Client Consultation Report

Project: Parkinson's Disease Prediction using AI/ML

Project Goal: To develop an AI/ML-powered system that accurately predicts Parkinson's Disease in its early stages using biometric and voice-based features, while also integrating 3D protein structure visualization (e.g., alpha-synuclein) to enhance understanding of disease progression and aid in potential drug target identification.

Client Meetings and Questions

This report consists of four meetings with the client, each addressing specific objectives. Below are the questions posed to the client and their responses.

Meeting 1: P Understanding Parkinson's Disease Prediction Goals

Objectives:

1. Understand the client's vision and primary goals for Parkinson's detection.
2. Discuss expected use cases and beneficiaries (doctors, researchers, etc.).
3. Clarify scope, dataset needs, and model expectations.

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- Q: What is the main purpose of predicting Parkinson's Disease using AI/ML?

  A: Early diagnosis to enable faster medical intervention and reduce diagnostic subjectivity.

- Q: Who are the primary end-users of this system?

  A: Neurologists, general practitioners, researchers, and potentially patients for self-screening.

- Q: What features should the model consider for prediction?

  A: Voice features (jitter, shimmer), motor function metrics, and protein structure data.

- Q: Is this system meant for clinical usage or research purposes?

  A: Both — initial use in research, followed by clinical deployment upon validation.

- Q: What kind of datasets are available or needed for this project?

  A: Voice datasets (like UCI Parkinson's), patient records, and PDB files for protein visualization.

- Q: What are the expected outcomes of the system?

  A: A prediction label (Positive/Negative), confidence level, and optional 3D visualization of affected proteins.

- Q: How soon do you expect results after a prediction request?

  A: Ideally under 5 seconds for voice-based diagnosis.

- Q: What is the scope of the MVP (Minimum Viable Product)?

  A: Voice-based disease prediction with result explanation and a basic dashboard.

- Q: Will the system give medical advice or only prediction output?

  A: Only diagnostic support and prediction — no treatment suggestions.

- Q: What specific challenges are you hoping AI will help overcome?

  A: Inconsistent symptom interpretation, delayed diagnosis, and manual analysis effort.

Meeting 2: Technical Design for Parkinson's Prediction System

Objectives:

1. Define technical and model requirements.
2. Discuss feature engineering, algorithms, and training strategies.
3. Clarify deployment and data handling needs.

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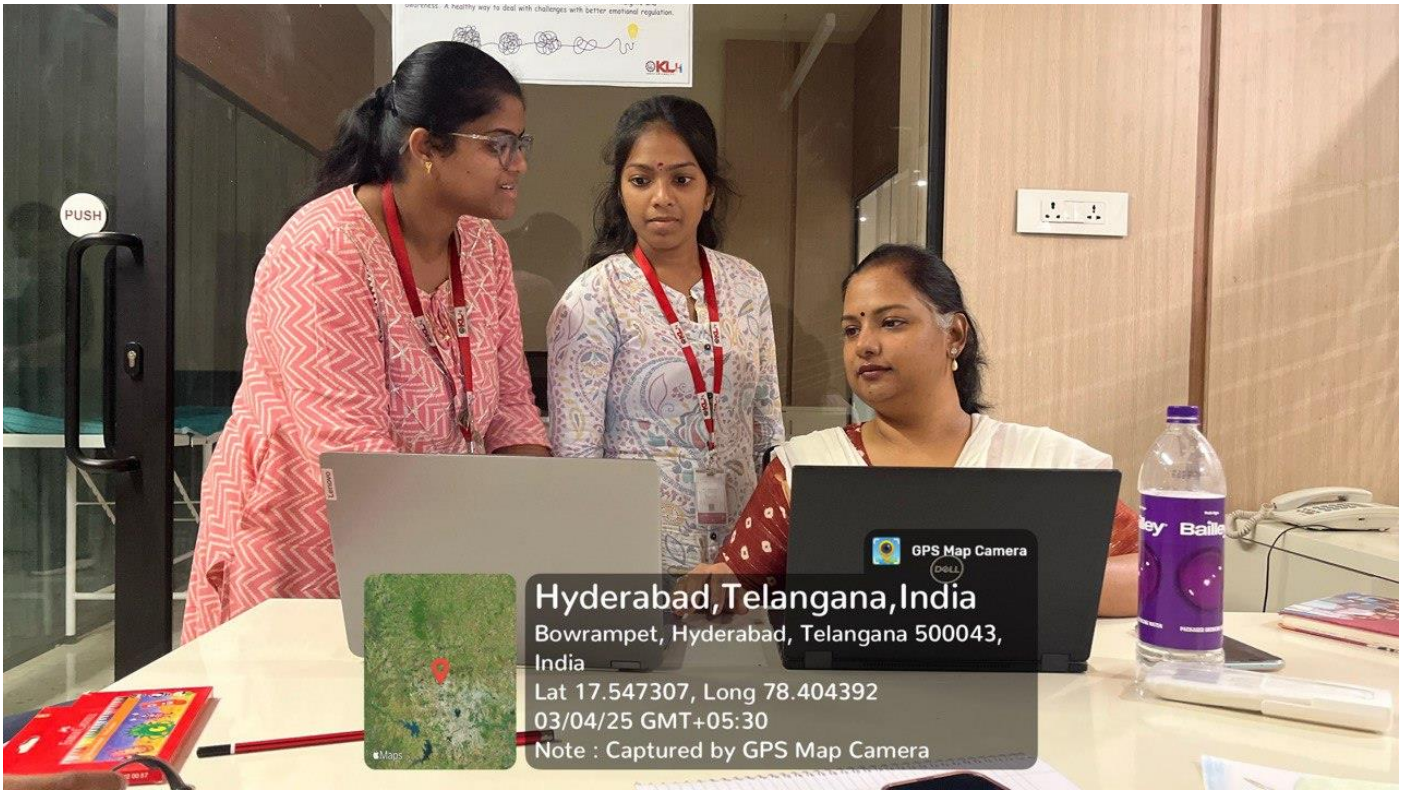

