



# AGOLEARN

*An black-box, "agnostic" evolutionary optimizer*

by: Yiding Li





foundation: evolutionary computing

# AGOLEARN

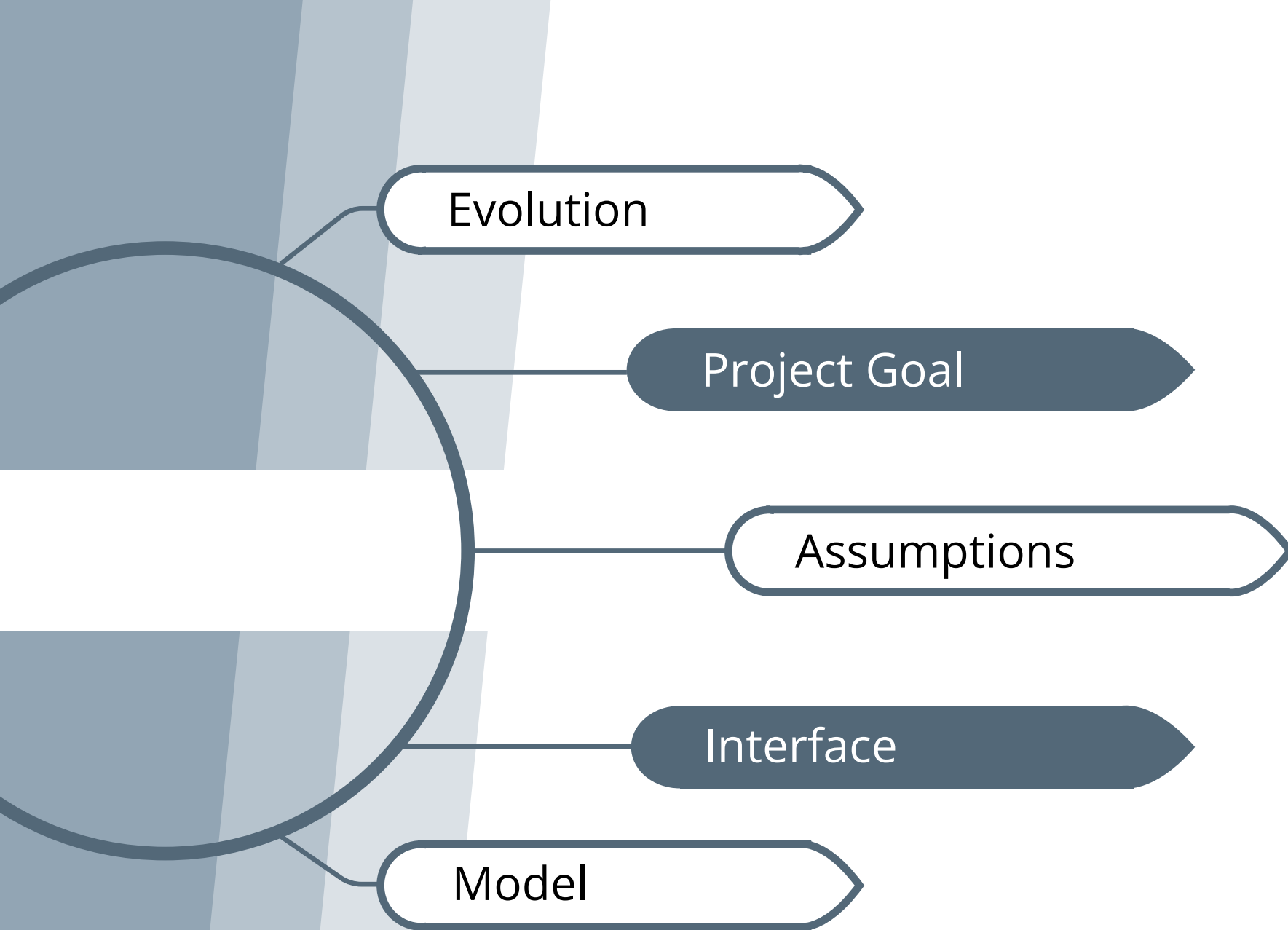
*An black-box, "agnostic" evolutionary optimizer*

