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Nachupally (Kondagattu), Kodimial Mandal, Jagtial Dist, Telangana - 505 501
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Department of Computer Science and Engineering

Major Project on

Smart Home Repair App

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Introduction

- The *Smart Home Repair App* is an **AI-enabled mobile platform** for intelligent home maintenance.
- Users upload images/videos of faulty devices or structures for **automated fault detection**.
- The system provides **real-time step-by-step repair guidance** and **verifies repairs post-completion**.
- Built with a **React Native front-end** and **MERN backend** integrated with **AI/ML models**.
- Designed to deliver **automation, affordability, and user convenience** in household repair management.



Motivation

1. Existing repair systems are **manual, time-intensive, and technician-dependent**, causing delays and high costs.
2. The rapid growth of **AI and mobile computing** presents an opportunity to build a **self-assistive repair ecosystem** that is intelligent, reliable, and accessible to all.



Existing System

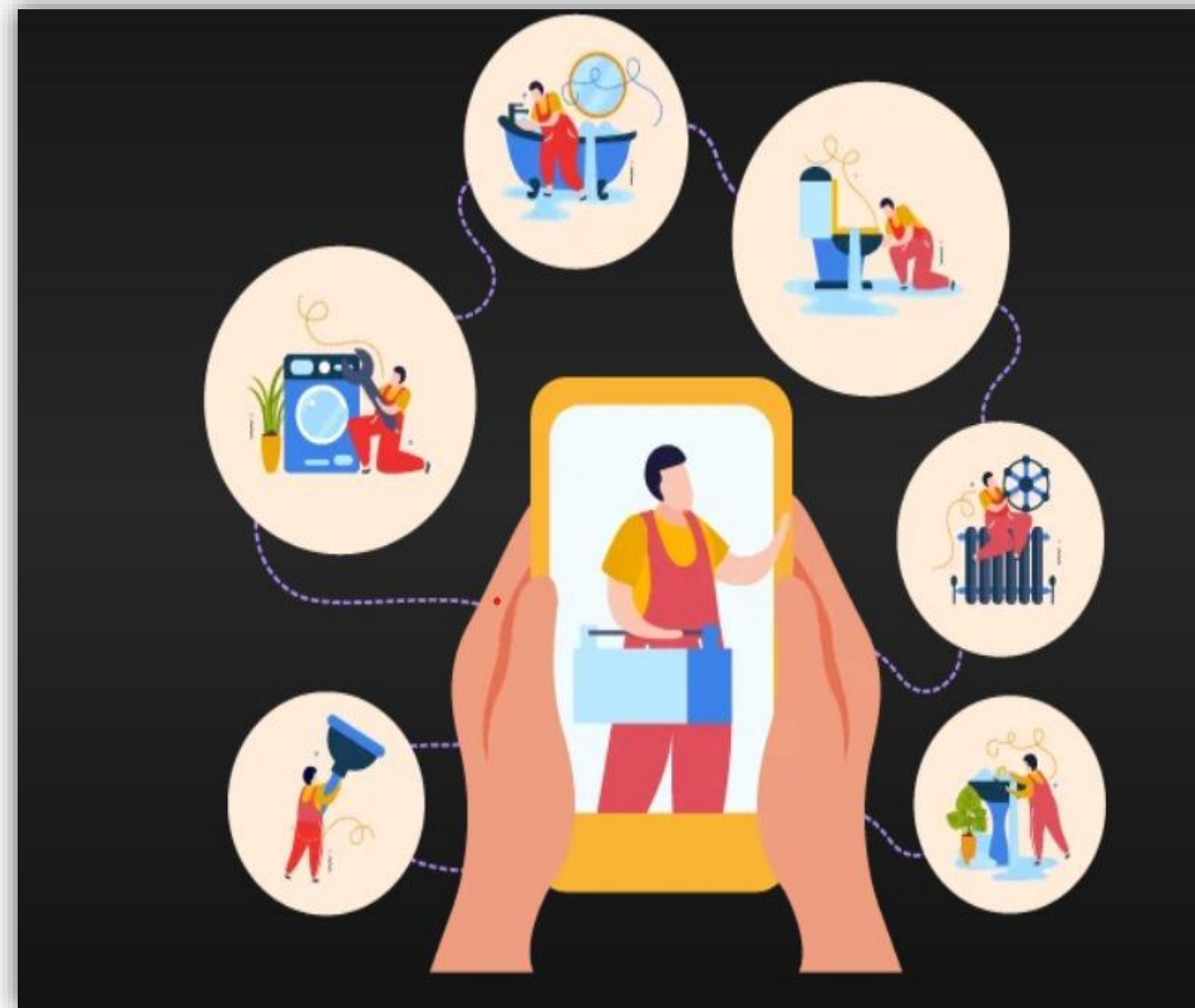
Current scenario:

