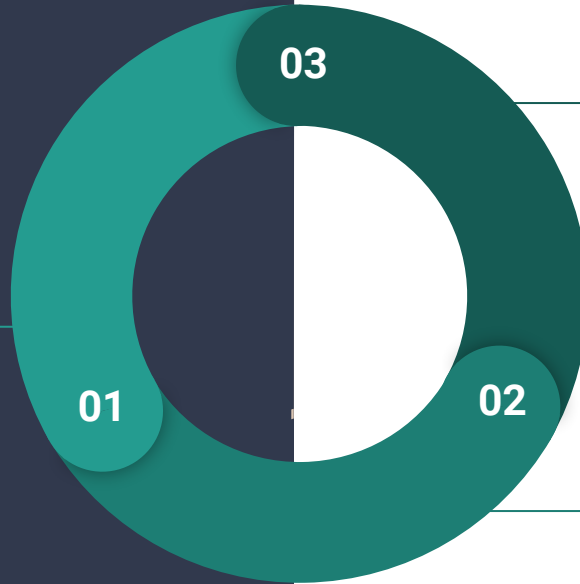Press any key to start..

CSCI 599:
Applied Machine Learning for Games

Team – BotAlmighty

Pavleen Kaur
Pritish Rawal
Shashank Misra
Tridha Chaudhuri

Introduction

03

Research on the use of Procedural Content Generation (PCG) and Generative Adversarial Network (GAN).

To generate harder and newer levels to make the game more interesting and keep the player engrossed.

01

02

Algorithms such as Dynamic Difficulty Adjustment (DDA) and Reinforcement Learning.

Prior Research

- Using Dynamic Difficulty Adjustment (DDA) to automatically modify a game's scenarios depending on the player's skills

- Reinforcement Learning in games such as Flappy Bird helps in estimating future rewards.
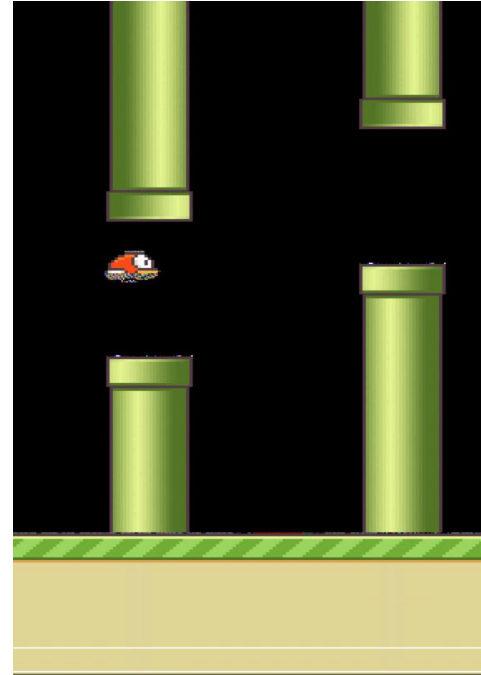
Procedural Content Generation

- Process of generating content for near-future gameplay
- Utilizes gameplay data as experience to generate new scenarios
- Algorithms could be designed to modify difficulty, environment and/or user experience during gameplay
- Generated content includes scenarios, games, pictures, characters, levels, etc.
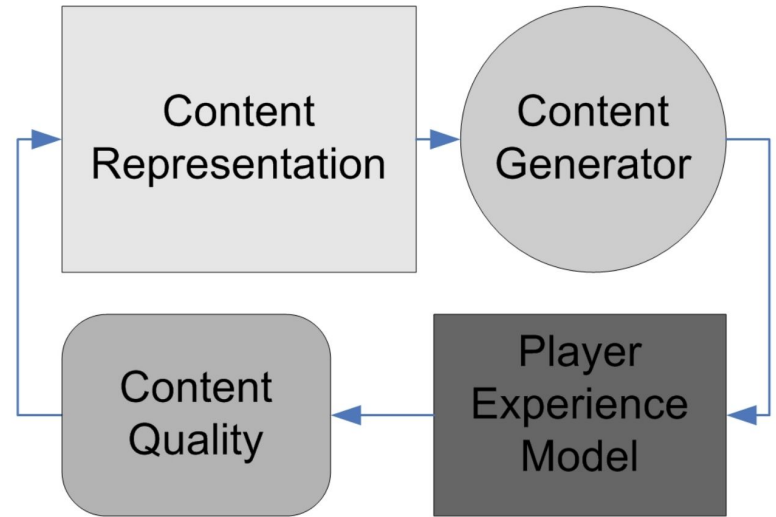

