

Controlling Two Characters Using Reinforcement Learning With Physics

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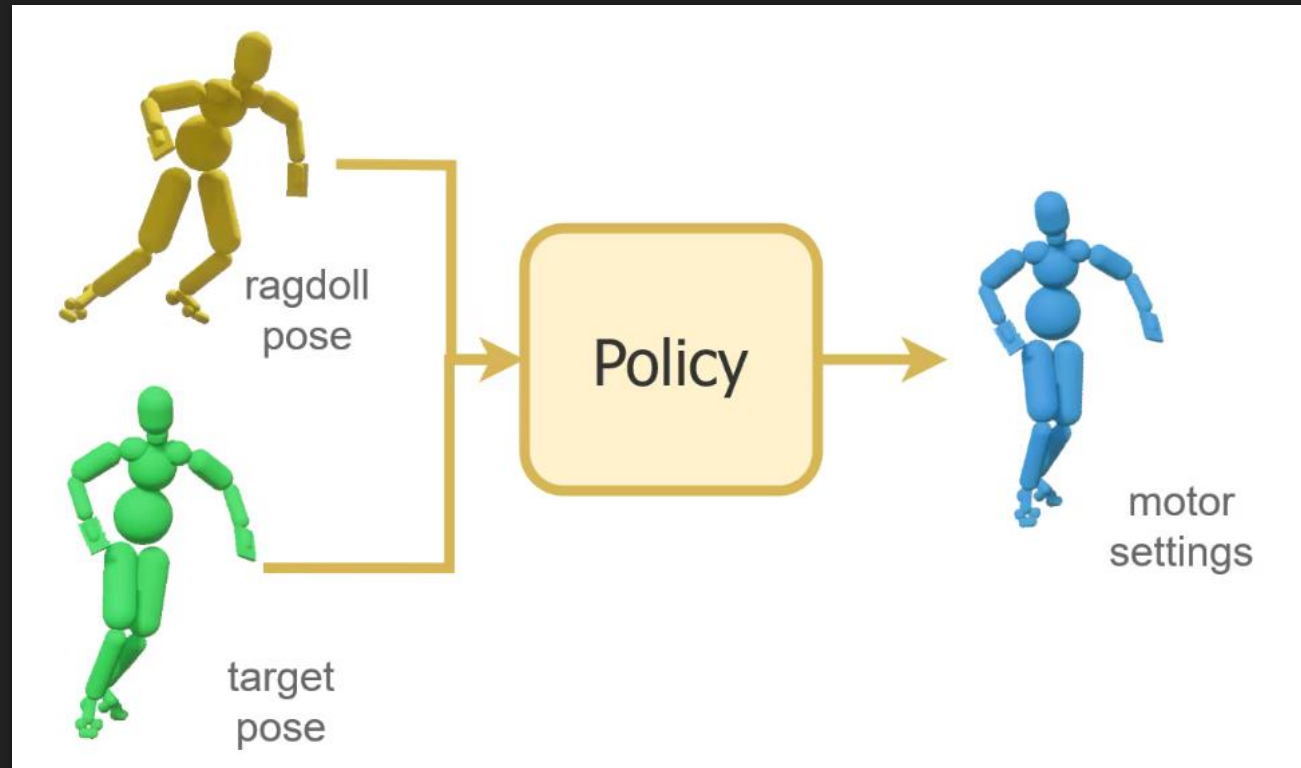
Physics-Based Character Animation

- Adaptable, accurate
- Uses algorithms to simulate real life
- Highly Engaging



Merida from the film Brave

Using Deep Reinforcement Learning



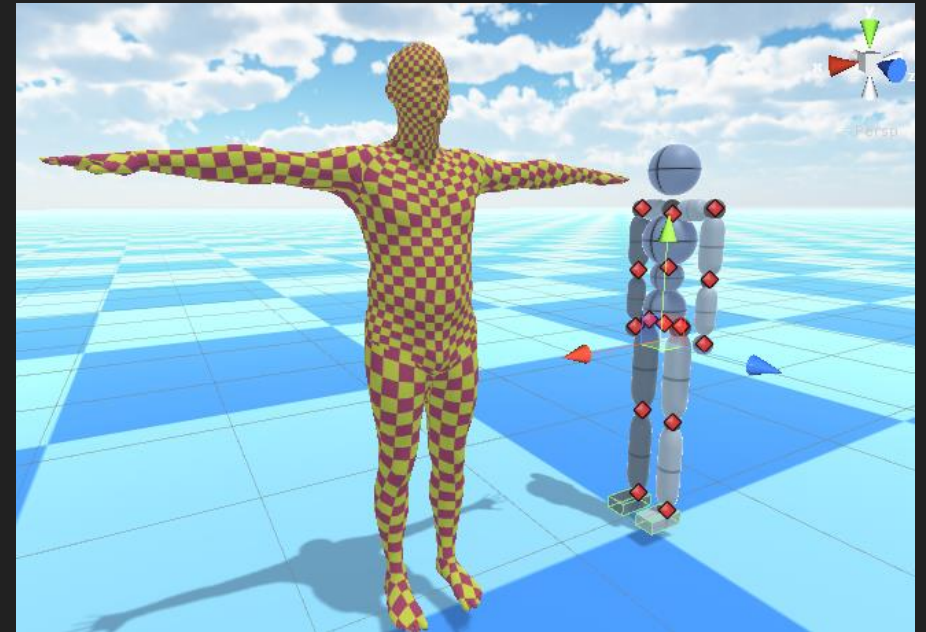
Sourced from Ubisoft Supertrack

DeepMimic

- One of the earlier implementations
- Open-sourced, has wide user-base
- Uses policies to learn movement
- Not able to simulate and train multiple characters
- A unique format for a humanoid