by: Yiding Li

objective function can be anything

goal: to optimize the objective function





## Evolution

Project Goal

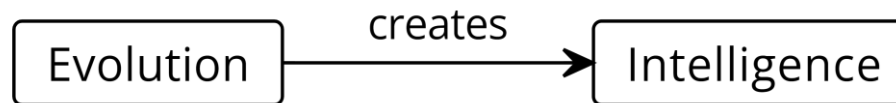
Interface

Assumptions

Model

# What is evolution?

- Evolution creates intelligence



## Evolution

Project Goal

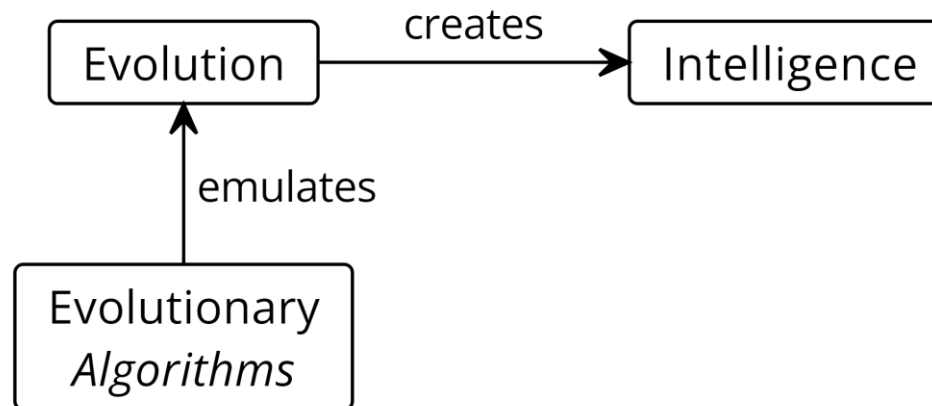
Interface

Assumptions

Model

## What is evolution?

- Evolution creates intelligence
- Algorithm emulates evolution



## Evolution

Project Goal

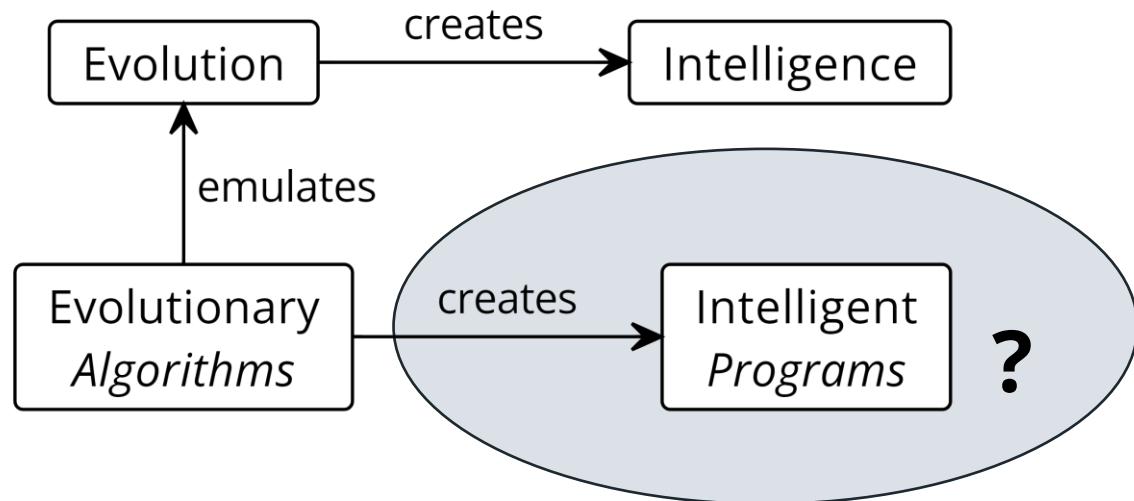
Interface

Assumptions

Model

## What is evolution?

- Evolution creates intelligence
- Algorithm emulates evolution
- Can algorithm creates intelligence?



## Evolution

Project Goal

Interface

Assumptions

Model

## Example: Adaptation in Moths

- Initial population: pale moths
- Environment: industrialisation
- Result: dark moths
- Improvement: **survivability**