Experience driven PCG

# Demonstration of PCG in dungeon games
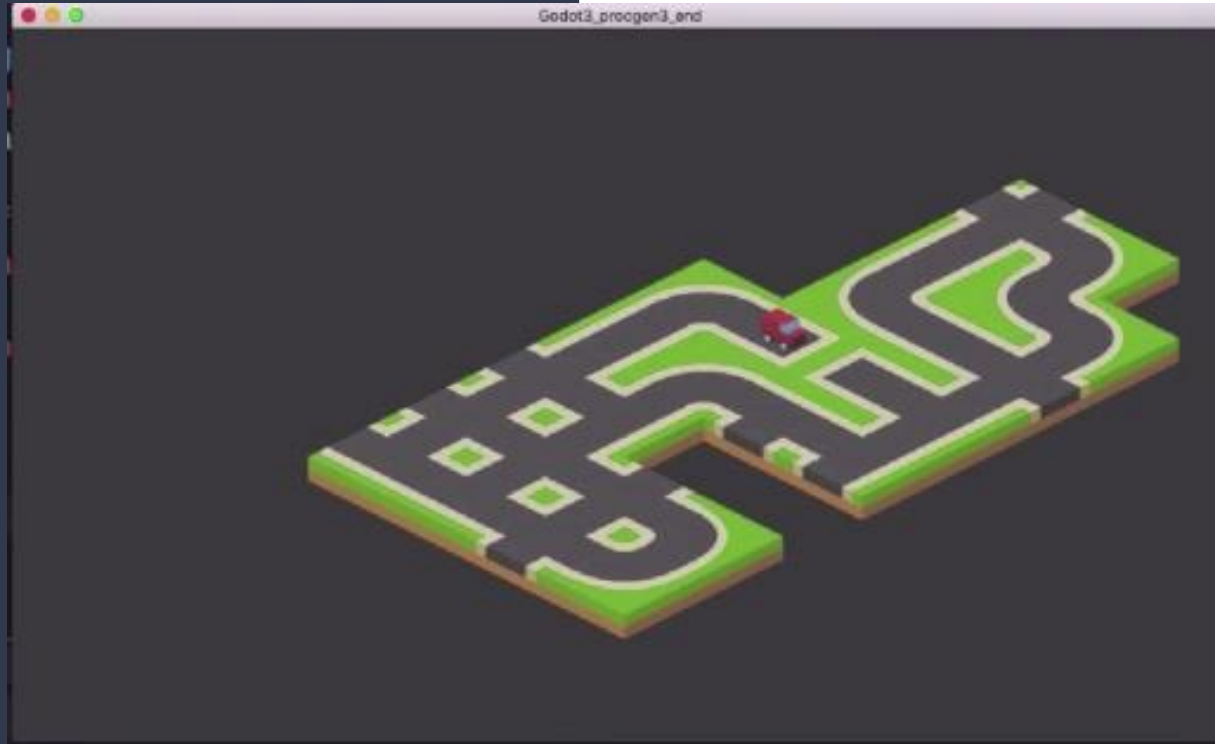
Generative Adversarial Network

- The GAN model can be used to evolve levels based on how a agent performs in them.

- We can evaluate the levels by playing them with agents like Robin Baumgarten's A* Agent(won the 2009 Mario AI Competition)

