Best Strategies in Repeated One Vs. Many Games: Dead by Daylight

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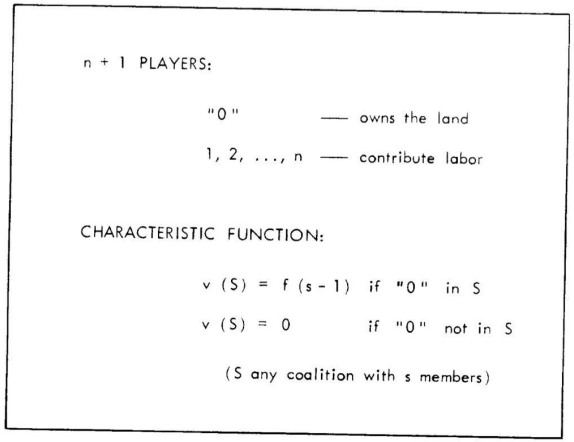
Motivation

- A fairly common interaction in modern society
- Modeled by a few different archetypes:
  - An employer dealing with their employees
  - Class Action Lawsuits
  - Large Distributors transacting with small businesses

N-Person Game (Farmer-Worker Example)

- Game is defined by a landlord and a collection of workers
- The Output is amount of corn produced
- The Landlord is a player but is unique as he owns the lands
- The game has a payoff function instead of a payoff matrix



n + 1 PLAYERS:

"0" — owns the land

1, 2, . . . , n — contribute labor

CHARACTERISTIC FUNCTION:

$v(S) = f(s-1)$ if "0" in S

$v(S) = 0$ if "0" not in S

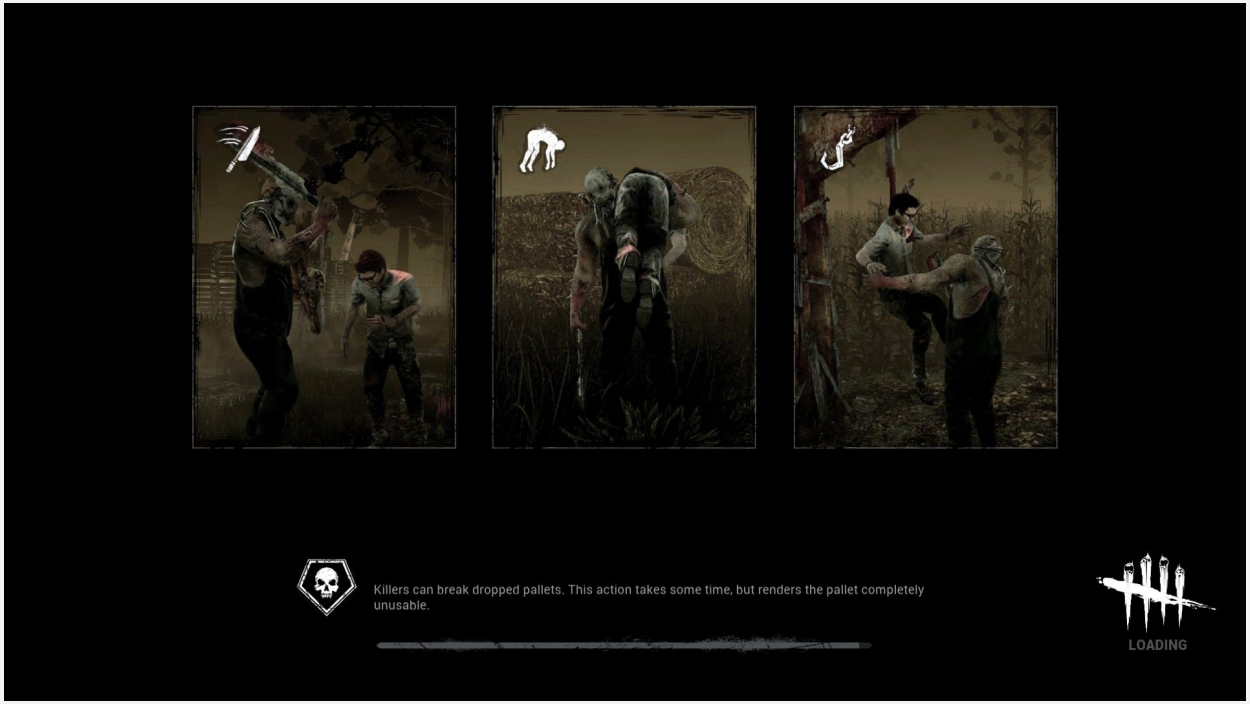
(S any coalition with s members)

