



# IMAGE PROCESSING TOOL

A WPF APPLICATION FOR LOADING, TRANSFORMING, AND  
SAVING IMAGES FROM A LOCAL FOLDER.

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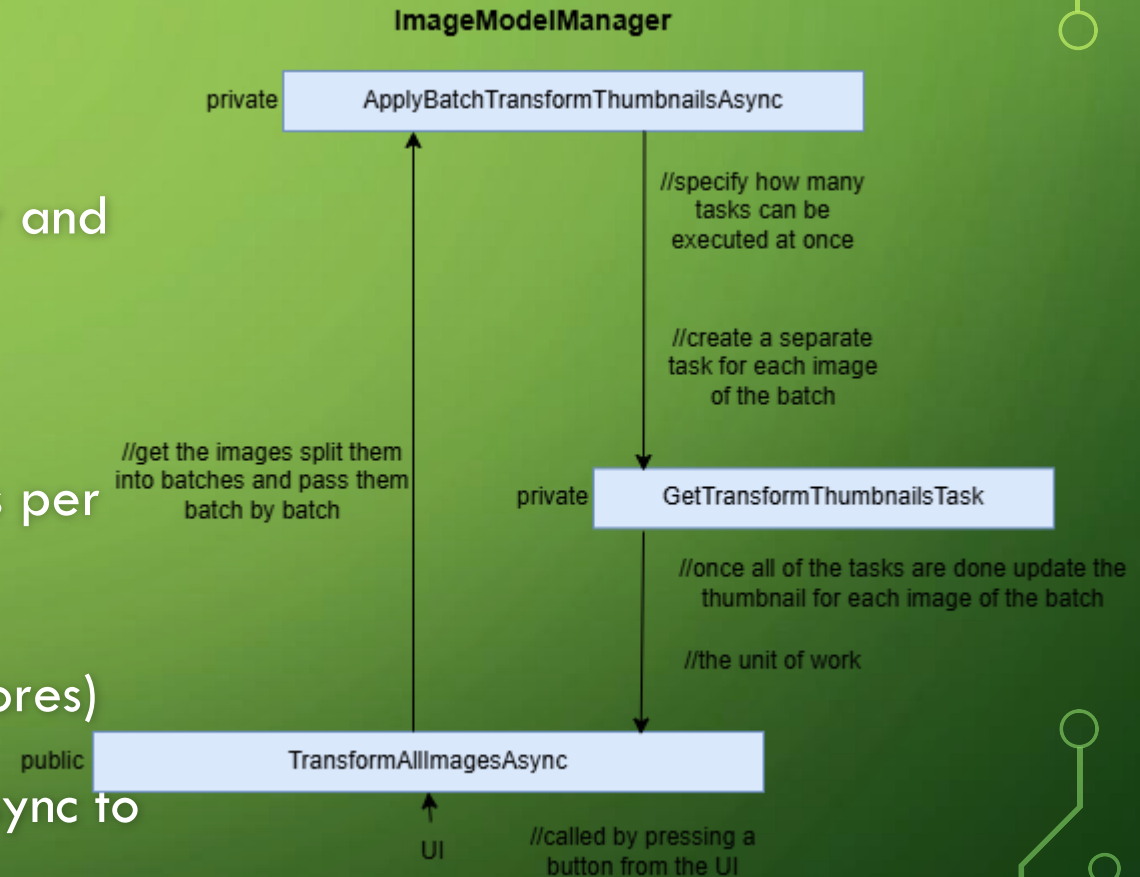
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# PROJECT OVERVIEW

- Built with .NET WPF, utilizes asynchronous and parallel programming.
- Handles over 500 images efficiently (dataset: 716 bird images)
- Core features:
  - Resize thumbnails (e.g.,  $128 \times 128 \rightarrow 64 \times 64$ )
  - Convert to grayscale
  - Undo last 4 actions
  - Save to custom folder
  - Search/filter by name
  - Cancel long operations
  - Configure batch size

# PROCESSING PIPELINE

- Core logic managed by ImageModelManager and its subclasses:
  - Load, Grayscale, Resize, and Save Managers
- Batching limits memory usage (e.g., 32 images per batch)
- Use Semaphore to control concurrency (CPU cores)
- Thumbnails updated using Dispatcher.InvokeAsync to remain UI-thread safe



# MODELS, CONTROLS AND SEARCH LOGIC

- ImageModel represents image state (name, path, bitmap, visibility)
- Bound to ThumbnailControl UserControl with UI thread safety
- Implements INotifyPropertyChanged for real-time UI updates
- Search uses AsParallel() for responsive filtering
- Batch size configurable via the Settings window and appsettings.json