- Q: What kind of ML models are suitable for this use case?

  A: SVM, Random Forest, and LSTM for temporal patterns in voice recordings.

- Q: What preprocessing steps are required?

  A: Noise removal, normalization, feature scaling, and voice segmentation.

- Q: Should the model be explainable for clinical confidence?

  A: Yes, SHAP/LIME-based feature importance should be displayed with results.

- Q: Do we need to support 3D visualization of proteins?

  A: Yes, using PyMOL or Chimera for alpha-synuclein structure and aggregation zones.

- Q: Will the application use Flask or Django for the backend?

  A: Flask, for a lightweight and scalable API service.

- Q: Are we expected to provide real-time predictions or batch processing?

  A: Real-time for small inputs; batch mode for clinical datasets.

- Q: What model accuracy is considered acceptable?

  A: At least 90% accuracy, with high precision to avoid false positives.

- Q: Is the model being trained from scratch or fine-tuned from existing models?

  A: Initially trained from scratch; future versions may use transfer learning.

- Q: What deployment platform do you prefer?

  A: AWS or Heroku for hosting; GitHub for version control.

- Q: Should the user be able to upload data like audio files or clinical records?

  A: Yes, with clear instructions on format and data security policies.

Meeting 3: User Experience and Model Interaction for Parkinson's Prediction

- **Objectives:**

  1. Finalize how users interact with the system.
  2. Design feedback, explanation, and error handling flow.
  3. Improve accessibility for healthcare professionals.

