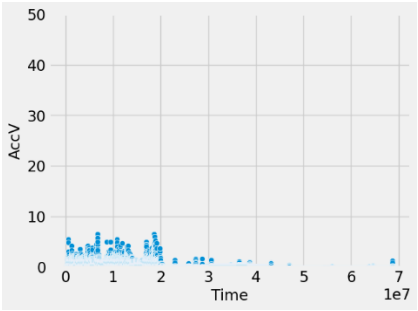

Turn Distribution
Density
Turn
0
10
20
30
40
0.0
0.2
0.4
0.6
0.8
1.0

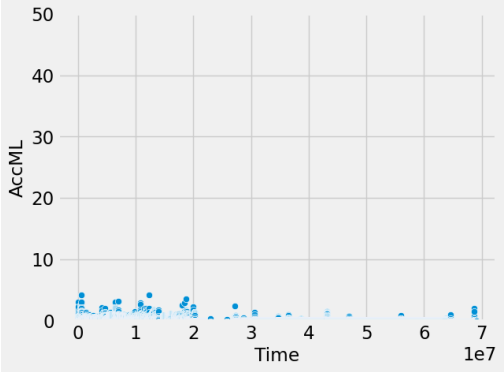
Acceleration in units of g, from a lower-back sensor on three axes: V - vertical, ML - mediolateral, AP – anteroposterior is observed as a 3d scatterplot.



The model is thereafter trained and the predicted Freezing-Of-Gait timestamps are recorded.



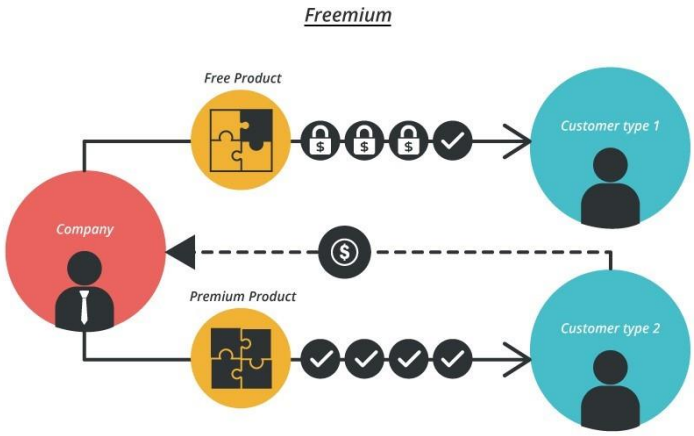




BUSINESS MODELLING

FREEMIUM MODEL:

Implementing a freemium model for Parkinson's disease can be an effective way to provide value to individuals while generating revenue for our business.



Here's how you can structure a freemium model for Parkinson's disease:

1. Basic Free Offering:

- Offer a free version of our product or service that provides essential features or a limited set of functionalities.

- The basic free offering will be valuable on its own and address some of the key needs of individuals with Parkinson's disease. This could include educational content, basic symptom tracking, or access to a community forum.

2. Premium Upgrade:

- Provide a premium version of your product or service with enhanced features, additional functionalities, or more extensive content.

- The premium upgrade will offer significant value and cater to the specific needs and preferences of individuals with Parkinson's disease. This could include advanced symptom tracking and analysis, personalized treatment plans, expert consultations, or access to exclusive educational resources.

3. Value Communication:

- We clearly communicate the value proposition of our premium offering to differentiate it from the free version.

- Highlight the additional benefits, convenience, or personalized support that individuals can gain by upgrading to the premium version.

- Use targeted marketing messages to demonstrate how the premium offering can enhance their quality of life and improve disease management.

4. Pricing and Subscription Model:

- Determine the pricing structure for the premium upgrade. This could include monthly or annual subscription fees or one-time payments for access to the premium features.

- We would like to set the price at a level that reflects the value provided and aligns with the market and target customer segment's willingness to pay.

- We consider offering different subscription tiers or plans to cater to varying needs and budgets.

5. Customer Retention and Loyalty:

- Offer exclusive benefits or rewards to loyal customers, such as early access to new features, priority customer support, or discounts on related products or services.

