TechnoKreate Image Classifier – Algorithm Overview

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1. Initialize App

- Set Streamlit page config

- Initialize `st.session_state` variables for:

    - Labels, classes, label mapping, model, developer state

    - Initial load and splash screen triggers

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2. Splash Screen

- If first load → show `TechnoKreate` splash

- If developer override entered → show developer splash

- Else → run main interface

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3. Label Management

- Sidebar:

    - Text input for new label

    - If input matches developer command → enter developer mode

    - Else, add label to state if unique

- For each label:

    - Show image uploader (multi-file)

    - Convert each image to array and resize (64x64)

- ○ Store image arrays in `st.session_state['labels'][label]`

- List existing labels with delete button

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4. Model Training Options

- If >1 label:

  - ○ Show button to start training

  - ○ Collect:

    - Model architecture (Simple CNN, VGG, ResNet, Custom)

    - Epochs, learning rate, batch size

    - (If developer) customization like dropout, early stopping, optimizer, augmentation

- On training:

  - ○ Flatten images and convert labels to one-hot

  - ○ Train model using `train_model()` function

  - ○ Show progress bar using custom callback

  - ○ Save training history in model object

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5. Testing

- If model is trained:

  - ○ Upload a single test image

  - ○ Show uploaded image

  - ○ Preprocess and predict using `test_model()`

- Display label and confidence

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6. Model Download

- If model is trained:

  - User selects `.h5` or `.tflite` format

  - On download:

    - Package model + `label_mapping.py` + `main.py` (usage script) into a `.zip`

    - Streamlit download button

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7. Developer Features

Only visible after entering override:

- Custom themes

- Custom model architecture (# conv/dense layers, activations)

- Regularization (dropout, L2)

- TensorBoard logs (not yet implemented)