**Detailed Requirements –**

**Analyzing images/videos to identify Baker's cyst**

צוף פולק 315424143  
יובל בן אליעזר 207184003  
תמר קינן 209335538

**Functional Requirements:**

1. User Authentication and Authorization

* Users can register and log in securely.
* Role-based access control for Admin, Doctors and Patients.

2. Image and Video Capture

* Users can upload images or videos containing the knee region.
* The application must ensure the image includes 15 cm above and below the knee.
* Provide real-time feedback to validate proper image positioning.

3. Data Labeling and Training

* Semi-automatic labeling where a doctor marks the Middle of the Baker's cyst.
* The ML algorithm automatically generates additional annotations based on the labeled data.
* Support for retraining the model with new labeled datasets.

4. Analysis and Detection

* The system detects and marks the Baker's cyst automatically.
* Provides measurements and positional data relative to anatomical landmarks.
* Generates visual overlays to highlight identified regions.

5. Reporting and Data Retrieval

* Generates structured reports with analysis results.
* Allows data retrieval based on specific criteria, such as date, patient ID, or findings.

6. Notifications and Alerts

* Real-time alerts for incomplete scans or improper positioning.
* Notifications for model updates and analysis completion.

7. Logs and Audit Trails

* Activity logs and compliance-ready auditing.

**Non-Functional Requirements:**

1. Performance

* Image processing and ML model predictions should complete within ? seconds.

2. Security

* Encrypted data storage and transmission (SSL/TLS).
* Multi-factor authentication.

3. Reliability

* ?% uptime target.

4. Usability

* Intuitive UI for easy navigation.
* Responsive design for mobile and desktop?.
* Clear instructions: "Expose your knees for 5 minutes while standing; the photo should be fixed and contain a knee with 15 cm above and below."

5. Compatibility

* Cross-platform compatibility for web and mobile devices.

**Technological Requirements:**

1. Programming Languages and Frameworks

* Python with TensorFlow or PyTorch for ML models.
* JavaScript/React for frontend; Node.js or Flask for backend APIs.?

2. Database and Storage

* SQL or NoSQL for metadata.
* AWS S3 or Azure Blob for scalable image storage.

3. Security Tools

* Encryption protocols and compliance monitoring.

4. Deployment Infrastructure

* Kubernetes or Docker containers for scalability.
* Cloud-based architecture with load balancing.

**Architectural Requirements:**

1. System Architecture

* Microservices architecture.
* RESTful APIs for service communication.

2. Scalability and Performance

* Horizontal scaling to handle large data volumes.
* Quick response times under ? seconds.

3. Reliability and Availability

* Redundant backups and high-availability setups.

4. Integration and Interoperability

* Support for federated learning frameworks.