- Encourage user feedback and actively respond to customer needs to foster a sense of community and build long-term relationships.

6. Marketing and Conversion Strategies:

- Develop marketing strategies to attract new users to the free offering and convert them into premium subscribers.

- We would like to utilize digital marketing channels, content marketing, social media, and partnerships with relevant organizations to raise awareness and drive user acquisition.

- Leverage positive user experiences, testimonials, and success stories to build credibility and encourage conversions.

7. Continuous Value Enhancement:

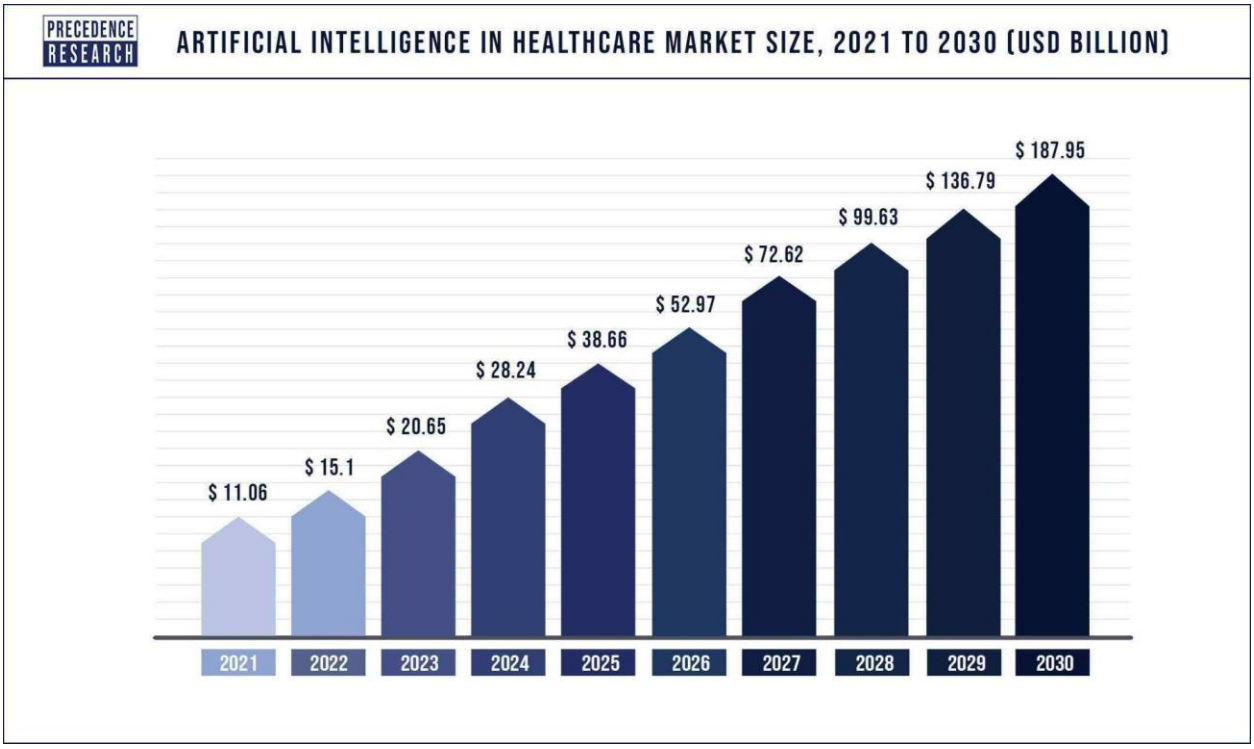
- Regularly evaluate user feedback, market trends, and advancements in Parkinson's disease management to enhance the value of your premium offering.

- Invest in research and development, collaborate with healthcare professionals, and integrate emerging technologies to stay at the forefront of Parkinson's disease care.

- Continuously communicate with our user base to ensure our offerings meet their evolving needs and expectations.

We would like to strike a balance between the free and premium offerings to provide enough value in the free version while incentivizing users to upgrade. By implementing a freemium model effectively, you can establish a sustainable business while making a positive impact on the lives of individuals with Parkinson's disease.

