**SYSTEM ANALYSIS**

**Existing Systems and Their Disadvantages**

The existing techniques for determining drug resistance in tuberculosis strains involve laborious processes, including growing bacteria in the presence of drugs. These conventional methods have significant drawbacks:

1. **Time-Consuming**: Obtaining results can take a long time, delaying crucial treatment decisions.
2. **Accuracy Issues**: These techniques can produce false positives or false negatives, leading to incorrect diagnoses and treatment plans.
3. **Manual Labor**: The processes require considerable manual intervention, which increases the likelihood of human error and makes scaling difficult.

**Proposed System and Its Advantages**

The proposed system introduces a deep learning framework using a Convolutional Neural Network (CNN) for automated drug resistance prediction in tuberculosis. This new approach offers several advantages:

1. **Speed**: The proposed method provides a quicker way to determine drug resistance, significantly reducing diagnosis time.
2. **Accuracy**: The CNN model achieved a high accuracy of 97.27%, outperforming conventional methods and ensuring more reliable predictions.
3. **Automation**: By automating the prediction process, the system reduces the need for manual labor and minimizes human error.
4. **Efficiency**: The model demonstrates high efficiency with low error rates and high precision, sensitivity, and specificity scores, making it suitable for clinical applications.
5. **User-Friendly Interface**: A user-friendly interface was developed to facilitate easy use by radiologists and clinicians, enhancing the practical applicability of the system in medical settings​