**Solution Architecture Summary: Alzheimer Detection System**

**1. Introduction:**

The Alzheimer Detection System combines frontend technologies, backend processing, and machine learning for early Alzheimer's detection. This report outlines the architecture facilitating user interaction, model prediction, and result visualization.

**2. Frontend:**

2.1 UI:

Bootstrap and EJS create a user-friendly interface for image uploads.

2.2 NodeJS and Express:

NodeJS with Express.js manages user requests, rendering views, and communication with the backend.

**3. Backend:**

3.1 Flask API:

The Flask API processes image data, invoking a CNN model with SMOTE for improved predictions.

3.2 Model:

The CNN model, saved in H5 format, efficiently predicts Alzheimer's likelihood.

**4. Integration:**

4.1 User Interaction:

Users upload images, and NodeJS forwards data to the Flask API.

4.2 Processing:

The Flask API employs the model, and results are sent to the frontend.

4.3 Visualization:

ChartJS dynamically displays bar charts representing prediction probabilities.

**5. Deployment:**

5.1 Cloud Hosting:

Deployable on cloud platforms for scalability.

5.2 Containerization:

Docker containers encapsulate components for easy deployment.

**6. Scalability and Extensibility:**

Designed for scalability with cloud services and containerization. Extensible for future enhancements.

**7. Security:**

Implement secure communication with HTTPS and access controls for data protection.

**8. Conclusion:**

The Alzheimer Detection System's modular architecture integrates frontend, backend, and machine learning, providing a flexible, scalable, and accurate tool for Alzheimer's prediction

**Architecture:**

