



# **It's All Astounding**

**Exploring Genetic Algorithms**

Whelan, Malopinsky



## Quick Recap:

1. Get an initial population



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6. Create a new population
7. Start over at #2 until satisfied

A close-up shot of a bald man with a frustrated or angry expression. He is looking slightly to his left with furrowed brows and a grimace showing his teeth. He is wearing a light blue or grey high-collared shirt. The background is dark and out of focus.

sometimes GAs don't make  
what you want them to make



sometimes GAs don't make  
what you want them to make

like sharks with fricking laser beams

attached to their heads

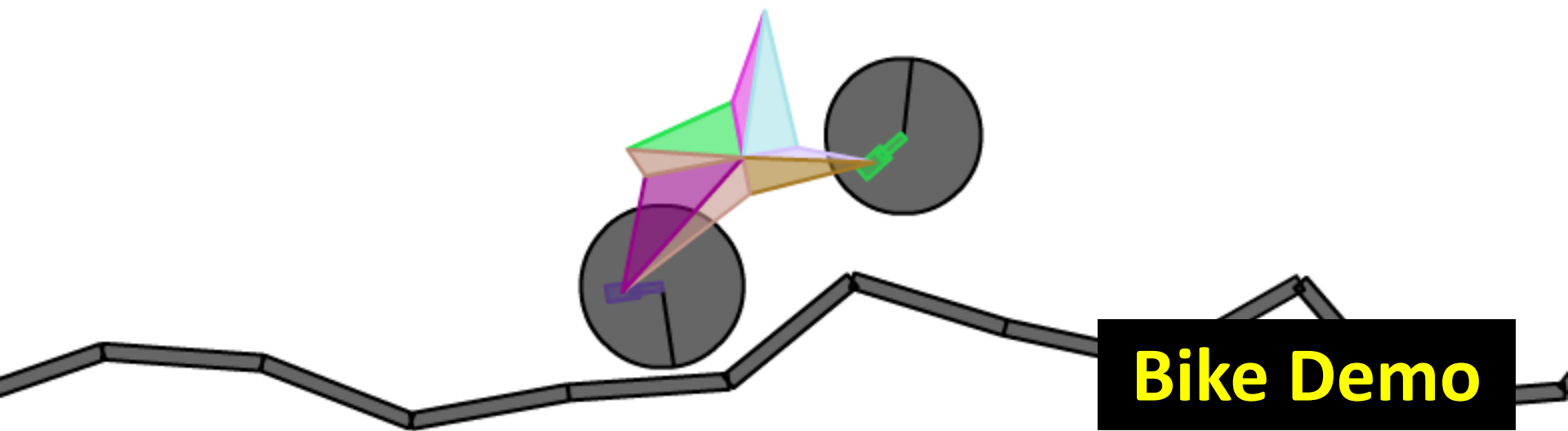


**Locomotion Demo**



sometimes GAs work

**pretty well**

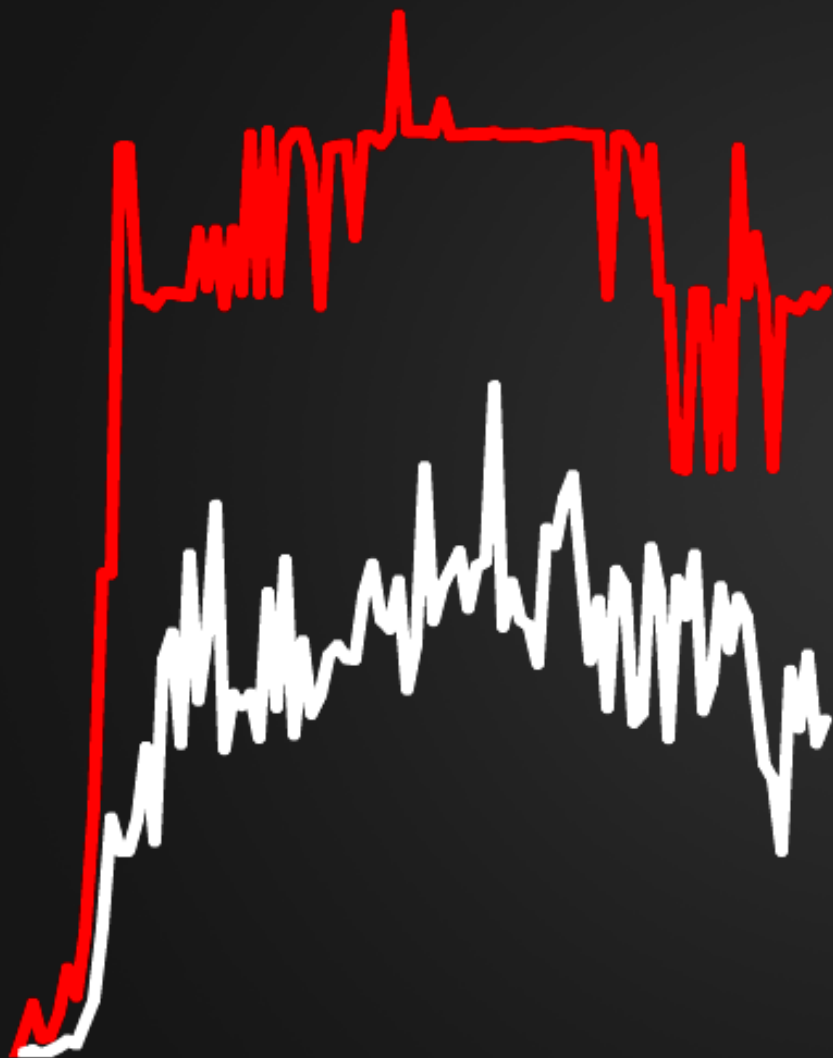


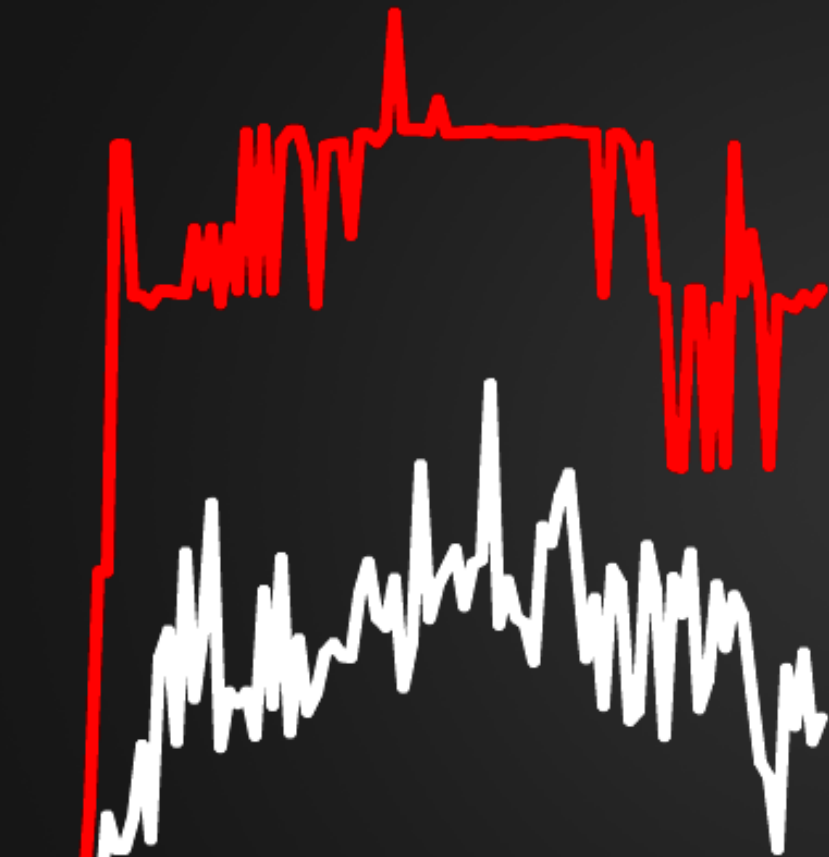
**Bike Demo**

sometimes we run into

**problems**



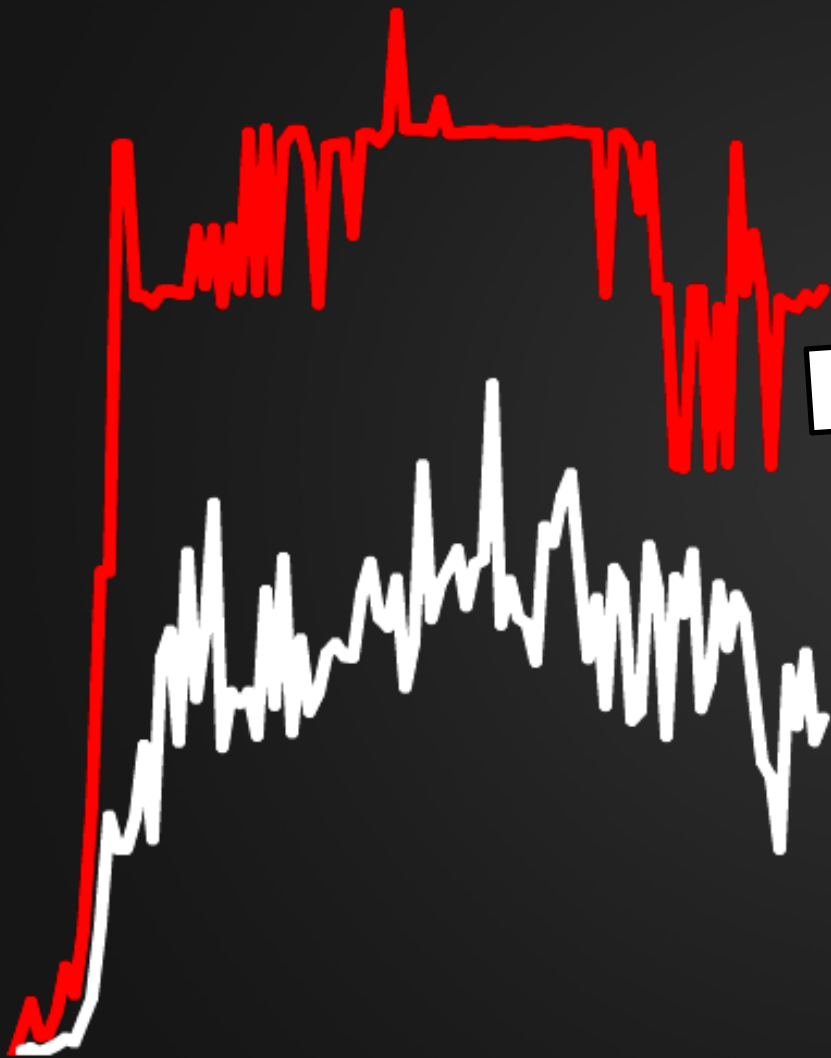




94 generations of bike demo

94 generations of bike demo

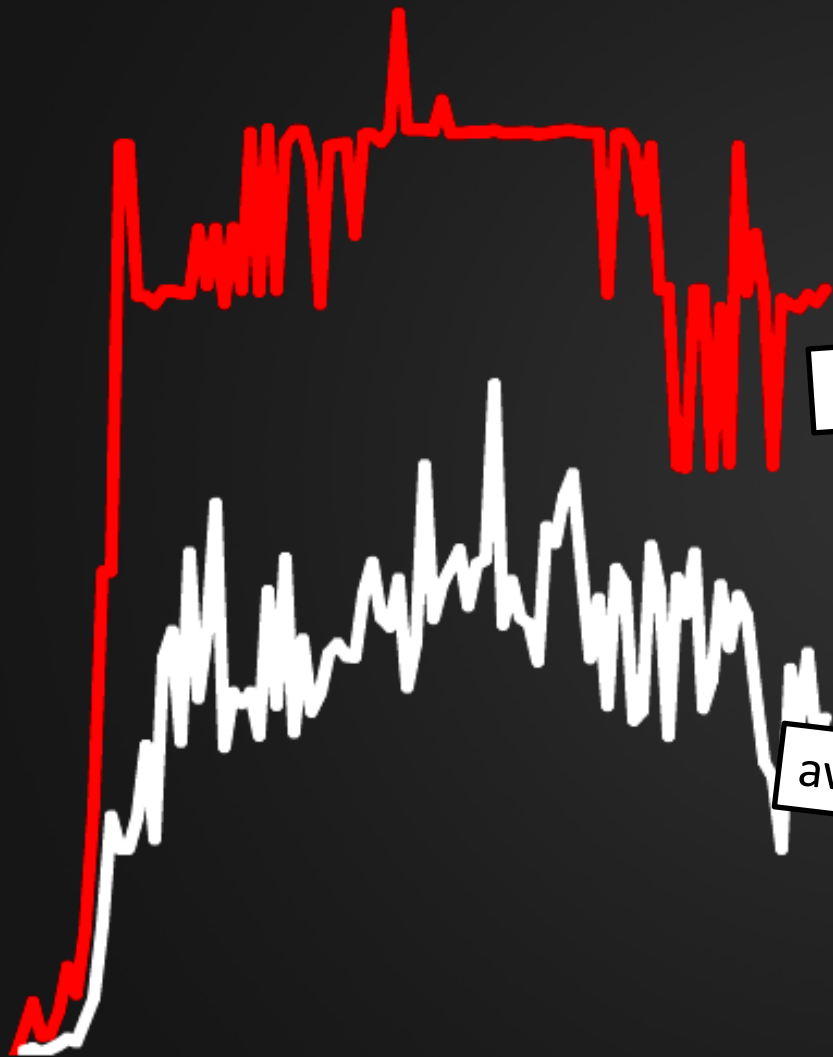
peak fitness



94 generations of bike demo

peak fitness

average fitness





A line graph on a dark background with two data series. The red line, labeled 'peak fitness', starts at a low value, rises sharply to a high plateau, and then drops sharply towards the end. The white line, labeled 'average fitness', starts at a low value, rises to a moderate plateau, and then drops sharply towards the end. Both lines are highly volatile. A yellow box with the text 'UH OH' is positioned to the right of the graph, indicating a warning or a negative outcome.