Conversion of Datasets

- More Datasets means more reliable data
- Conversion is hard
- CHI3D – a dataset for multiple people interacting
- Skeletons aren't always compatible



Sourced from Zju George in a DeepMimic issue

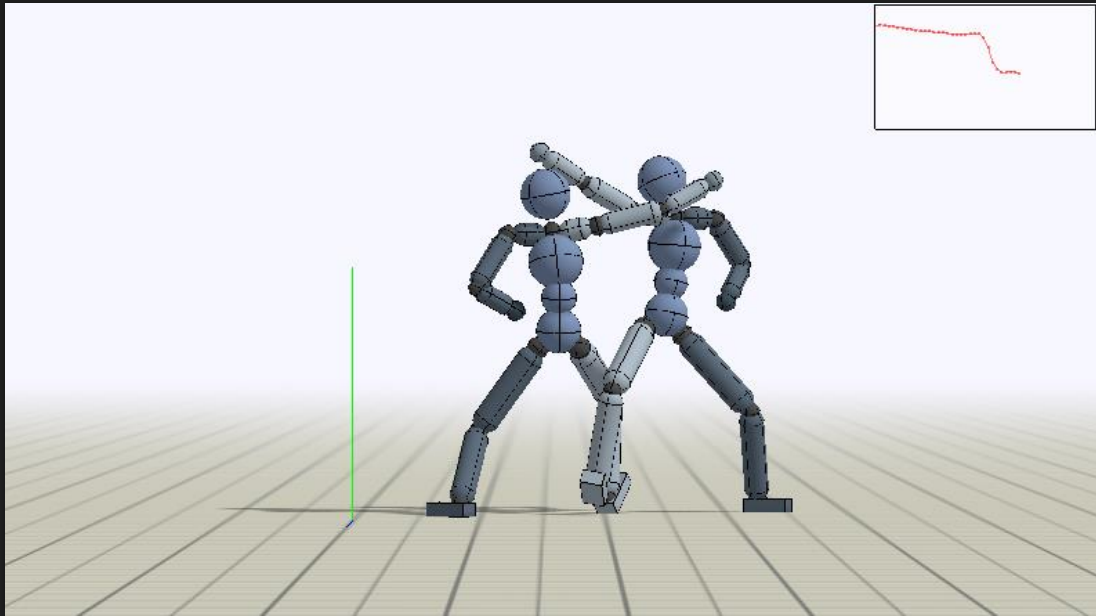
The bottleneck

- Dive into the source code
- Inheritance of classes
- Relevant functions finally revealed
- Argument files

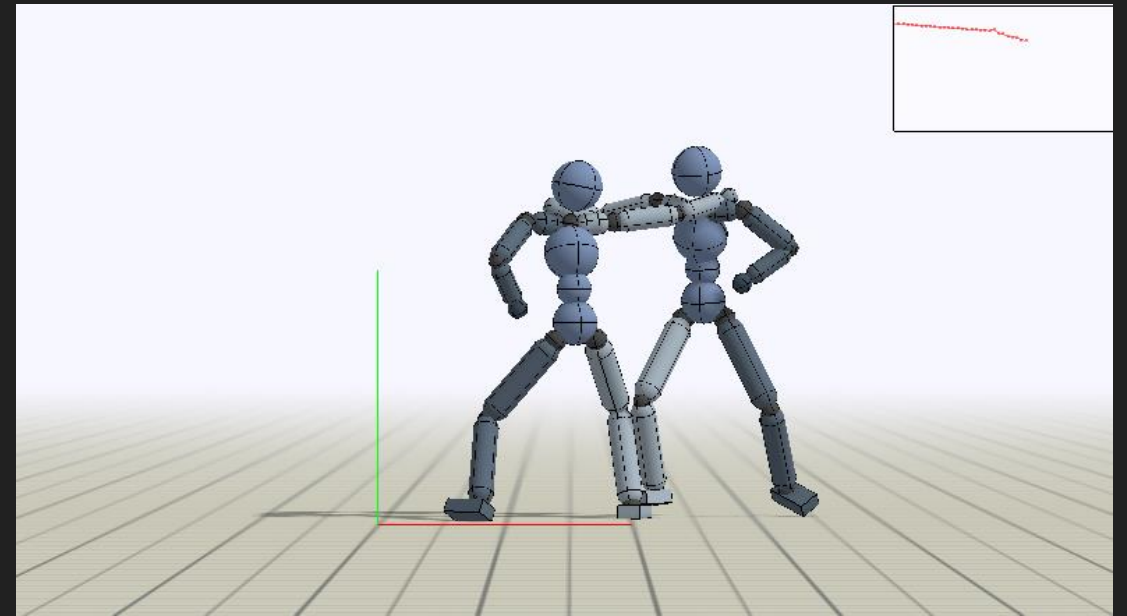
Solution

- Alter source code such that multiple characters can interact
- Train two policies on two characters performing actions individually
- Train a policy with them interacting with each other
- The Result?

Evaluation and Final Remarks



The Two Characters Who Trained Separately



Those That Trained Together