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Collecting Image Cropping Dataset: A Hybrid System of Machine and Human Intelligence

Uyen T. Mai
Portland State University

Feng Liu
Portland State University

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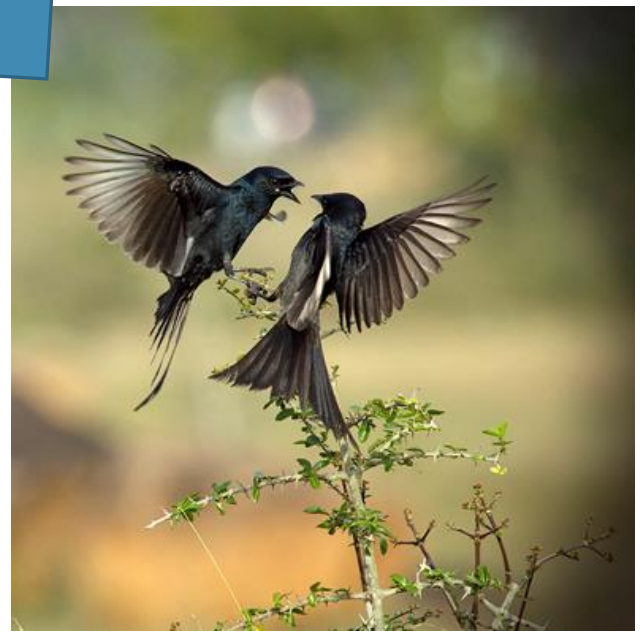
Target crop
w : h = 1 : 1