# Evolution

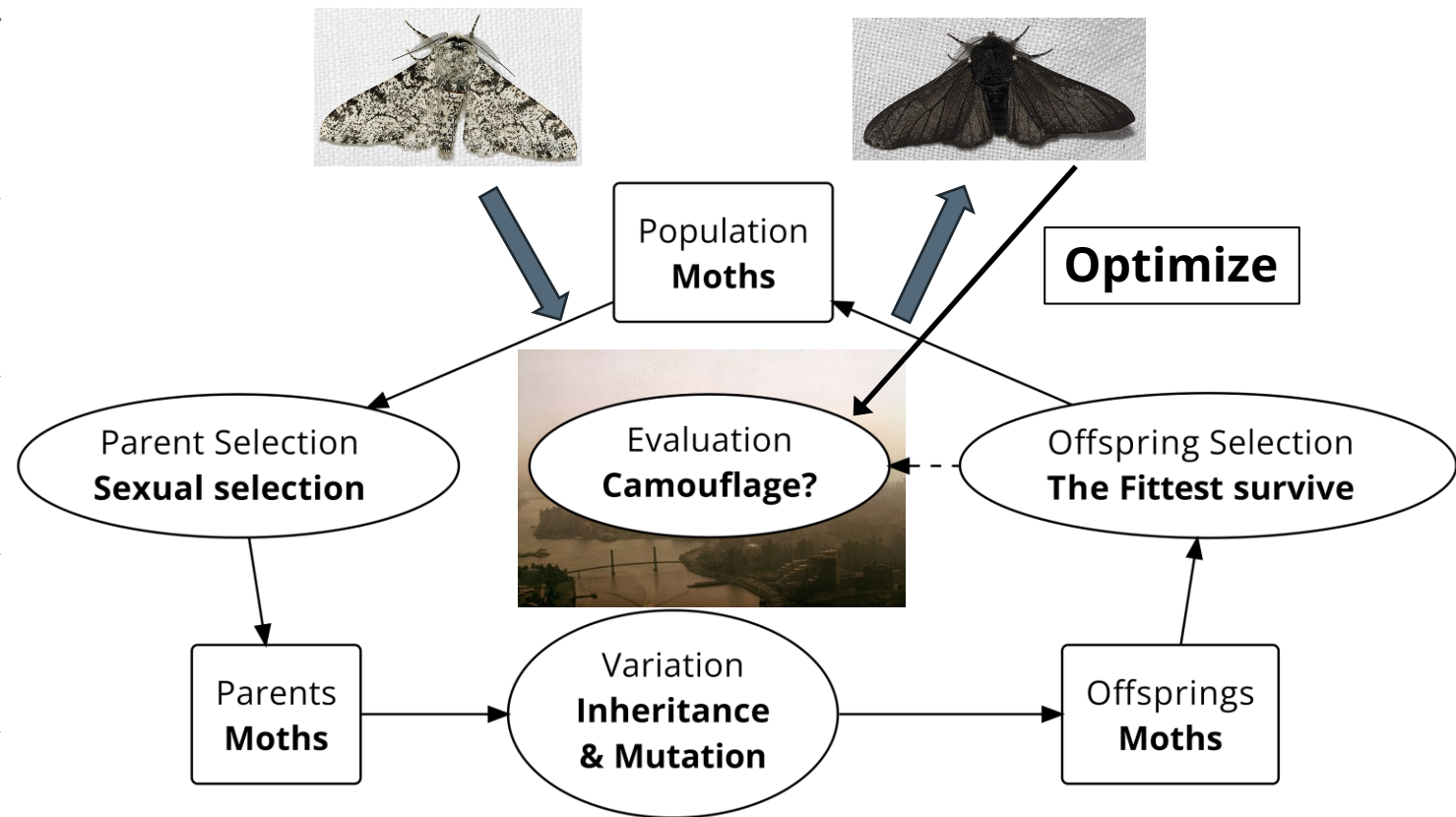
Project Goal

Interface

Assumptions

Model

## The Algorithm of Evolution





# The Algorithm of Evolution (cont.)

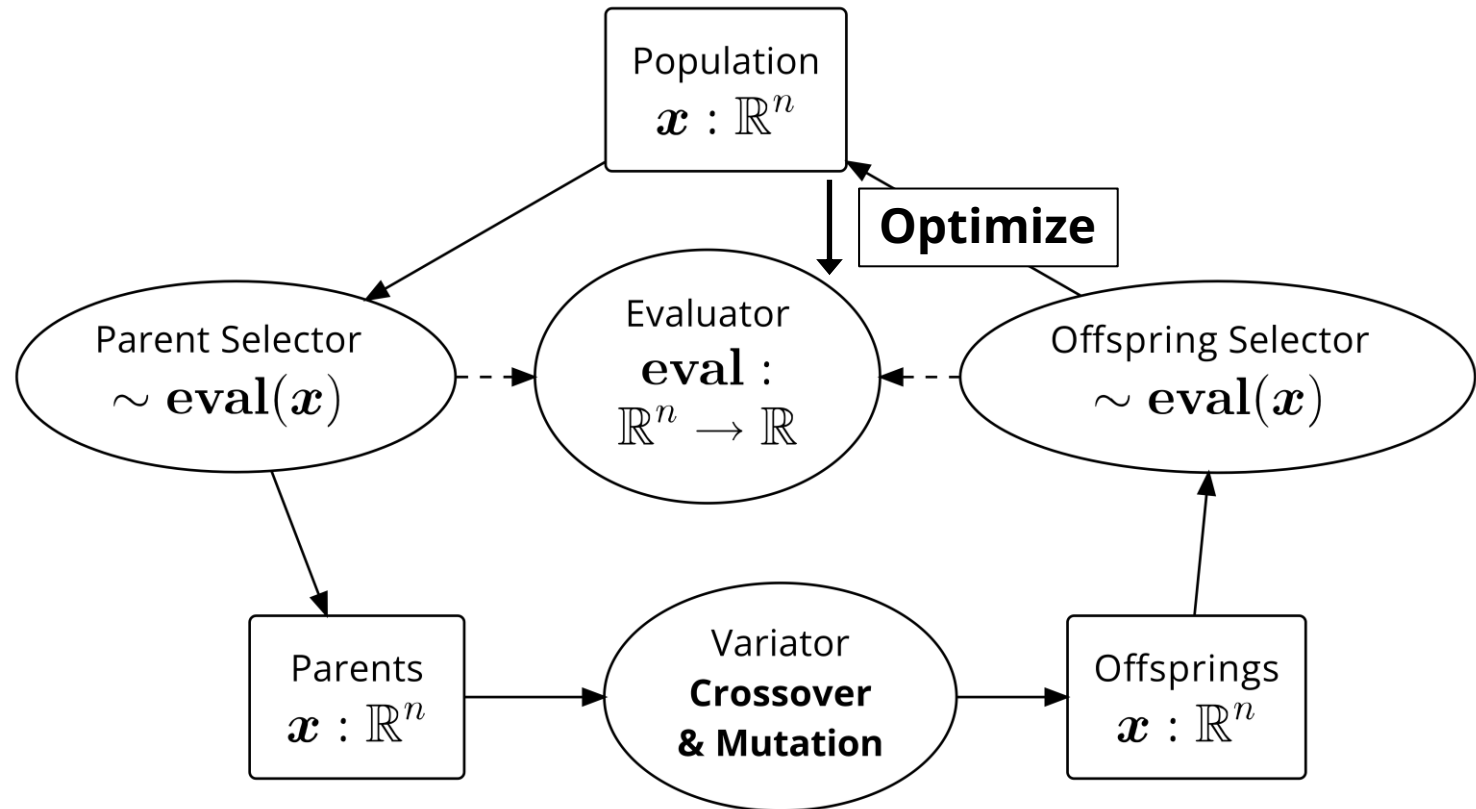
Evolution

**Project Goal**

Interface