- Manual reporting of repair issues.
- Dependence on physical inspection by technicians.
- Unavailability of reliable self-diagnosis tools.
- High costs and delays due to scheduling.
- No systematic verification after repairs.



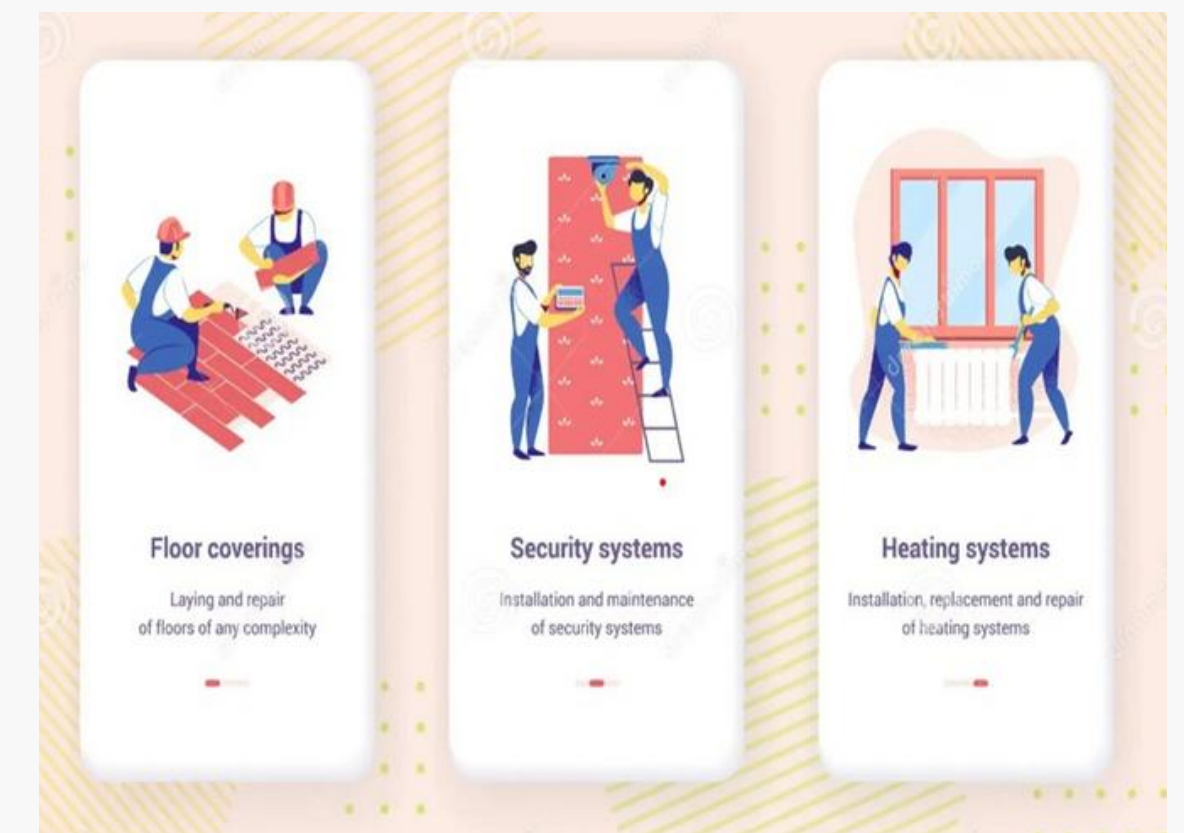
Problem Statement

To design an AI-powered mobile application capable of detecting and diagnosing home appliance faults through image/video analysis, providing interactive repair guidance, connecting users with technicians when required, and validating the success of repairs automatically and efficiently.



Objectives

- **Automate fault detection** using AI-based photo/video analysis.
- Provide real-time, step-by-step **repair guidance to users**.
- **Connect users with professional technicians** when required.
- Verify and validate completed repairs through **post-repair analysis**.
- Reduce **repair costs, time, and dependency** on external help.