w : h = 1 : 1

w : h = 1 : 1

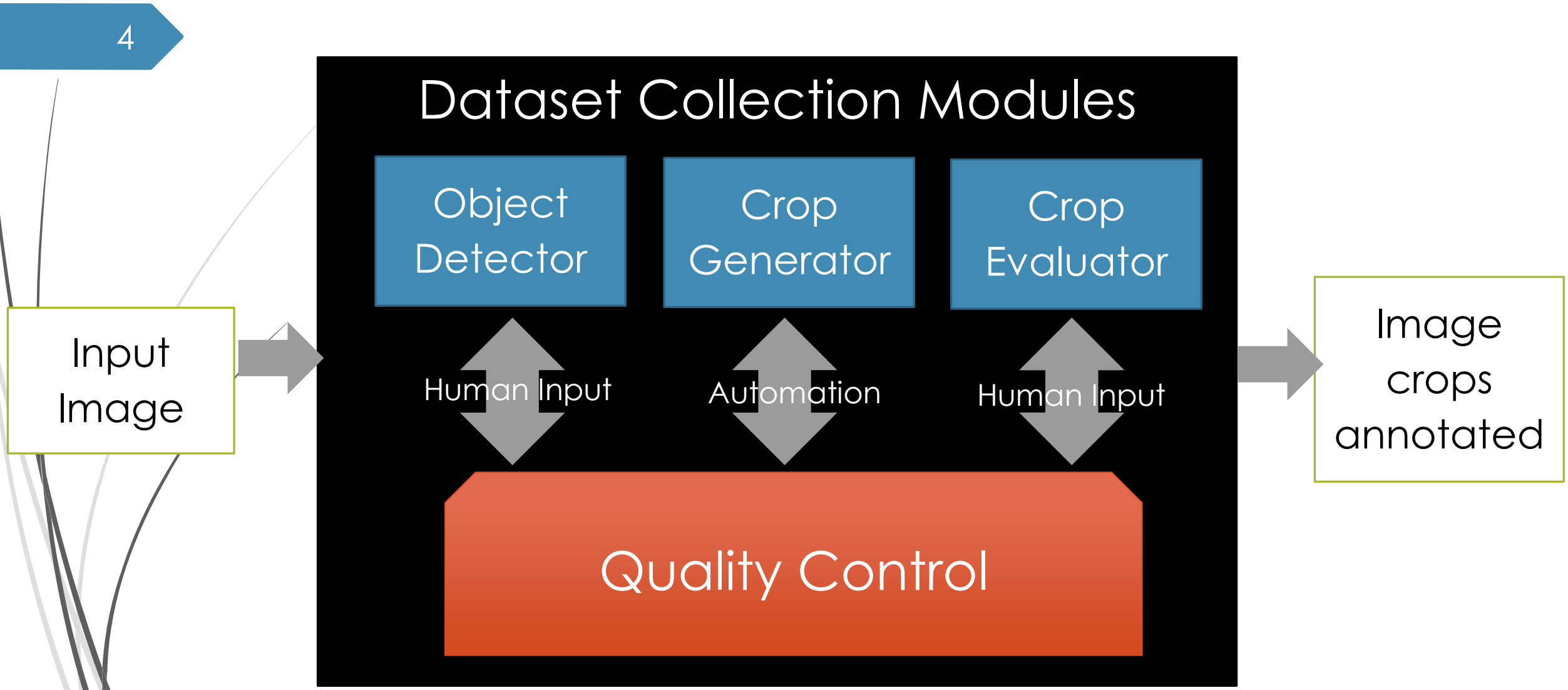
w : h = 1 : 1

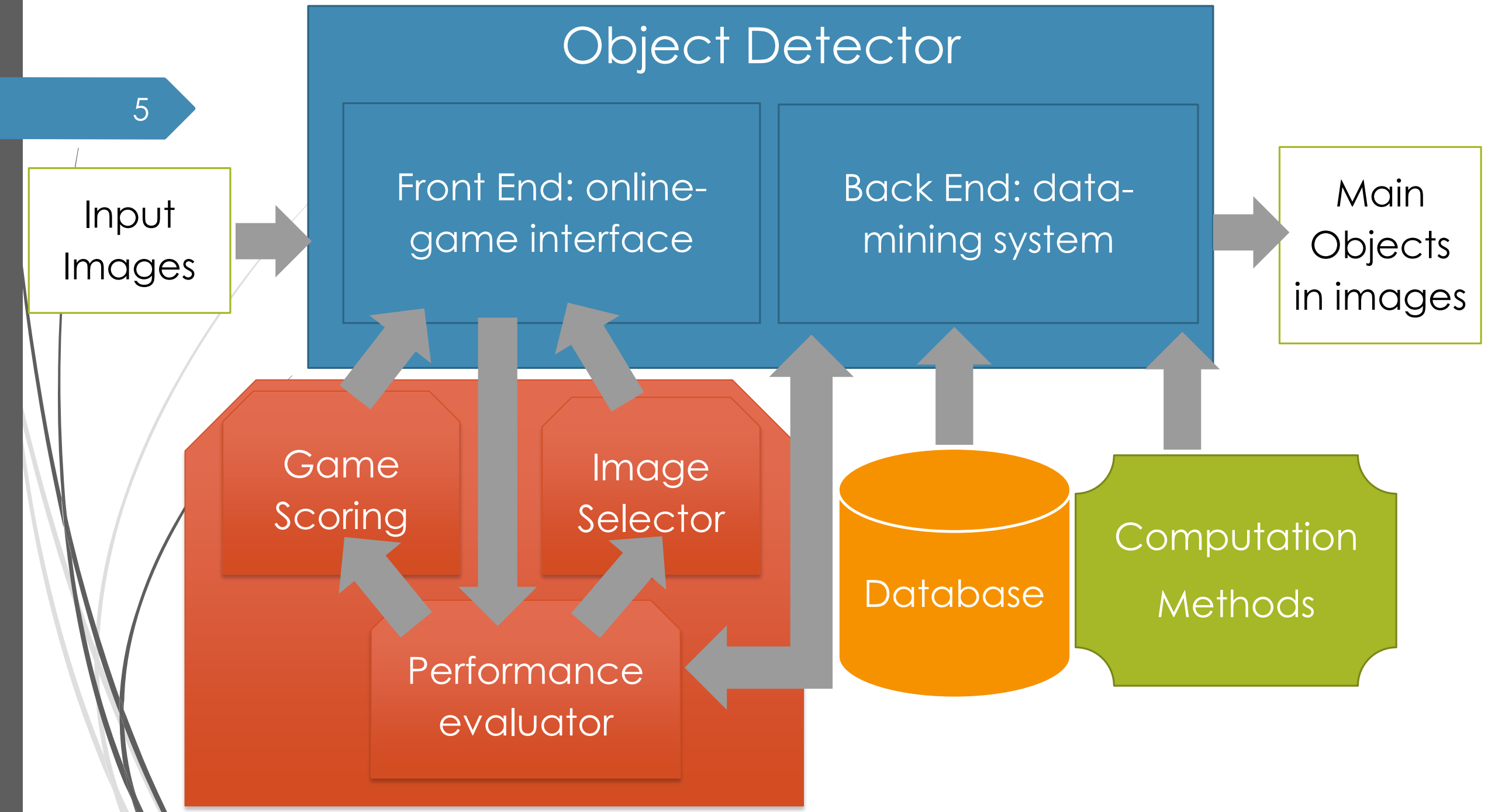
w : h = 1 : 1



Project goals

- Collect a dataset of up to 50,000 images
  - at least one good crop for each aspect ratio 1:1, 4:3, 16:9
- Employ crowdsource for annotation
- Hybrid system of human & machine intelligence
- Online-game interface


Dataset Collection Modules
Object Detector
Crop Generator
Crop Evaluator
Human Input
Automation
Human Input
Quality Control
Input Image
Image crops annotated


Object Detector
Front End: online-game interface
Back End: data-mining system
Input Images
Main Objects in images
Game Scoring
Image Selector
Performance evaluator
Database
Computation Methods

Game interface

Your Score: 0

2

Your Score: 0

Your Score: 782

3

The starting set of labeled images

- Have 5 persons labeled objects for 100 images
  - Use Kmeans clustering to group and center the object marked
- Labeled images are used for quality control and scoring