Assumptions

Model



Evolution

**Project Goal**

Interface

Assumptions

Model

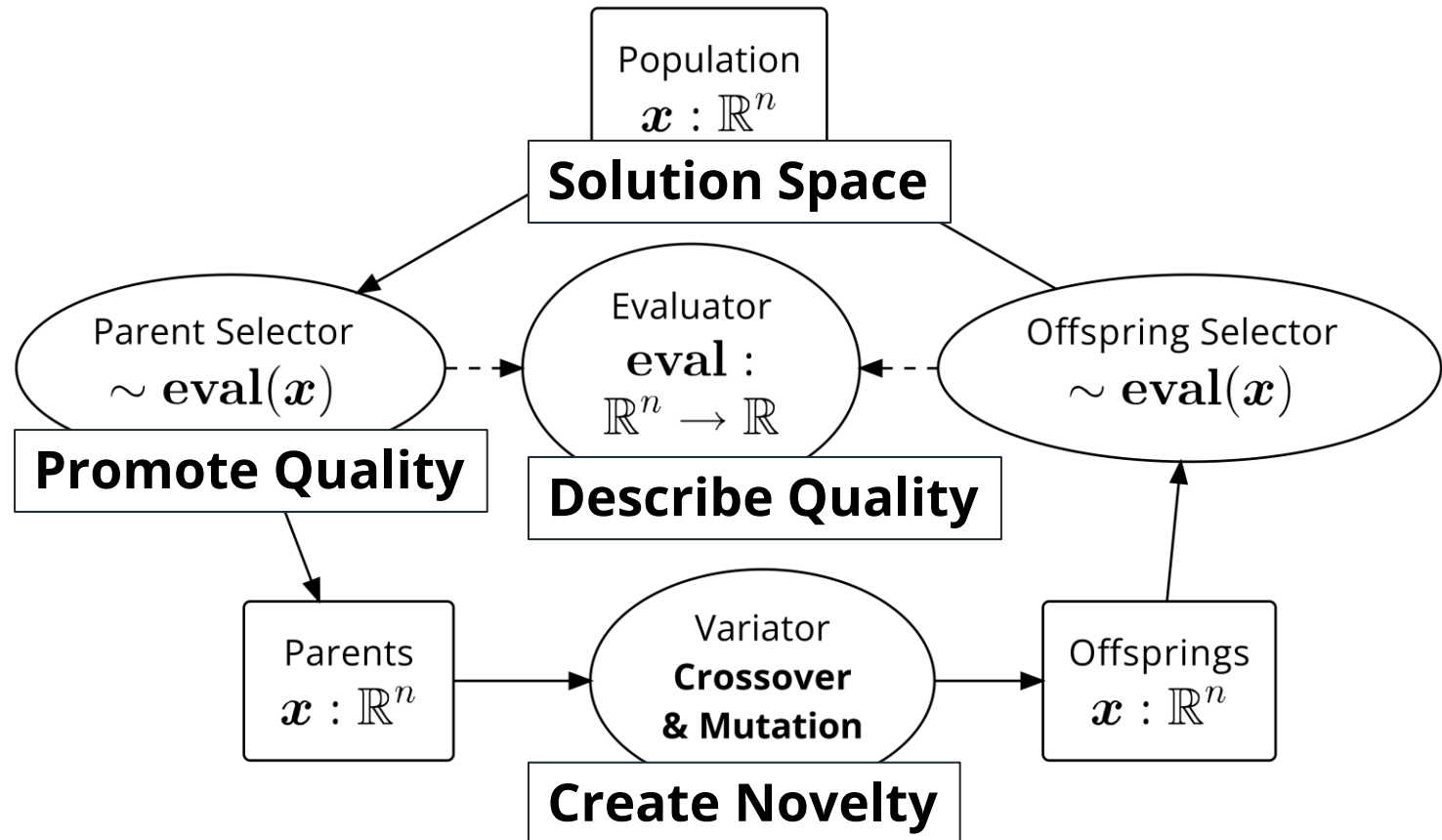
## Evolution

## Project Goal

## Interface

## Assumptions

Model



# Input

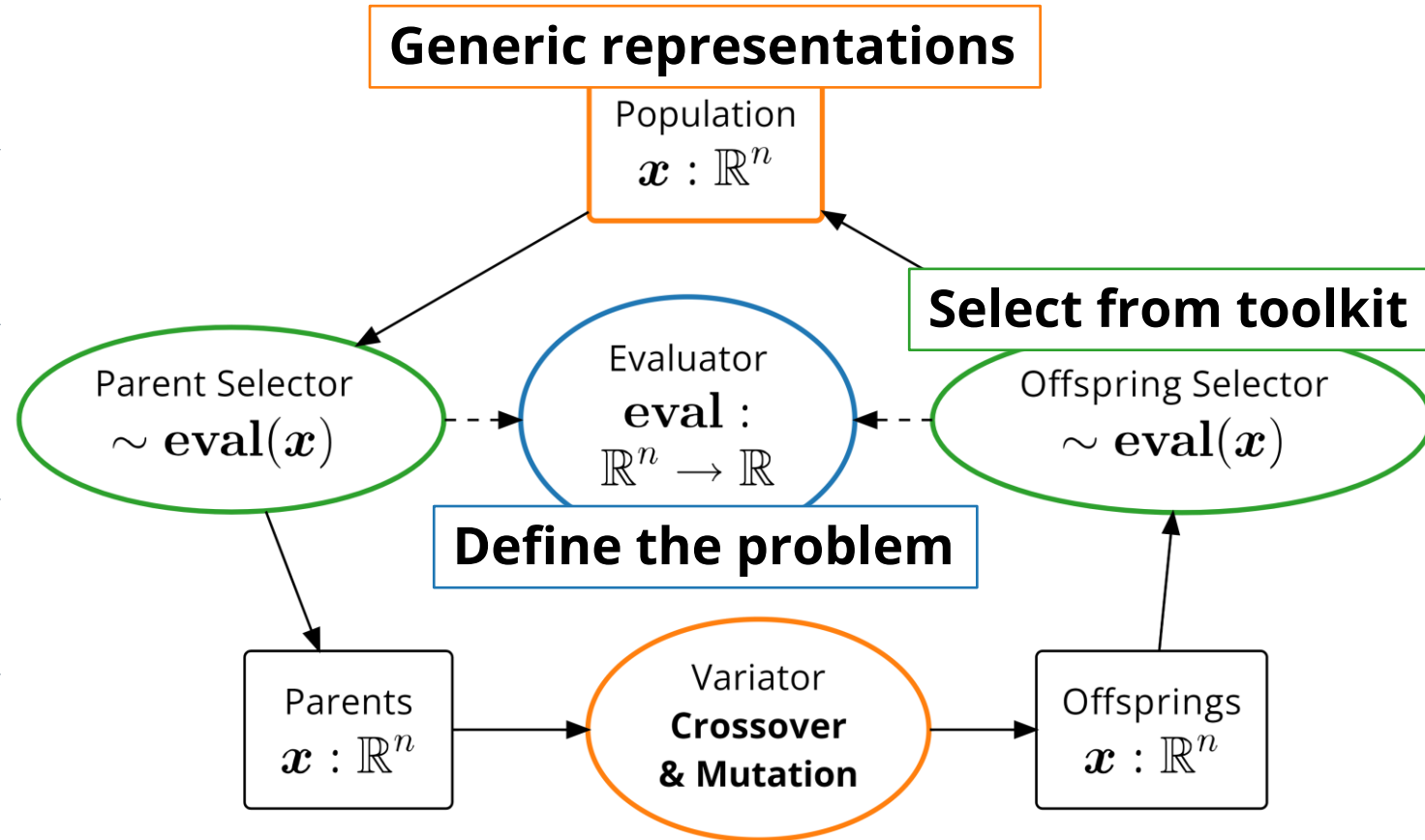
Evolution