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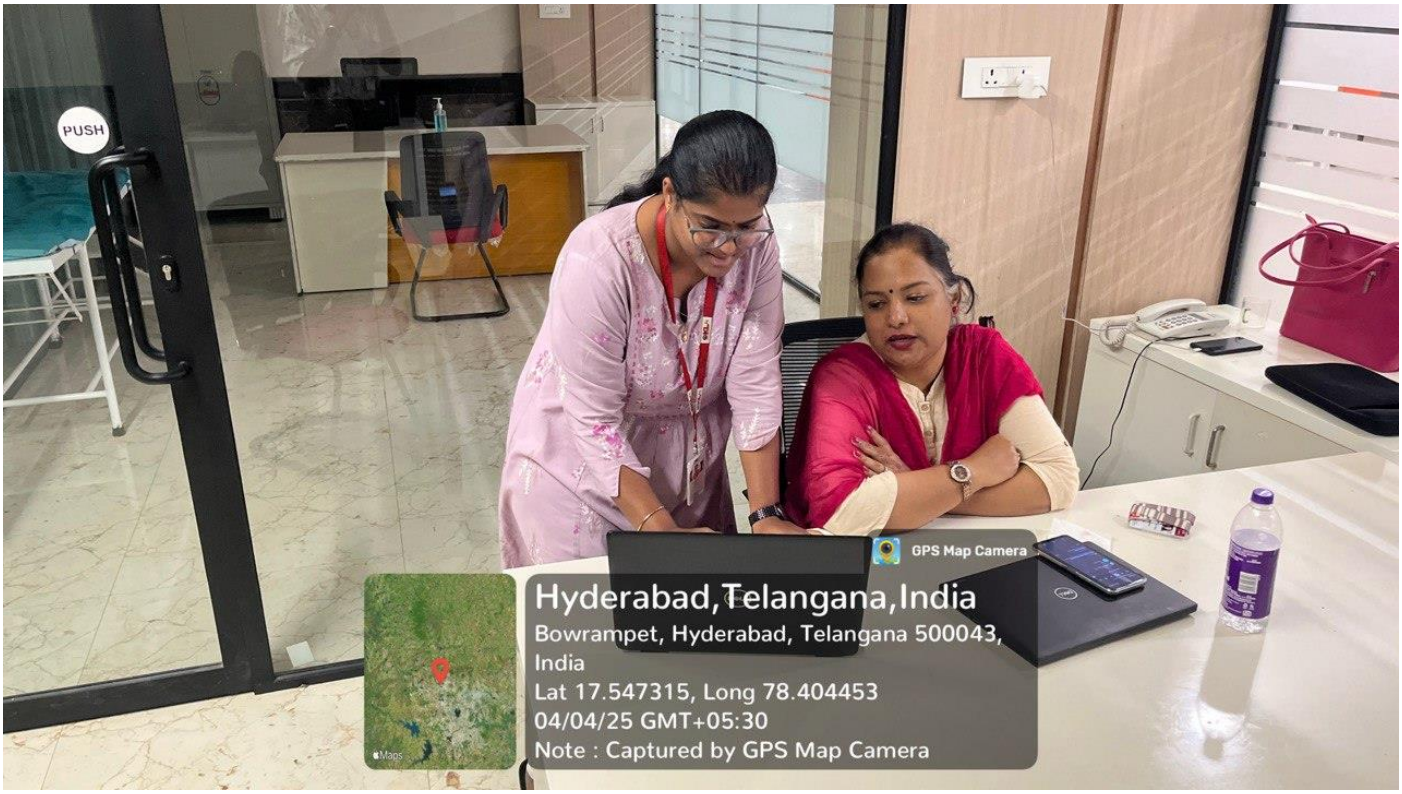

- Q: How should the prediction result be presented?

  A: Clearly labeled (e.g., 'Likely Parkinson's Detected'), with a probability score and explanation.

- Q: Should the user get suggestions on what to do next after prediction?

  A: Yes, like 'Consult a Neurologist' or 'Run Additional Tests'.

- Q: Do we need audio input directly from mic or only file uploads?

  A: File upload is preferred, but mic input can be a future enhancement.

- Q: How should errors like unsupported file types be handled?

  A: Gracefully — show an alert with accepted formats and a retry option.

- Q: Will the UI be accessible for older users or those with disabilities?

  A: Yes, with larger fonts, voice commands (future), and simple navigation.

- Q: Should the user receive a downloadable report after diagnosis?

  A: Yes, a PDF summary with results, input features, and explanation.

- Q: What happens if the model encounters very low confidence?

  A: The system will return an 'Inconclusive' result and suggest clinical review.

- Q: Will the system allow data visualization like feature plots or timelines?

  A: Yes, at least basic charts like bar graphs for input analysis.

- Q: Do we need multilingual or regional support?

  A: English first, but support for other languages may be added later.

- Q: Can users provide feedback on predictions to improve the model?

  A: Yes, user-confirmed feedback can be saved (with consent) for future retraining.

Meeting 4: Deployment, Validation, and Final Checklist

Objectives:

1. Confirm final deployment plans and hosting platform.
2. Discuss testing, security, and release timeline.
3. Final QA checks and go-live readiness.

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- Q: When is the target go-live date for this system?

  A: Within the next 2 months, post final testing and validation.

- Q: What kind of testing will be done before release?

  A: Unit testing, functional testing, and clinical simulation testing.

- Q: How do you plan to validate the model clinically?

  A: By running predictions on anonymized clinical datasets verified by experts.

- Q: What data privacy rules must the system follow?

  A: GDPR/HIPAA compliance, encrypted storage, and anonymized records.

- Q: Will there be user training or documentation?

  A: Yes, a user guide and a walkthrough video will be provided.

- Q: What are the fallback measures in case the service crashes?

  A: Automatic restart, alert system, and backup model service.

- Q: Will the model be retrained periodically?

  A: Yes, biannually with new clinical or research data.

- Q: Is there a system to track usage statistics?

A: Yes, an analytics dashboard for monitoring usage, predictions, and user feedback.

- Q: Will users be notified of model or feature updates?

  A: Yes, via in-app alerts or email for registered users.

- Q: Who is responsible for post-deployment support?

  A: Our technical team will handle maintenance and support for 6 months after deployment.

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