Image ID: 28 Go

Next

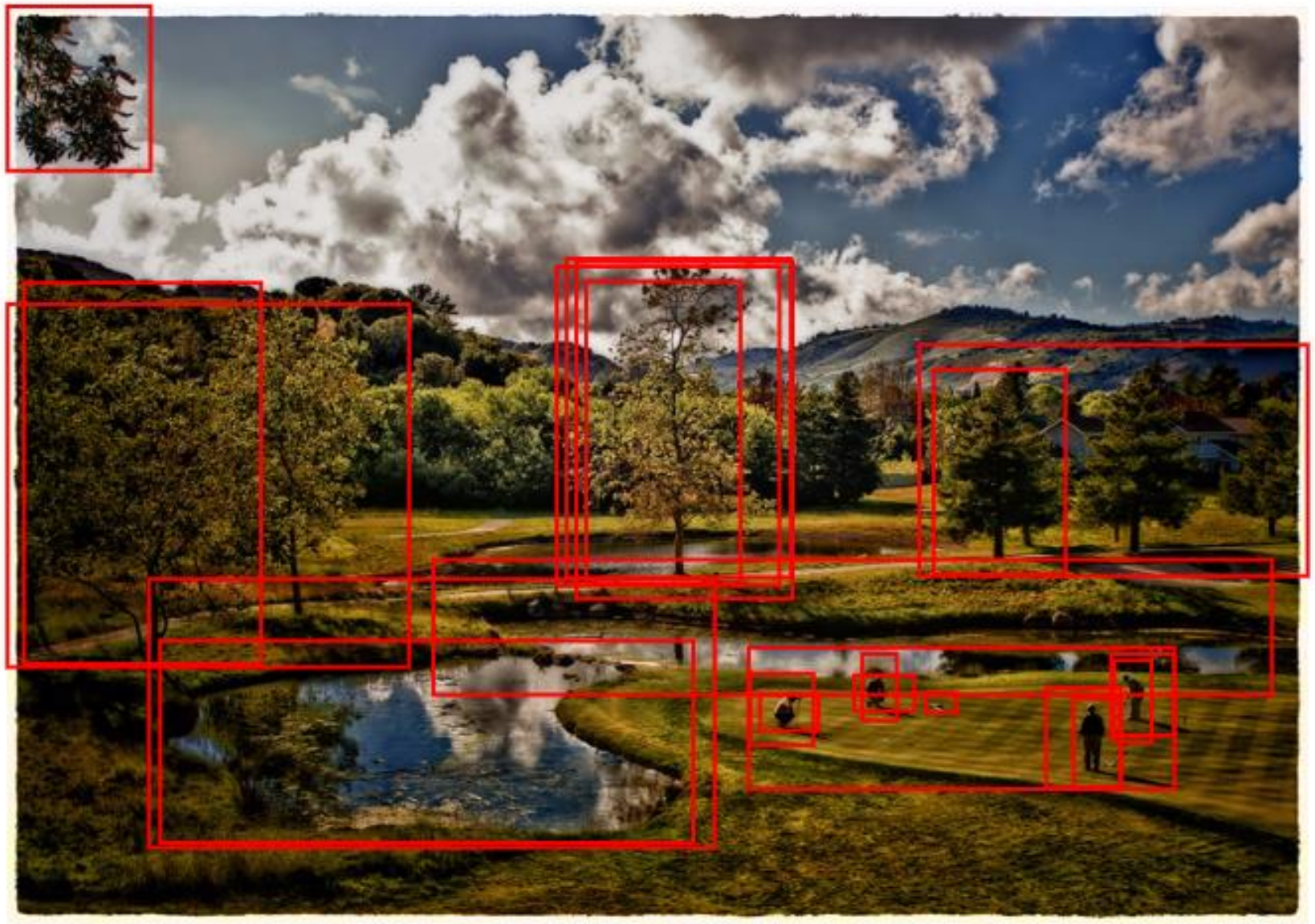