- Try to build generator architecture that learns to generate levels that incorporate a player's play-style from human play-traces derived from video
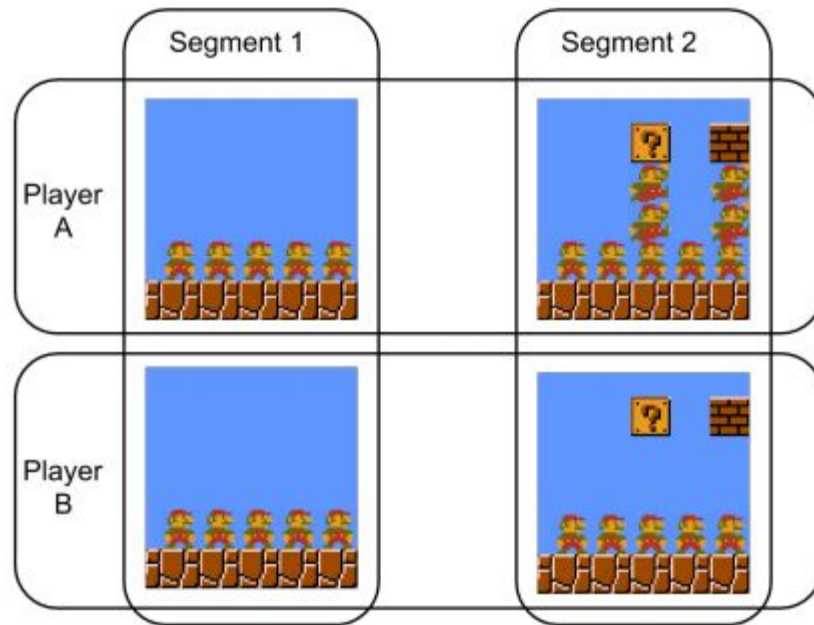
An example of Super Mario player that collects every coin and power-up vs play-trace of a player that speed runs through a level.
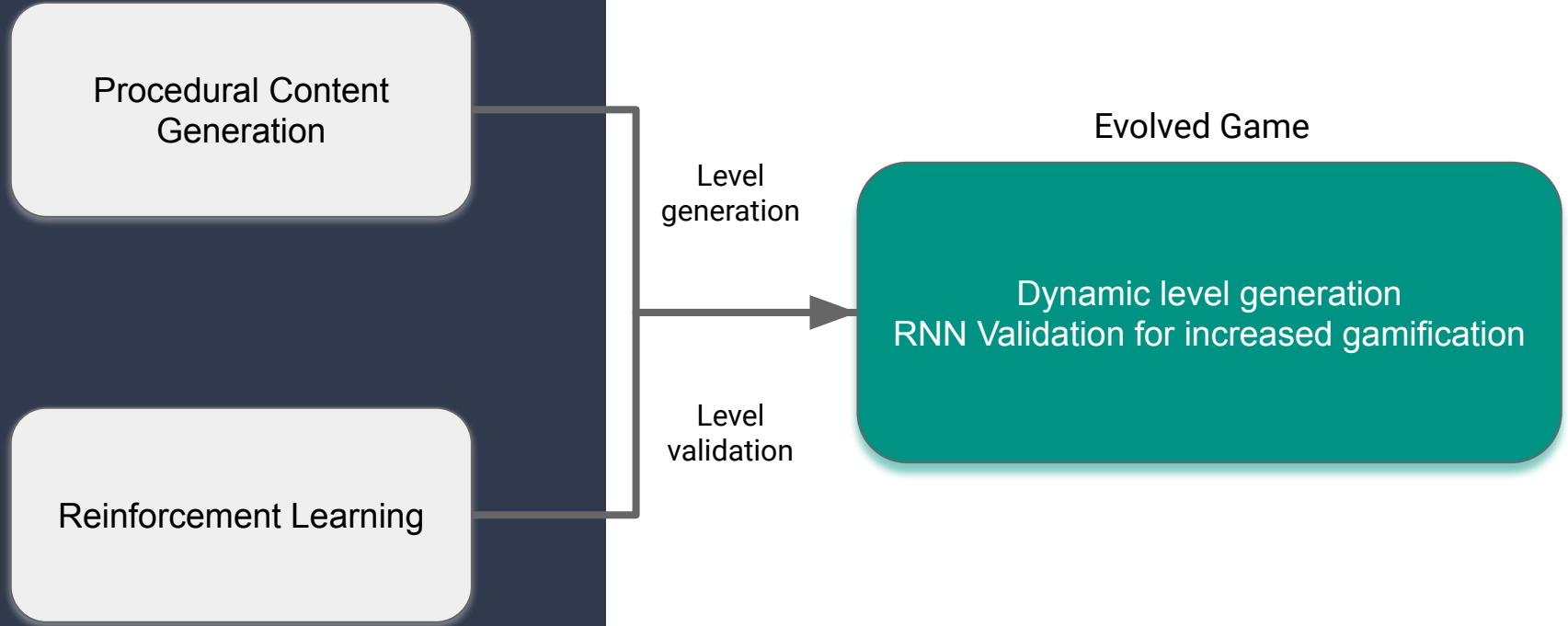
Game we will be working on
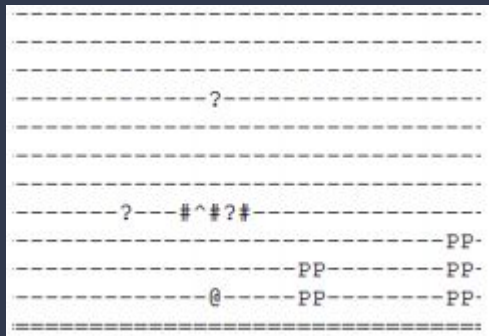
What makes up a Mario level :

1. Non solids : air / sky (has no effect on Mario's movement) and coins (a reward)
2. Solids : Include ground, pipes, coin blocks or power-up blocks and breakables (mario can't pass through them)
3. Monsters - can be considered as monster blocks that move around
4. Moving platforms - go vertically and horizontally for a set distance

Planned methodologies

Procedural Content Generation

Reinforcement Learning

Level generation

Level validation

Evolved Game

Dynamic level generation
RNN Validation for increased gamification

Thank You