Project Goal

**Interface**

Assumptions

Model



Evolution

Project Goal

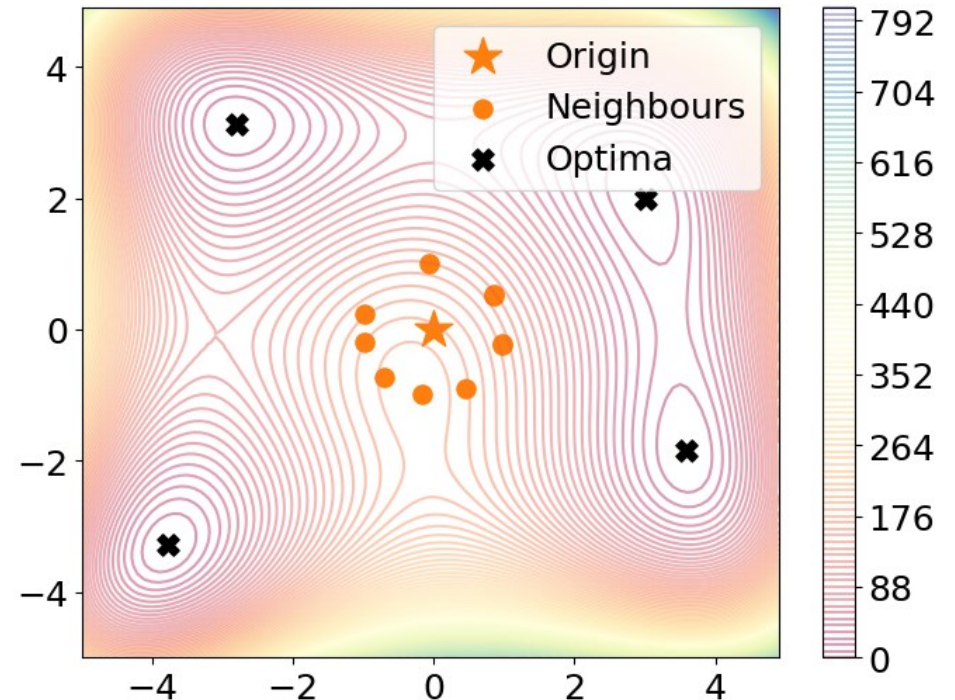
**Interface**

Assumptions

Model

## Input (Example)

- **Evaluator**: loss function
- **Variator**: random neighbours