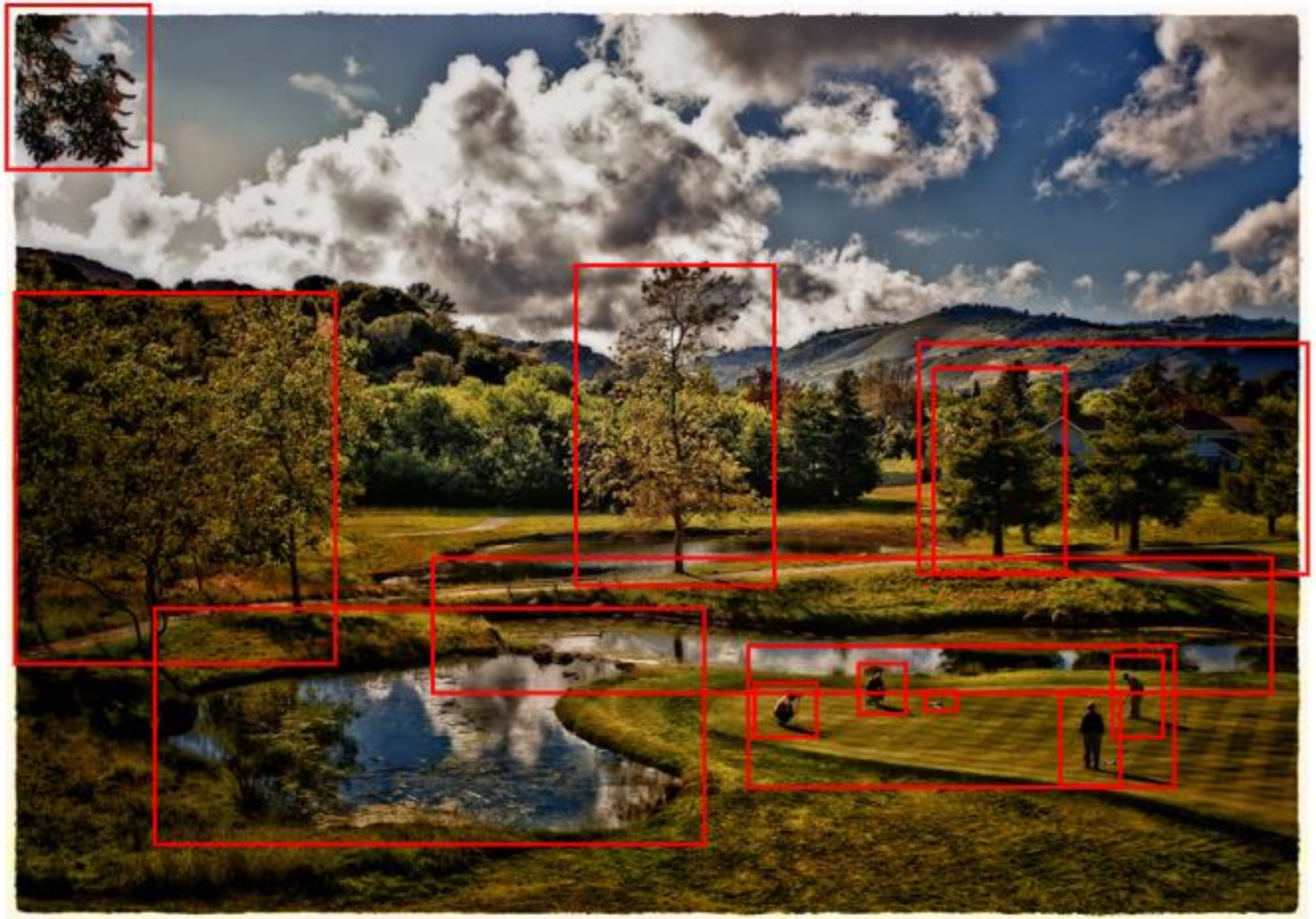