94 generations of bike demo

peak fitness

**UH OH**

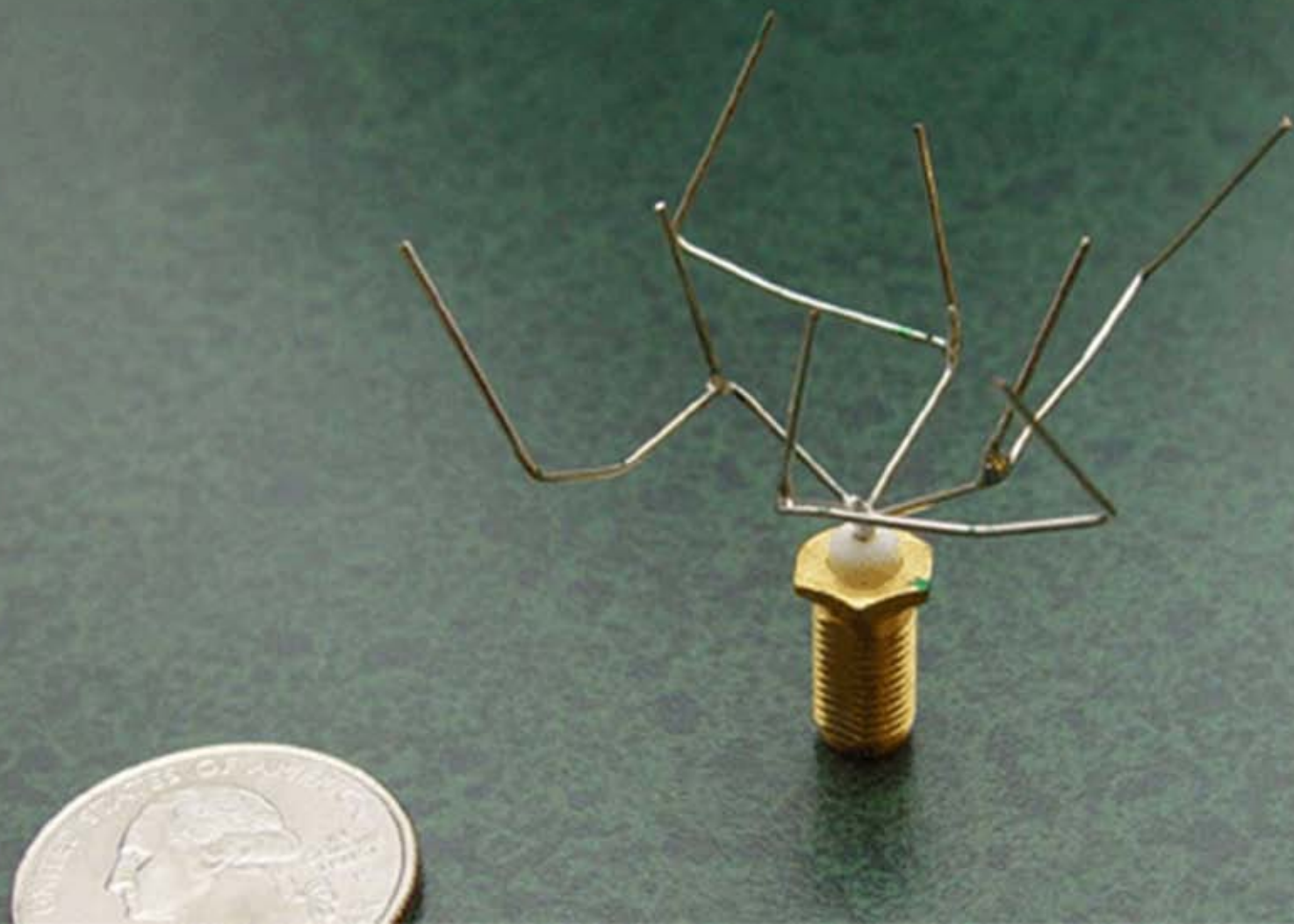
average fitness

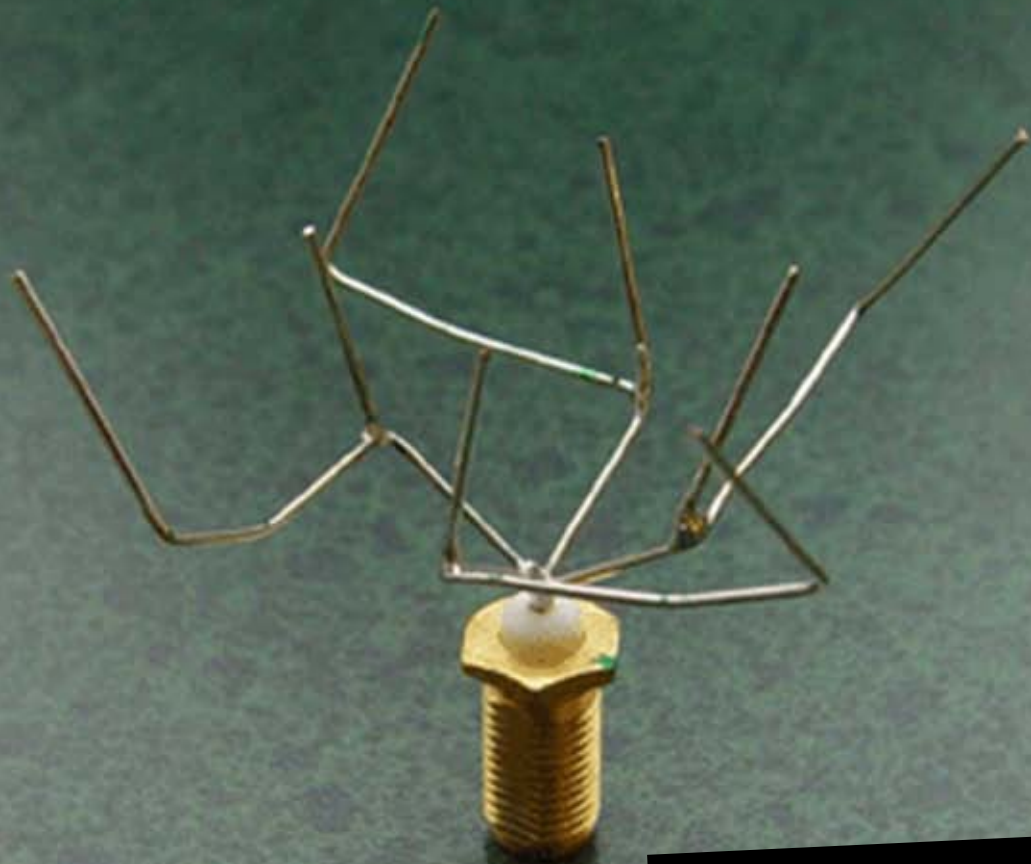




**real world**

**applications of GAs**





**antenna design**





**solar energy collector**

DIFFICULTY: 02 CREATURES: ON TIME  
SEED: 2 ALL RILLS: 6  
TYPE: Overground (0) by Fire: 4  
LENGTH: 213 of 320 by Shell: 4  
COINS: 20 by Stomp: 2  
MUSHROOMS: 00  
FLOWERS: 00  
Agent: GA Trained Neural Network Player  
Selected Actions:  
RIGHT JUMP SPEED



DIFFICULTY: 02 CREATURES: ON TIME  
SEED: 2 ALL RILLS: 6 166  
TYPE: Overground (0) by Fire: 4 FPS:  
LENGTH: 213 of 320 by Shell: 2 24  
COINS: 20 by Stomp: 2 Total:  
MUSHROOMS: 00 101  
FLOWERS: 00  
Agent: GA Trained Neural Network Player  
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RIGHT JUMP SPEED



game AI development





**improved locomotion**



**GA-evolved Dr. House sez:**

Here are our  
own demos!