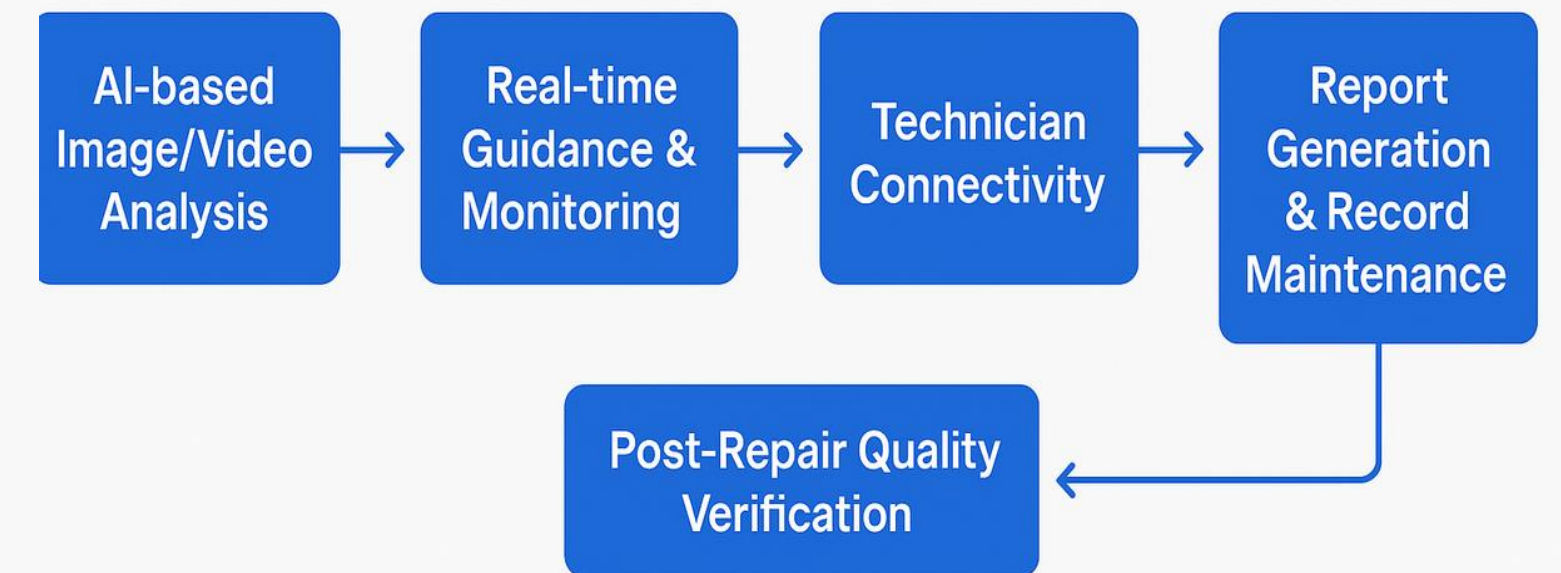


Proposed System

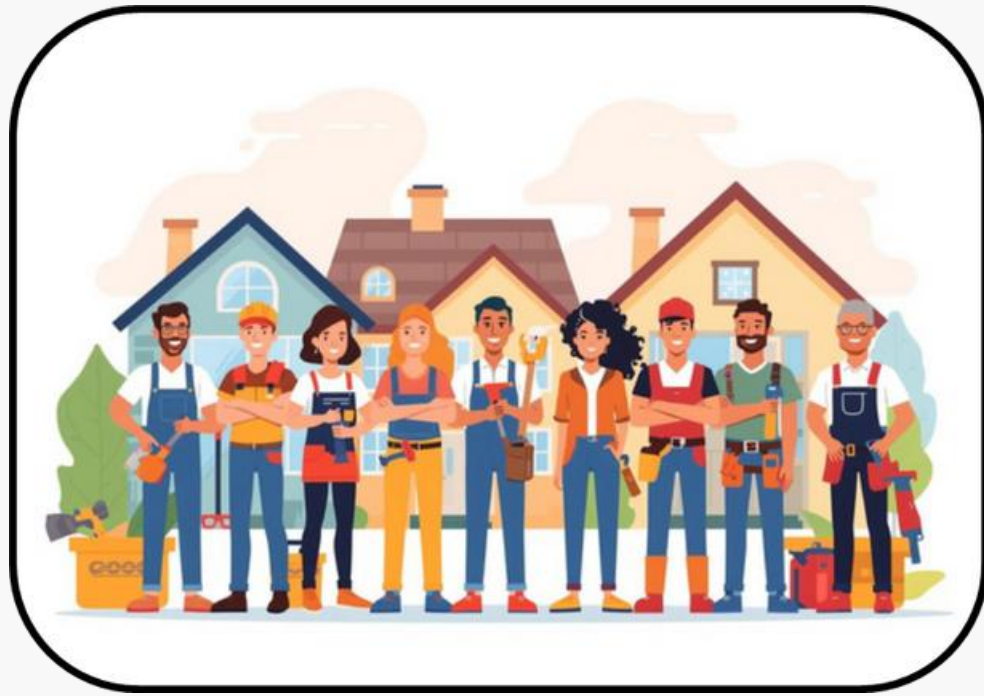
The proposed Smart Home Repair App integrates AI-driven fault diagnosis, interactive guidance, and automated verification.

