Project Requirements:

1. **Functional Requirements:**

i) User Authentication and Authorization:

- Users (patients and doctors) must be able to securely authenticate themselves.
- Role-based access control should be implemented to ensure that only authorized users can access specific functionalities and data.

ii) **Tissue Sample Collection and Management:**

- We collected tissues sample dataset from gaggle to train our Model.
- Implement a database to store metadata associated with each tissue sample, including patient information, sample type, and collection details

iii) **Quantum-Assisted Health Analysis:**

- Integrating both classical and quantum computing algorithms for analyzing tissue samples to determine their pathology status.
- Developing interfaces to interact with quantum computing resources and process the analysis results.

iv) **AI-Driven Data Analysis:**

- Train machine learning models to classify tissue samples as cancerous or non-cancerous.
- Implement algorithms for preprocessing, feature extraction, and classification.

v) Secure Web3 Storage:

- Utilize blockchain technology for decentralized and secure storage of patient data.
- Implement encryption mechanisms to ensure data confidentiality and integrity.
- Develop smart contracts for managing access control and data sharing permissions.
- We use Alchemy to do common operations like consult gas price, get blocks and send transactions.

vi) User Interface:

- Design user-friendly interfaces for patients to view their analysis results and for doctors to review patient data.
- Ensure accessibility and compatibility across different devices and platforms.

vii) Reporting and Notifications:

- Generate comprehensive reports summarizing the analysis results for patients and doctors.
- Implement notification mechanisms to alert users when analysis results are available or when action is required.

2 . **Non-Functional Requirements:**

i) Security:

- Data encryption both in transit and at rest to ensure confidentiality.
- Regular security audits and vulnerability assessments to identify and address potential security risks.

ii) Performance:

- Ensure timely processing of analysis tasks to provide quick results to users.
- Optimize algorithms and infrastructure for efficient resource utilization.

iii) Scalability:

- Design the system to handle a growing volume of data and user requests.
- Implement horizontal and vertical scaling strategies to accommodate increasing demand.

iv) Reliability:

- Minimize system downtime and ensure high availability.
- Implement backup and disaster recovery mechanisms to prevent data loss.

v) Compliance:

- Adhere to relevant healthcare regulations (e.g., HIPAA) to protect patient privacy and data security.
- Ensure ethical handling of patient data and obtain informed consent for data usage.

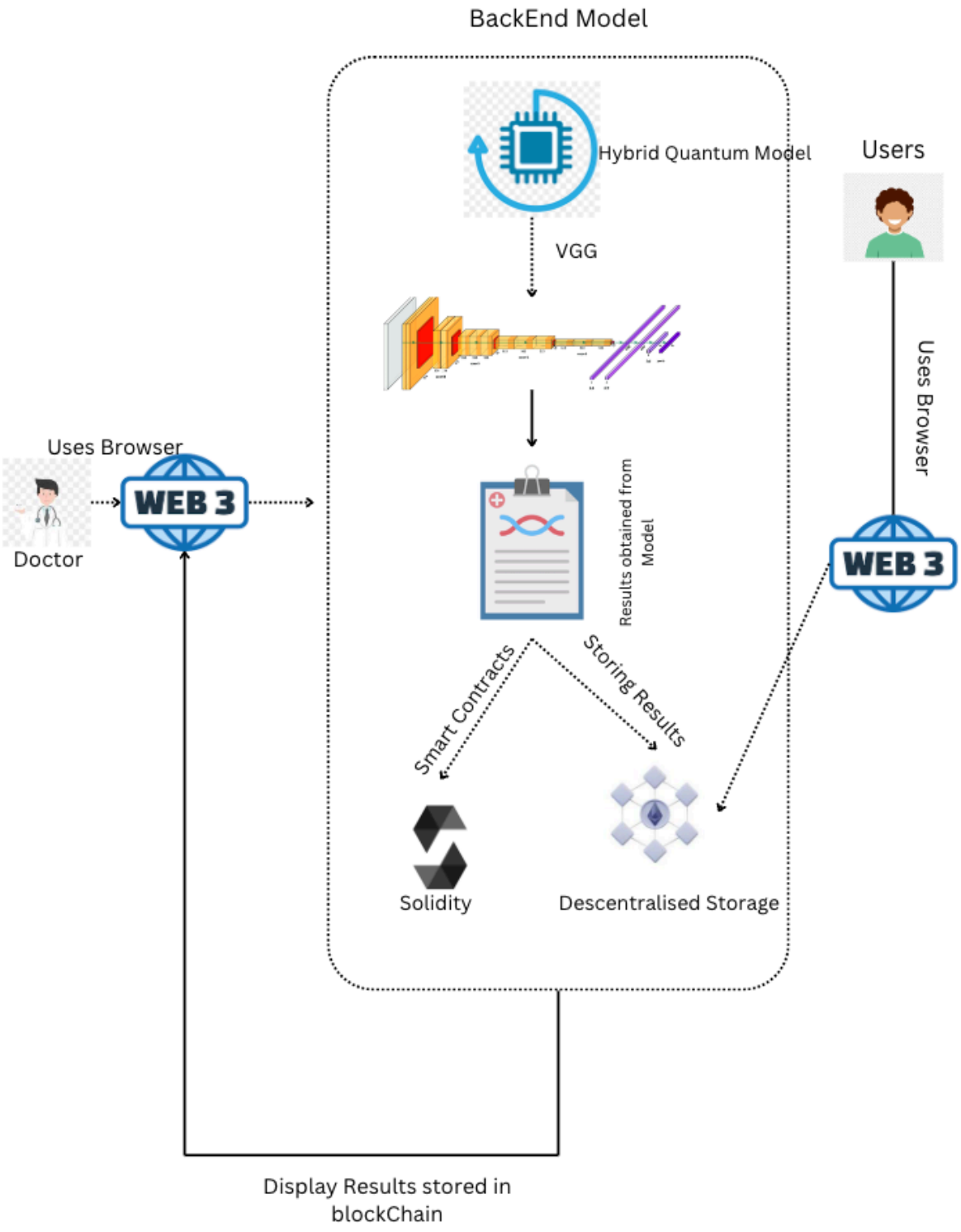
vi) Usability:

- Conduct user testing and feedback sessions to ensure the system is intuitive and easy to use.
- Provide adequate documentation and support resources for users.

Problem statement:

Our primary objective of our model is to develop a robust and innovative framework for pathology health analysis. We aim to enhance the accuracy and efficiency of cancer diagnosis by integrating quantum computing for intricate calculations and ML for data analysis and pattern recognition. This project seeks to revolutionize pathology by providing a comprehensive and reliable solution for diagnosing and classifying cancer based on cellular characteristics b y analysing tissue.

Architecture:



System Requiremets:

Developing System Requirements:

Hardware Requirements:

- Deep Learning: Workstations with NVIDIA GPUs
- Blockchain Integration: Alchemy

Software Requirements:

- Quantum Computing: Pennylane
- Deep Learning: VGG , QNN , CNN
- Blockchain Integration: Solidity, Truffle
- IDEs: Visual Studio Code

S**torage Requirements:**

- High-capacity storage: Local SSDs