Image ID: 28 Go

Next



Your Score: 3840

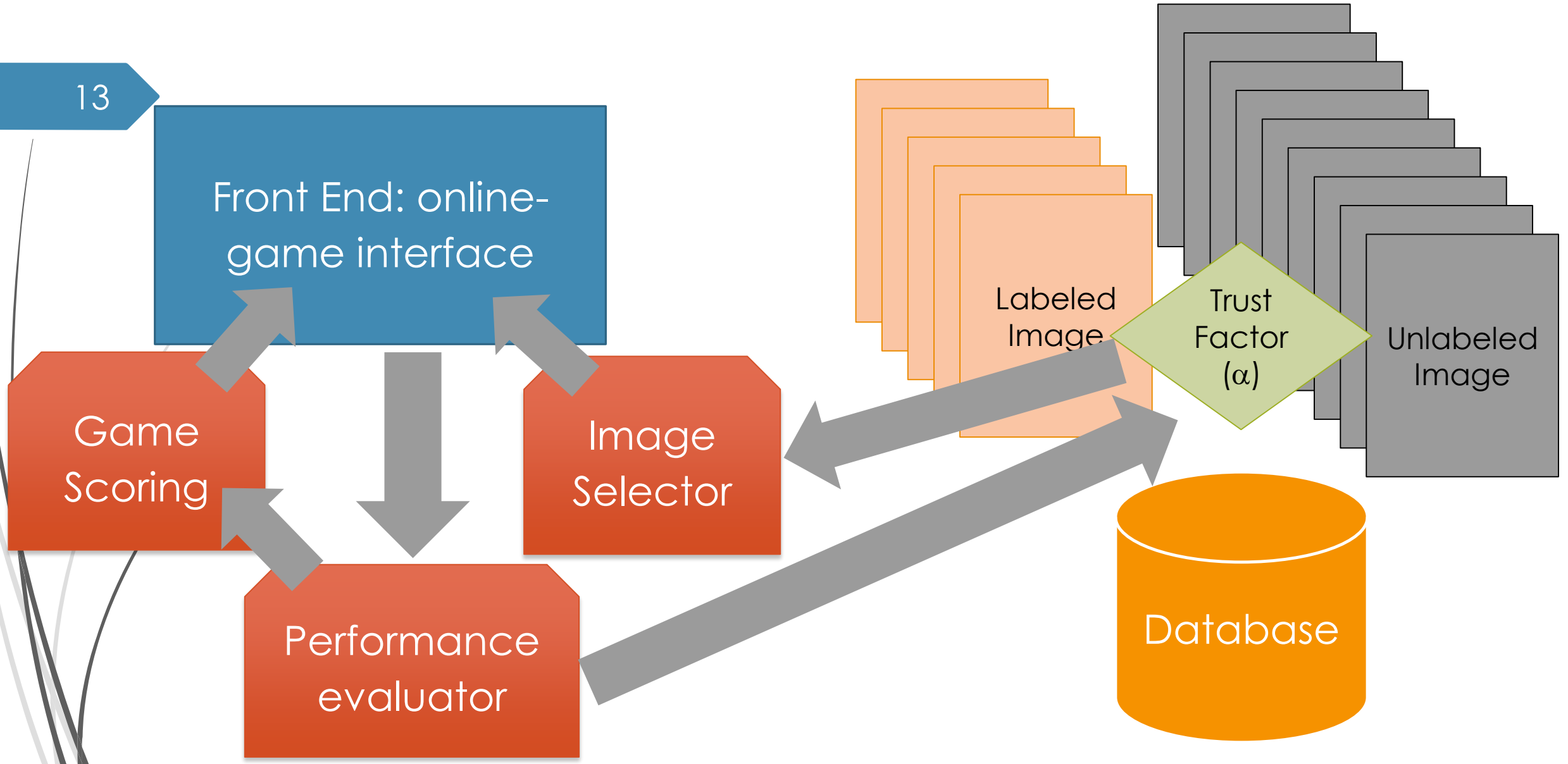
6

Your Score: 0

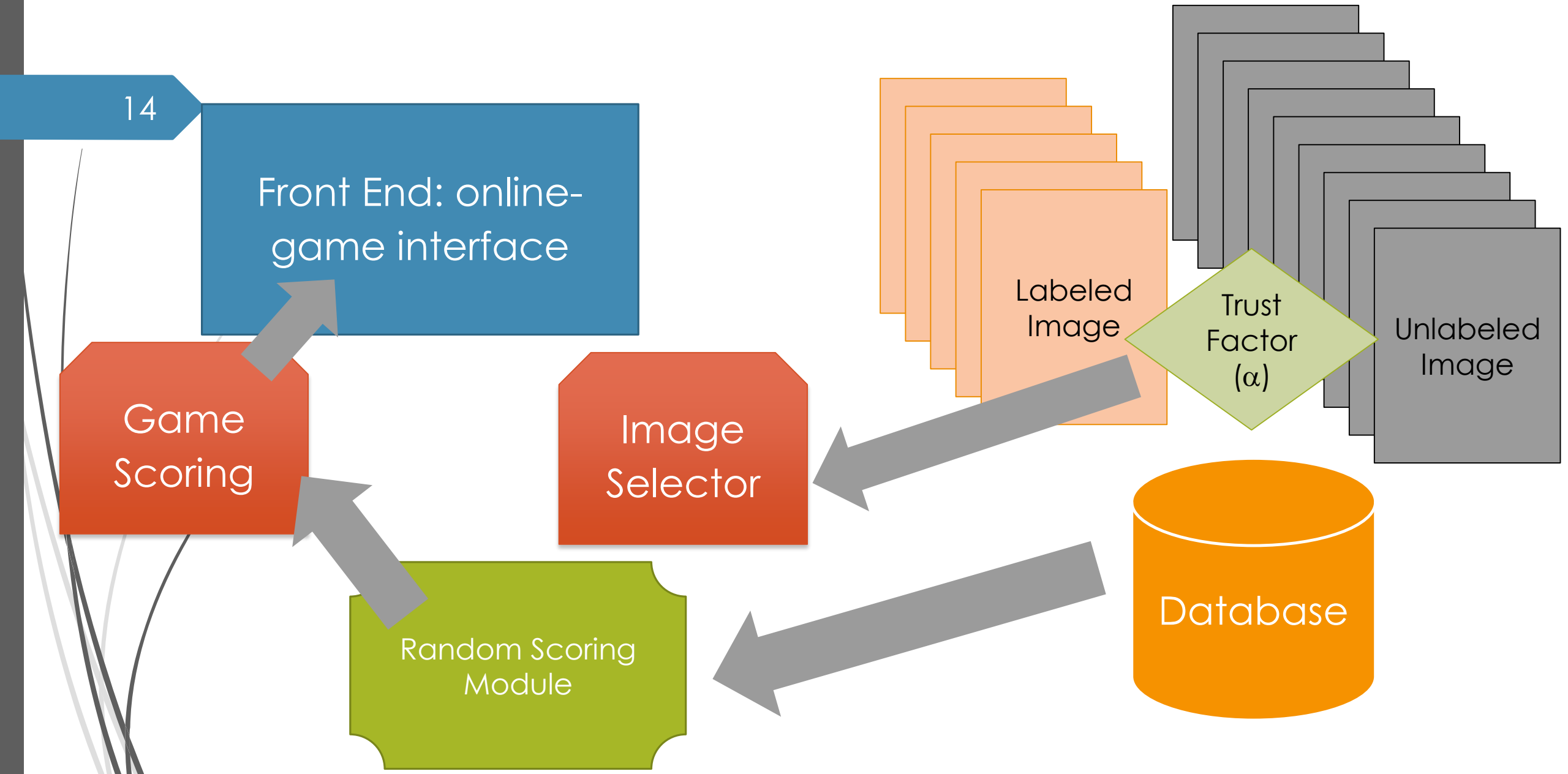
6

Quality control

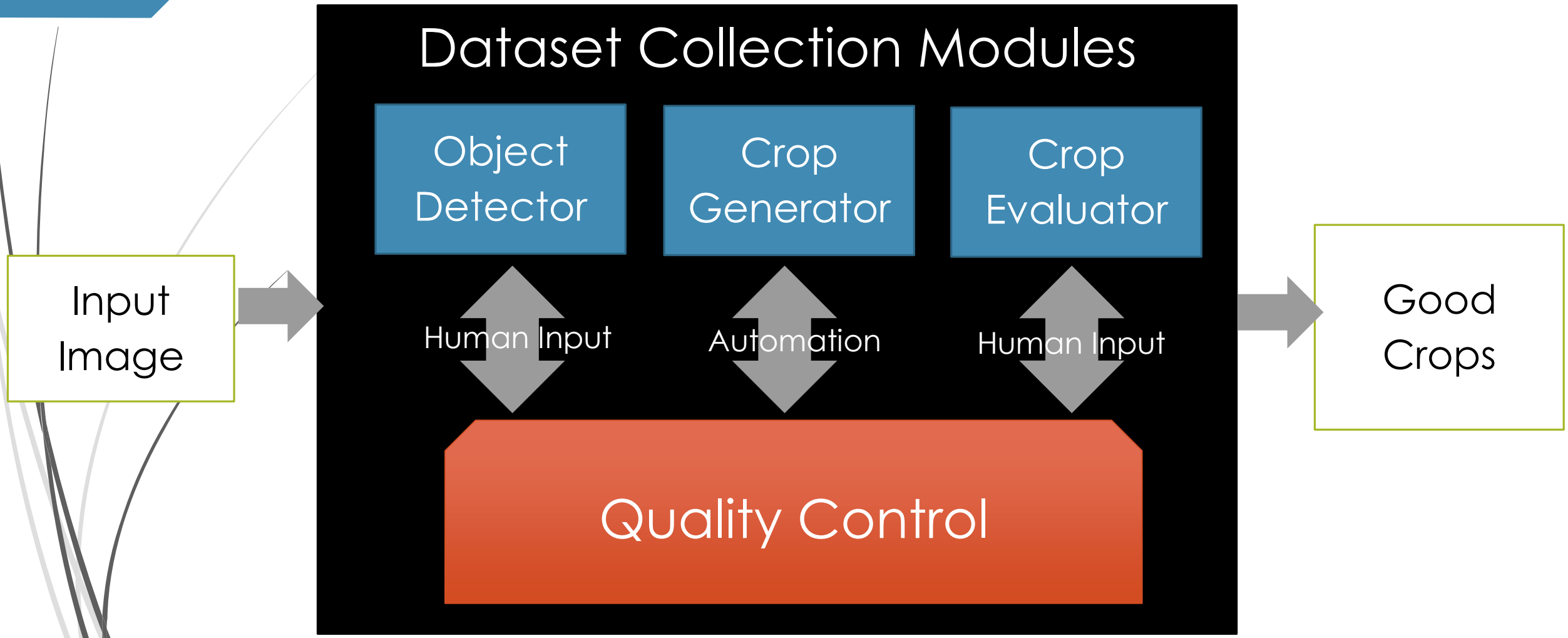
- After each game turn, evaluate and record player's performance
- Players that performed well have a higher probability to be given an unlabeled image in the next turn
- BOTH labeled and unlabeled images are updated with new objects