- **Selector**: select best result



Evolution

Project Goal

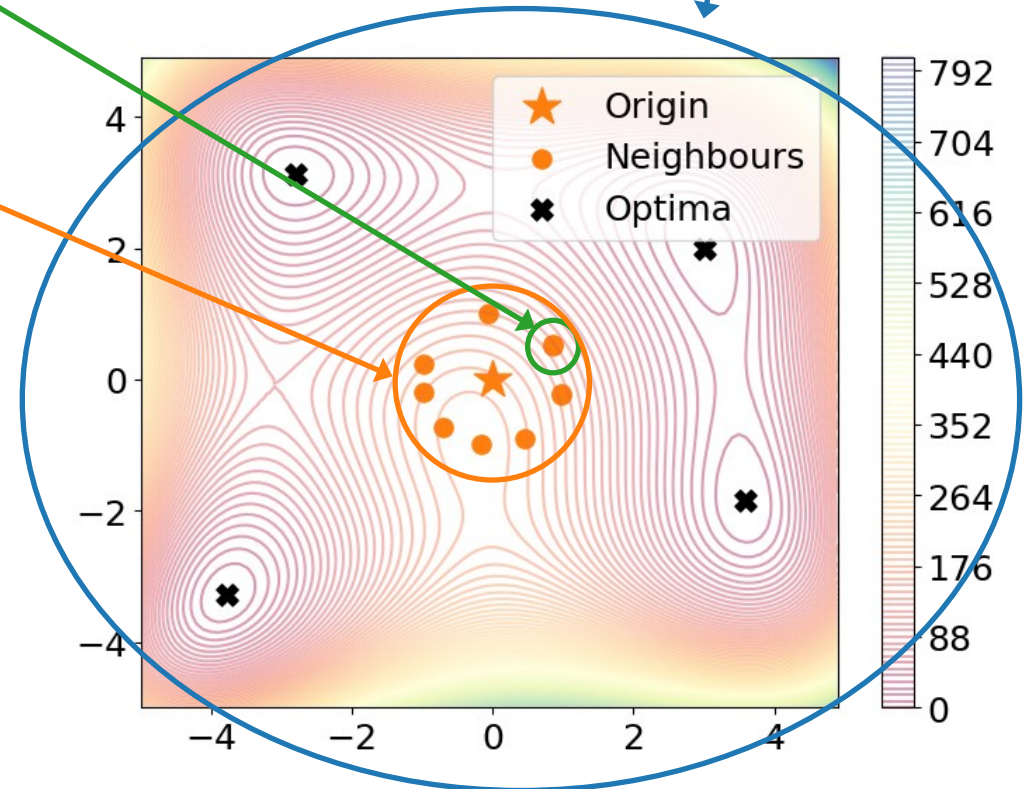
**Interface**

Assumptions

Model

## Input (Example)

- **Evaluator**: loss function
- **Variator**: random neighbours
- **Selector**: select best result