FINANCIAL EQUATION



The above diagram shows the growth of AI based products in healthcare and related fields.

Our initial cost includes the salary of , 2 ML engineers, Product manager, UX/UI Designer, Mobile App Developer, Data Scientist, Backend Developer, Quality Assurance (QA) Engineer, supposedly our products takes a month to finish starting from the scratch it will take about 2 weeks to make a ml model by the 2 ML engineers, a product manager will be hired for full time, others can be added on a freelance basis as they are not needed regularly.

The breakdown is:-

1. 2 ML engineers for 2 weeks will cost around 50k INR (taking 6 lakh as annual average salary in India).
2. UI/UX engineer will be hired for a max of 10k INR (taking 10k as average salary per project as freelancer in India as UI/UX designer).
3. Mobile App developer will be hired for 50k INR (taking 50k as average salary per project as a freelancer in India as an Android developer).
4. Data Scientist will be hired once every 3 months to oversee the correct business strategy, which will cost 60k INR (taking 20k as average salary per project as a freelancer in India as a Data Scientist).
5. Backend developer will be hired for 40k INR (taking 40k as average salary per project as a freelancer in India as a backend developer).
6. Quality Assurance (QA) Engineer will be hired for 15k INR (taking 15k as average salary per project as a freelancer in India as a Quality Assurance (QA) Engineer).

7. The remaining cost is of product engineer for yearly salary taking it 6.1 lakh INR in India
8. Taking 10-15 k of additional budget.

Adding up the costs of all of the expenditures mentioned above, the total initial cost including the product manager is around **840000 INR.**

Taking the initial cost in mind we will cost the subscription of our App to be **3499 INR** for a period of 3 months and a yearly subscription for **15999 INR.** As the user base increases we can either increase the subscription price or decrease the time for which we currently offer it for.

So the profit or financial equation looks like this:-

$Y = 15999*x(t) - (840000)$

Here x(t) is a function that represents the growth of the customer base and Y is the profit.

CONCLUSION

In conclusion, the proposed Parkinson's Disease application, embedded with machine learning solutions, presents a comprehensive strategy for catering to the diverse needs of patients, caregivers, and healthcare professionals. By incorporating multifaceted features and prioritizing a user-centric design, the application has the potential to deliver personalized care, facilitate symptom management, and ultimately enhance the quality of life for individuals living with Parkinson's disease.

Success, however, hinges on the execution of an effective business model that takes into account not only commercial viability but also robust marketing strategies and continuous refinement based on user feedback and evolving research in Parkinson's disease. Collaborations with medical professionals, patient advocacy groups, and other relevant stakeholders will also play a crucial role in the application's acceptance and widespread use.

While the application provides numerous benefits, it's crucial to acknowledge potential social implications. These could include a digital divide, where those without access to the required technology are excluded, and potential privacy concerns around sensitive health data. Addressing these issues proactively can help ensure broader social acceptance.

Future enhancements could include more personalized machine learning algorithms, integrating real-time data from a broader range of wearable devices, and expanding the educational resources offered within the app. By continuously monitoring user feedback, the app can evolve to better serve the needs of the Parkinson's community.

In essence, the Parkinson's Disease application, combining technological advancements and a supportive community, could represent a significant stride towards early detection, personalized care, and improved outcomes in managing Parkinson's disease.

CREDITS

1.RITABRATA CHAKRABORTY—

- ABSTRACT
- PROBLEM STATEMENT
- AN INSIGHT INTO TARGET MARKET
- PREVALENCE OF PD IN INDIA
- CODE IMPLEMENTATION

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- TARGET MARKET SPECIFICATIONS
- OTHER SECTORS OF BUSINESS
- PATENTS AND GOVERNMENT CONDITIONS

3.HAVILAH PRAGNAM—

- PROTOTYPE SELECTION
- BUSINESS MODEL

4.SANSKAR SINGH BHARDWAJ—

- FINANCIAL EQUATION
- CONCLUSION

GITHUB LINK TO CODE DOCUMENTATION--
https://github.com/Ritabrata04/PARKINSON-DISEASE