Key Modules:

- AI-based Image/Video Analysis
- Real-time Guidance & Monitoring
- Technician Connectivity
- Post-Repair Quality Verification
- Report Generation & Record Maintenance



Target Users for Smart Home Repair App



Homeowners

Seeking DIY solutions for household repairs



Professional Technicians

Looking for diagnostic support and efficiency

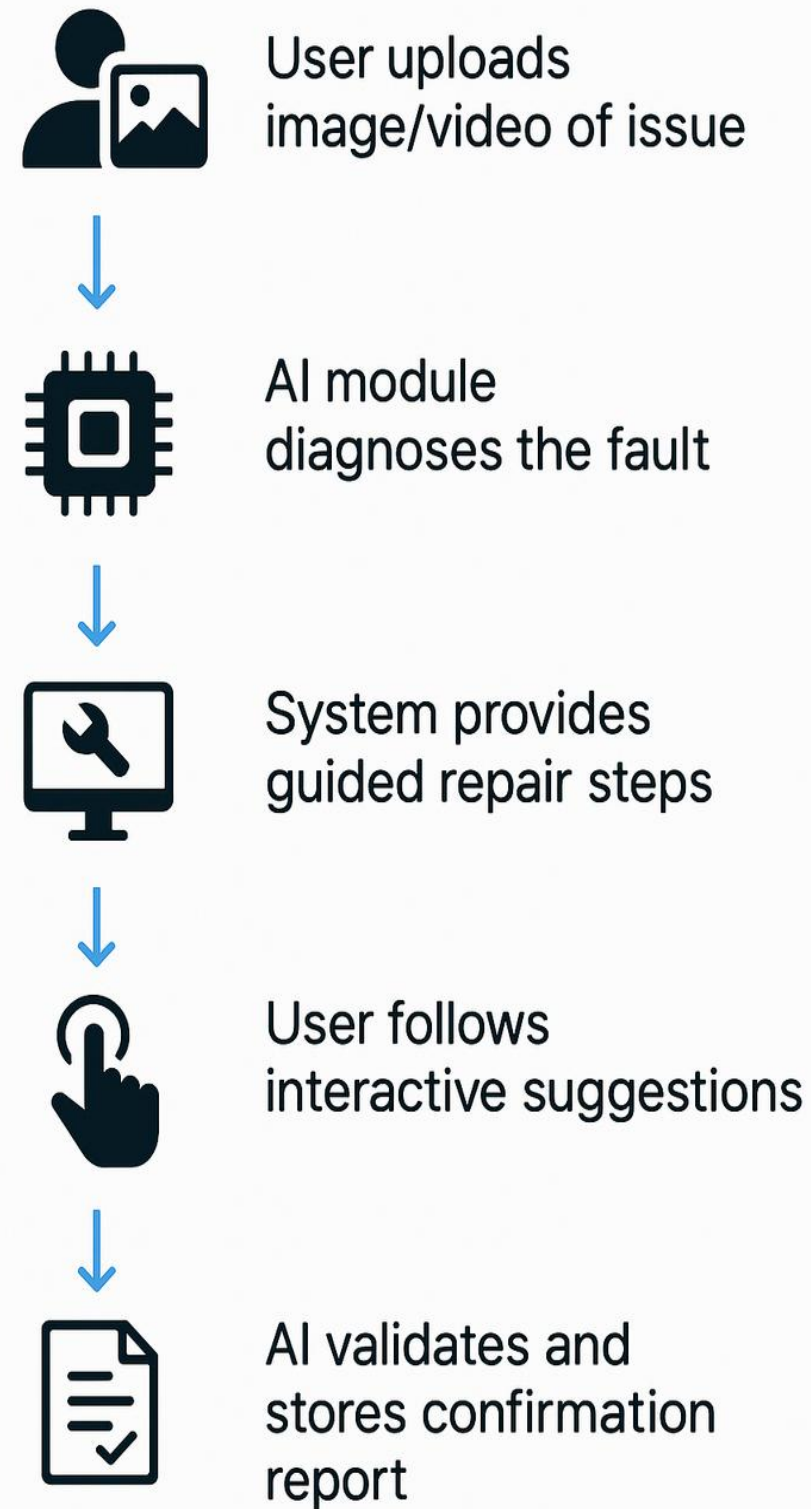


Elderly Users

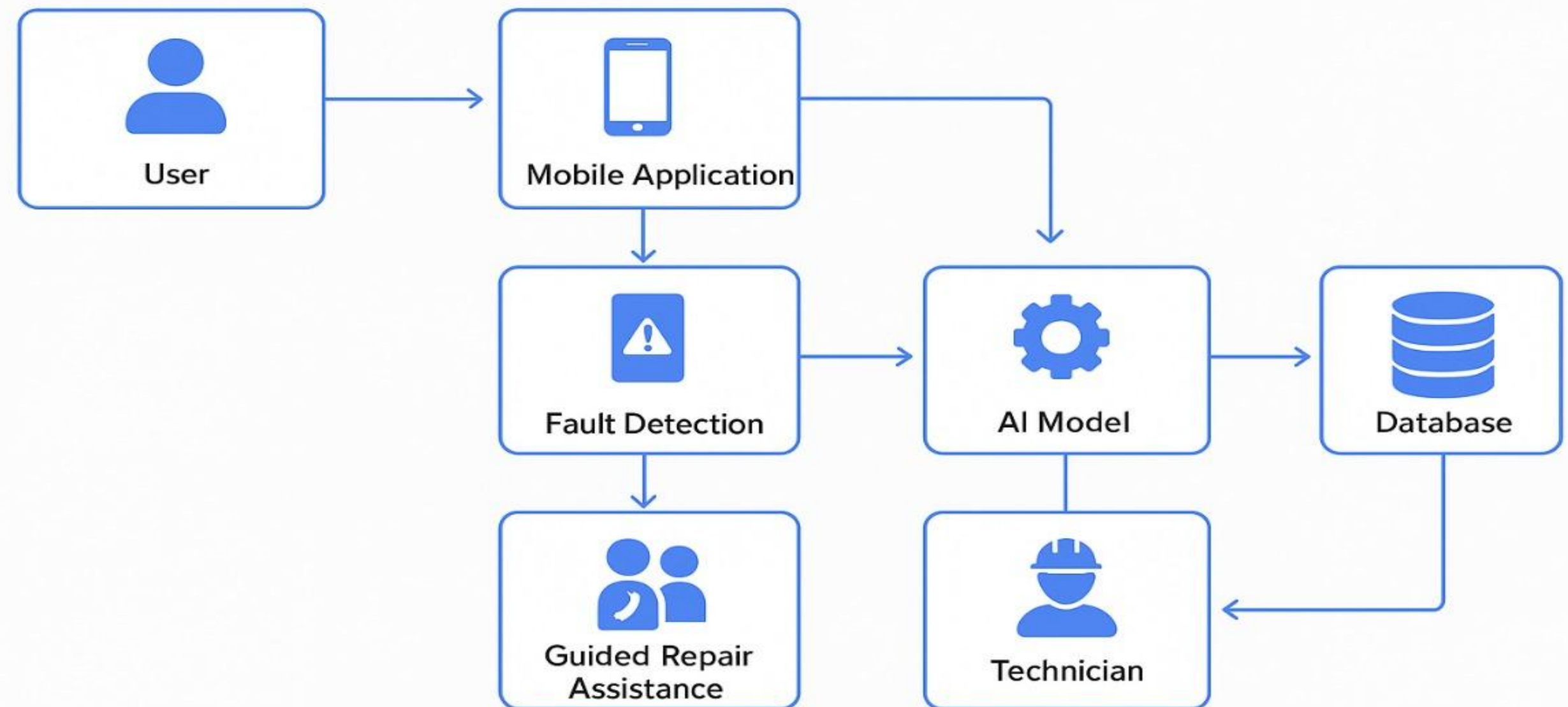
Requiring simple, guided assistance for repairs