Evolution

Project Goal

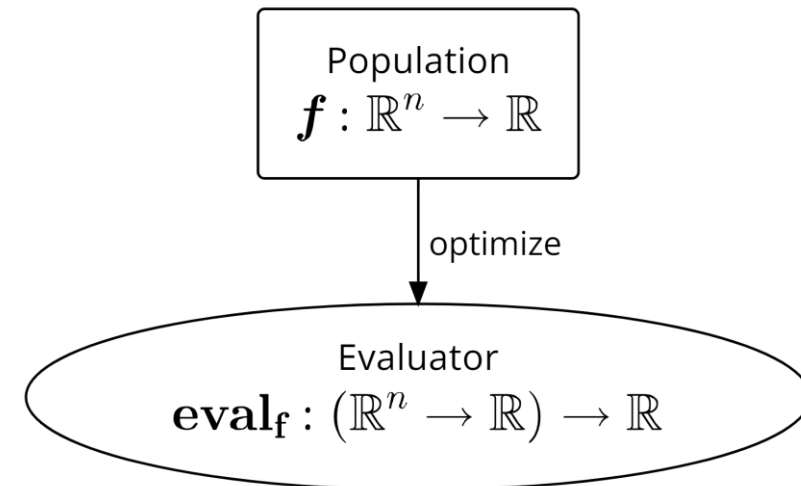
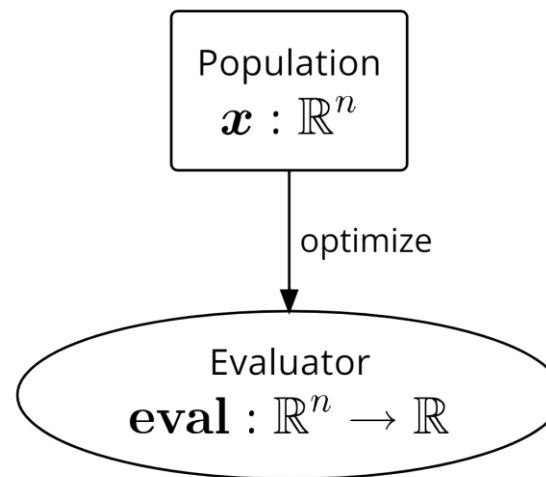
**Interface**

Assumptions

Model

## Input (Details)

- **Starter Goal:**  
optimize real-valued functions
- **Stretch Goal:**  
optimize higher-order functions