Trust Factor = the probability that an unlabeled image is shown



Trust Factor = the probability that an unlabeled image is shown


Dataset Collection Modules
Object Detector
Crop Generator
Crop Evaluator
Human Input
Automation
Human Input
Quality Control
Input Image
Good Crops

Generating potential good crops

- Composition Principles
  - Rule of third
  - Rule of balance
  - Rule of simplicity
- Computation Modules
  - Sliding windows
  - Saliency analysis

Target Ratio
w : h = 1 : 1

Crop Generator

Composition Principles

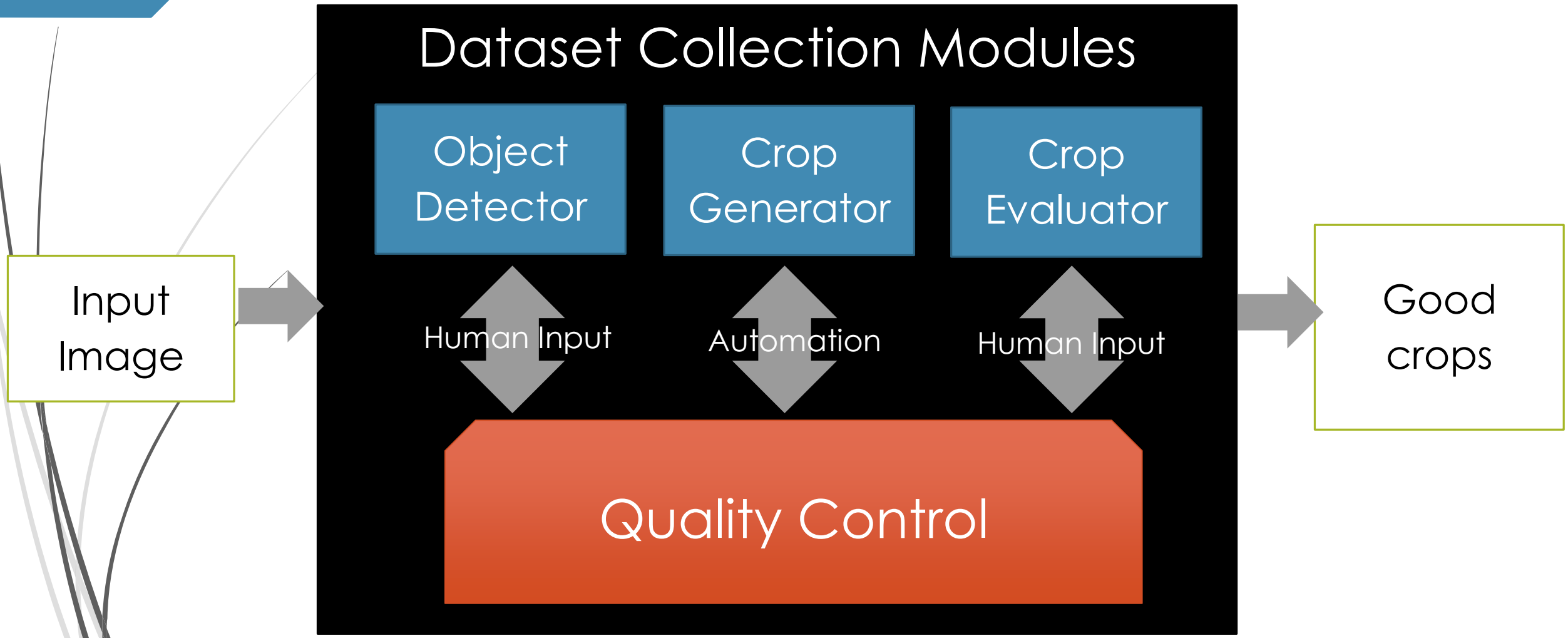
Computational Modules

Target Ratio
w : h = 4 : 3

Crop Generator

Composition Principles

Computational Modules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Quality Control
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Good crops

Evaluation of the generated crops

- A person is asked to select the best crop among 4
- Quality control
  - 2 random crops & 2 potential good crops
  - Timing
  - Scoring