**Mobile App for Real-Time Skin Cancer Detection Using Machine Learning**

**Motivation:**
Skin cancer is one of the most common and deadly cancers worldwide. Early detection is crucial to improving survival rates. A mobile app that can analyze photos of skin lesions and provide preliminary cancer detection offers a convenient, accessible tool to raise awareness and encourage timely medical consultation.

**Goals:**

1. Develop a mobile app that captures photos of skin lesions and predicts whether they are benign or malignant.
2. Train a machine learning model — for example, a Convolutional Neural Network (CNN) using transfer learning or another suitable algorithm — on the ISIC skin lesion image dataset.
3. Convert the trained model to TensorFlow Lite format for efficient mobile deployment.
4. Integrate the ML model into the mobile app to provide real-time predictions on user photos.

**Objectives:**

1. **Create a Mobile App:**
	* Design an intuitive interface for taking/uploading skin lesion photos and displaying prediction results.

**2. Develop the Machine Learning Model:**

* Use transfer learning with pretrained CNN architectures (e.g., MobileNet, EfficientNet, ResNet) trained on the ISIC dataset.
* Classify skin lesions into benign and malignant categories.
1. **Model Conversion and Integration:**
	* Convert the trained model to TensorFlow Lite format.
	* Integrate the model into the mobile app and implement image preprocessing for inference.
2. **Testing and Validation:**
	* Test the app with real images to evaluate prediction accuracy, speed and usability.
	* Add clear disclaimers emphasizing the app is for preliminary screening only, not a medical diagnosis.

**Final Output:**
By the end of this project, students will deliver a functional mobile app capable of capturing photos of skin lesions and providing real-time cancer risk predictions. The app will demonstrate the practical integration of machine learning into mobile software, empowering users to monitor skin health conveniently.

**Dataset:**
ISIC Skin Cancer Image Dataset: <https://www.isic-archive.com/>

**Learning Objectives:**

* Gain hands-on experience in mobile app development with Flutter or native SDKs.
* Learn how to train and fine-tune CNN models for image classification using a real-world medical dataset.
* Understand how to optimize and convert ML models for mobile deployment using TensorFlow Lite.
* Develop skills in integrating machine learning models into mobile applications for real-time inference.
* Improve abilities in testing, documenting, and presenting interdisciplinary projects effectively.