I have developed a CLI-based Python tool called "Proteogenomics Prototype: An Advanced Biomarker Identification Tool" for my college project. It processes proteomics (e.g., mzML) and genomics (e.g., FASTA) data to identify biomarkers, producing outputs like protein and gene IDs with an "Is_Biomarker" column in CSV format. The tool handles large datasets and completes processing in under 5 minutes. I want to transform this CLI tool into a SaaS platform hosted on a free-tier infrastructure like AWS, targeting academics, biotech startups, and potentially big pharma, with the following features and requirements:

SaaS Conversion:
Convert the CLI tool into a web-based application with a user-friendly interface.

Implement a Flask-based web app (or similar lightweight framework) to handle file uploads, processing, and result downloads.

Ensure compatibility with large datasets and maintain processing speed (<5 minutes).

Host the app using AWS Free Tier for zero-cost deployment.

Freemium and Premium Plans:
Freemium Plan: Offer limited features (e.g., Parsing, Integration and basic biomarker analysis, CSV output) for free users.

Premium Plan: Include advanced features (e.g., unlimited data processing, enhanced visualization, priority support, API access) with a subscription model. Suggest a structure for tiered pricing (e.g., monthly/annual plans). Use PayPal , 2000 Rupees / Month as Premium , 10000/Year , as a Premium , for foreign countries make paypal payment methods adapt to Indian currency

Provide a backend system to manage user subscriptions and plan restrictions.

User Authentication:
Implement a secure login system with email/password and optional OAuth (e.g., Google, GitHub).

Ensure user data isolation to protect sensitive proteomics/genomics data.

Dashboard:
Create an interactive dashboard for users to:
Upload input files (mzML, FASTA, CSV, etc.).

View processing status with progress bars.

Display results (e.g., biomarker tables with protein/gene IDs, "Is_Biomarker" status, and criteria like "Length_Gt_100," "Has_Motif").

Download results in CSV or PDF format.

Visualize results with charts (e.g., using Plotly or Matplotlib for biomarker distribution).

Ensure the dashboard is responsive and beginner-friendly.

User Feedback System:
Add a feedback form for users to report bugs, suggest features, or rate the tool.

Store feedback in a database (e.g., SQLite or AWS DynamoDB Free Tier) for review.

Optionally, include a rating system or comments section for community engagement.

Legal and Compliance:
Generate a Privacy Policy compliant with data protection laws (e.g., GDPR, CCPA, India's DPDP Act) to address handling of sensitive biological data.

Create a Terms of Service outlining user responsibilities and service usage.

Suggest steps for intellectual property protection (e.g., patenting the algorithm, trademarking the tool's name). Tool name is ProteogenomiX , Tagline : Advanced Biomarker Identification Tool

Ensure compliance with bioinformatics data regulations (e.g., secure storage, encrypted data transfer).

Additional Cool Features:
Add real-time processing status notifications (e.g., email or in-app alerts).

Implement an API for premium users to integrate the tool into their workflows.

Include sample datasets (e.g., glioblastoma data in mzML/FASTA) for demo purposes.

Add exportable visualizations (e.g., biomarker heatmaps, sequence length histograms).

Suggest other innovative features to enhance user engagement (e.g., AI-driven insights, batch processing).
Technical Requirements:
Use Python (with libraries like pandas, matplotlib, and biopython) for core functionality, preserving the existing CLI logic.

Optimize for large file handling (e.g., chunked processing, progress feedback).

Ensure cross-browser compatibility and mobile responsiveness.

Provide a list of required installations (e.g., Python packages, AWS setup).

Include error handling and user-friendly error messages.

Deliverables:
Complete source code for the SaaS platform, including frontend, backend, and database.

Instructions for deploying on AWS Free Tier.

Sample Privacy Policy and Terms of Service templates.

Documentation for users and developers (e.g., setup guide, API usage).

Suggestions for marketing the SaaS to academics and biotech startups.

Please provide the complete codebase, ensuring it builds on my existing CLI tool's functionality (parsing, integration, analysis, visualization). Include steps for legal compliance, especially for India-based deployment, and suggest how to validate demand (e.g., customer interviews, beta testing). If possible, provide a timeline for development and any free tools to minimize costs. Let me know if you need more details about my CLI tool's code or specific features!