Evolution

Project Goal

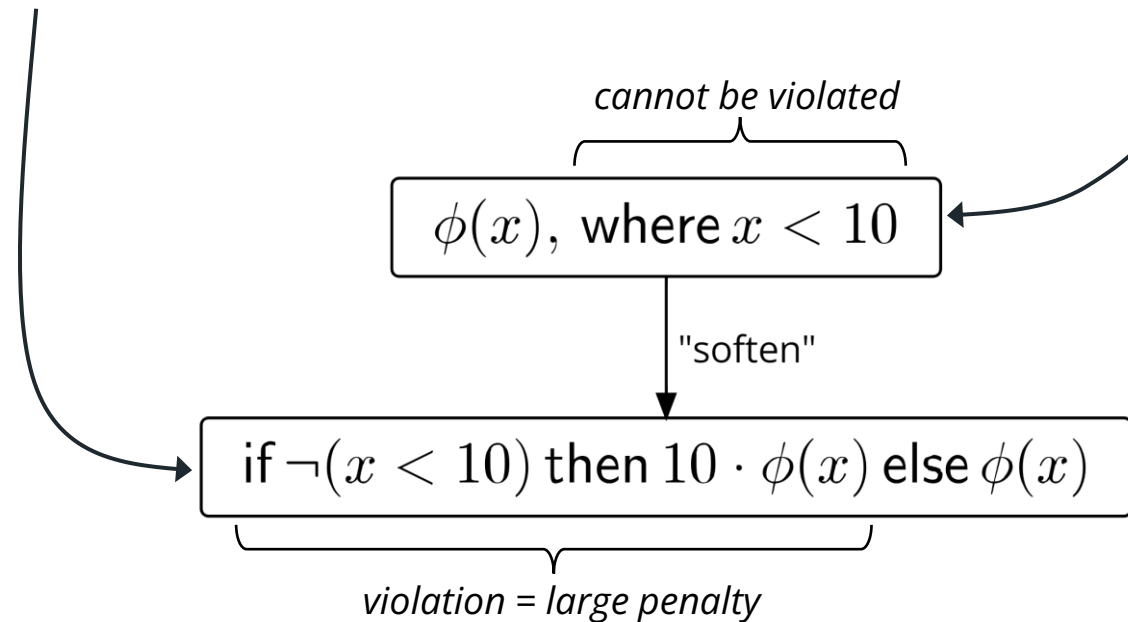
Interface

**Assumptions**

Model

## Assumptions

- Optimality **not** guaranteed
- No **hard** constraints on input
- **Soft** constraints are still possible



Evolution

Project Goal

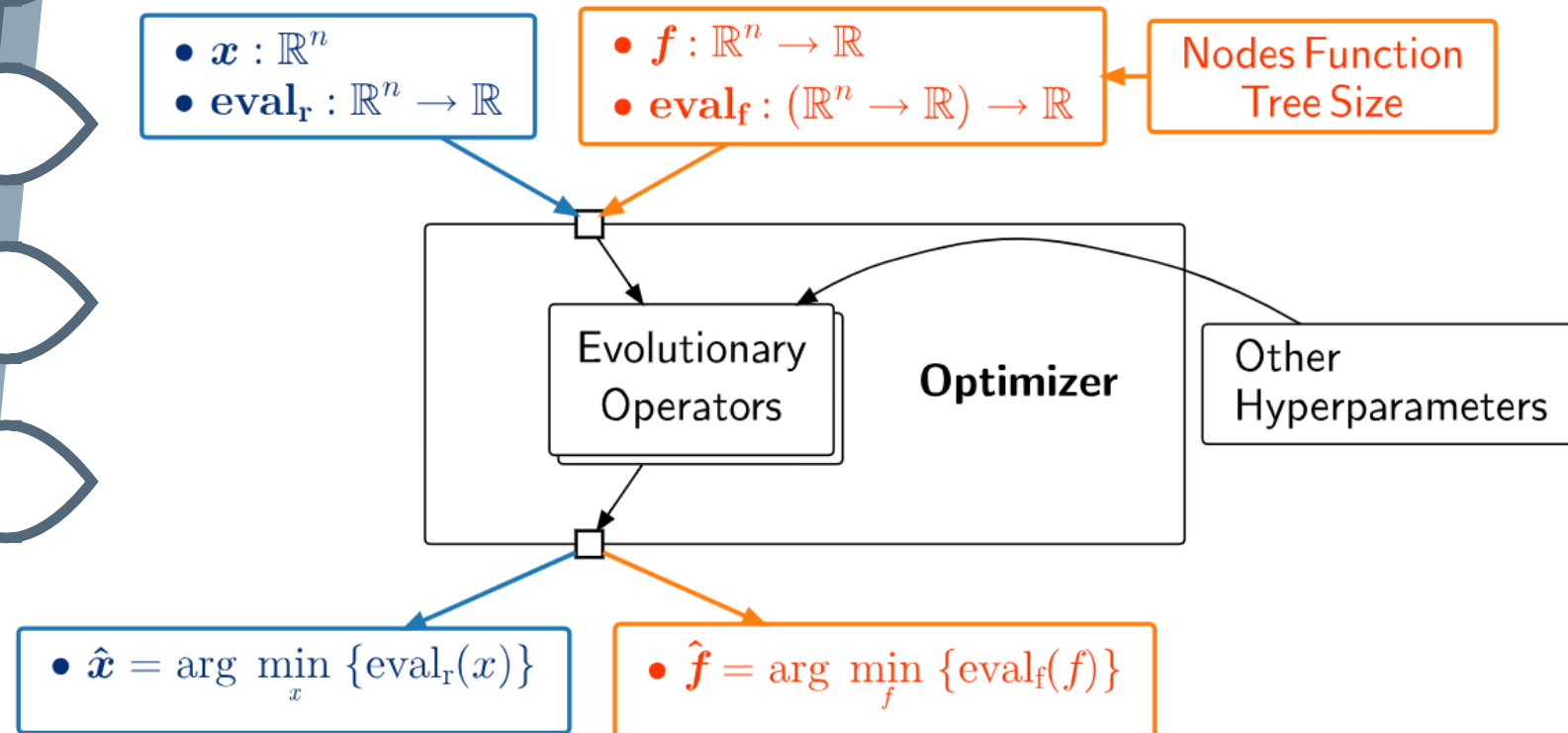
Interface

Assumptions

**Model**

## Draft Model

- Inputs and outputs defined
- Hyperparameters *not* defined







# QUESTIONS