System Architecture



SMART HOME REPAIR APP ARCHITECTURE

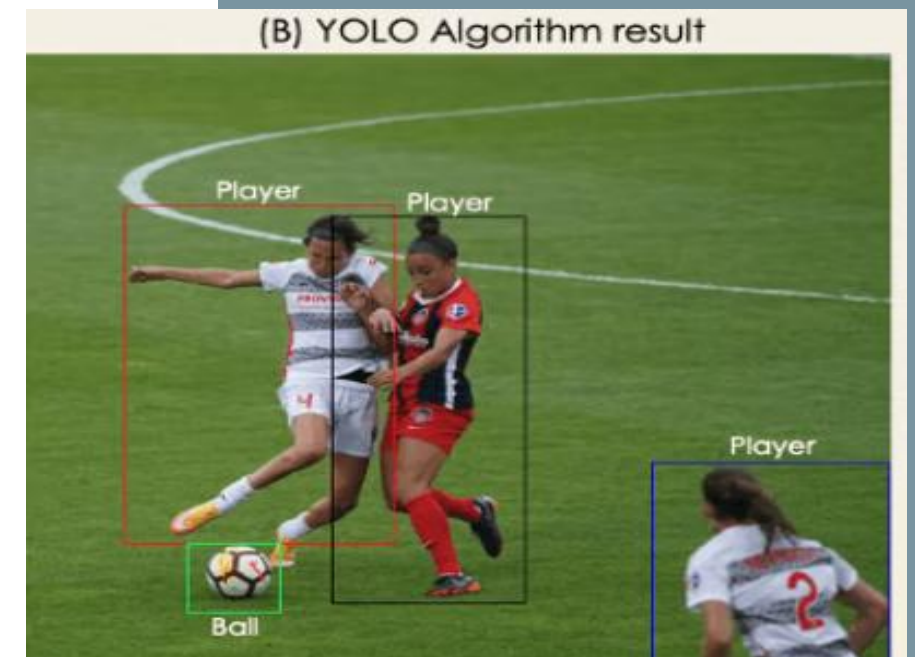


Proposed Algorithm

Algorithms Used: YOLOv5 + CNN

Process Flow:

1. Capture or upload an image/video of the damaged area.
2. Preprocess the data using OpenCV (resize, filter noise).
3. Detect and localize faults using **YOLOv5 object detection**.
4. Classify fault type via **Convolutional Neural Networks (CNN)**.
5. Generate suitable repair guidance based on AI results.
6. Post-repair image re-analysis for validation.
7. Store results and logs in MongoDB for future tracking.



Software and Hardware Requirements

Software Requirements:

- ✓ **Operating Systems:** Windows / macOS / Android
- ✓ **Languages & Frameworks:** JavaScript, Python, React Native, Node.js
- ✓ **Database:** MongoDB / Firebase
- ✓ **AI Libraries:** TensorFlow, OpenCV
- ✓ **Development Tools:** VS Code, Android Studio

Hardware Requirements:

- ✓ Smartphone with HD camera
- ✓ Intel Core i5/i7 Processor (min. 8 GB RAM)
- ✓ 256 GB SSD or higher storage
- ✓ Stable Internet / Cloud server with GPU support

Future Work

- Integrate a **voice-based AI assistant** for hands-free repair guidance.
- Employ **IoT sensors** for predictive maintenance and live fault monitoring.
- Enhance AI for **multi-object and multi-fault recognition**.
- Develop a **web-based admin and technician dashboard** for analytics and remote diagnostics.
- Incorporate **Augmented Reality (AR)** for immersive, real-time repair visualization.
- Add **multi-lingual support** to make the system accessible to users of different regions and languages.



References

- Al Kendi, A. et al. (2022). *Home Repairs: Mobile Application for Home Maintenance Services*, Middle East College.
 - Kumar, S. & Qadeer, A. (2012). *Application of AI in Home Automation*.
 - IEEE, ResearchGate, and ScienceDirect resources on AI, YOLO, and Smart Home Maintenance Systems.
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Thank you