Previous Relevant Research on topic

- A few overarching topics were researched for background
- Prior Studies on the One Vs. Many Archetype
- N-Person games
- General Extensive Games

General Game Setup

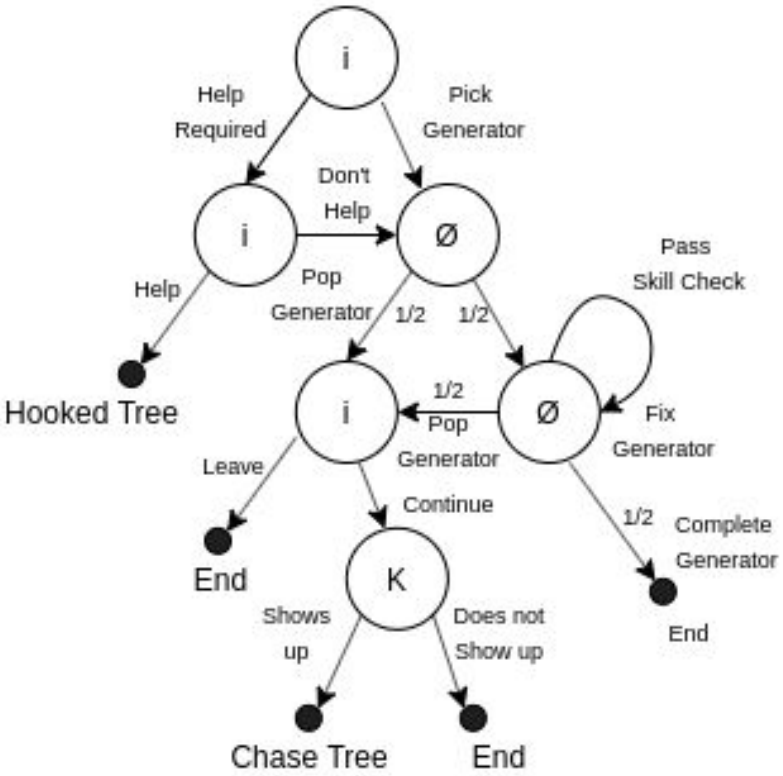
- Modeling One Vs. Many Scenario using Extensive Game decision trees
- Each player has an individual decision tree
- The many tree and the one tree differ
- Certain actions by the one or many players can cause an impromptu multi-person decision tree too be entered by the N-person



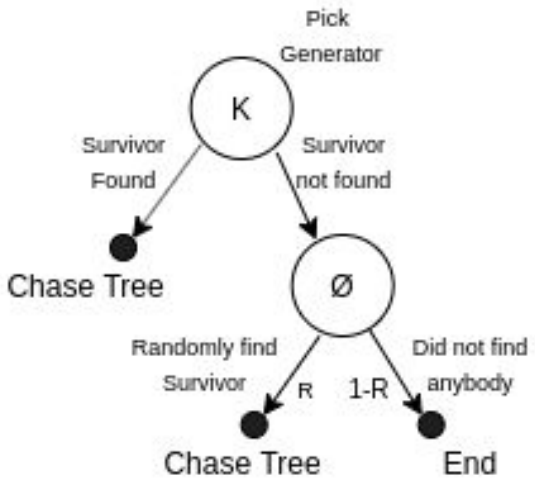
Dead By Daylight

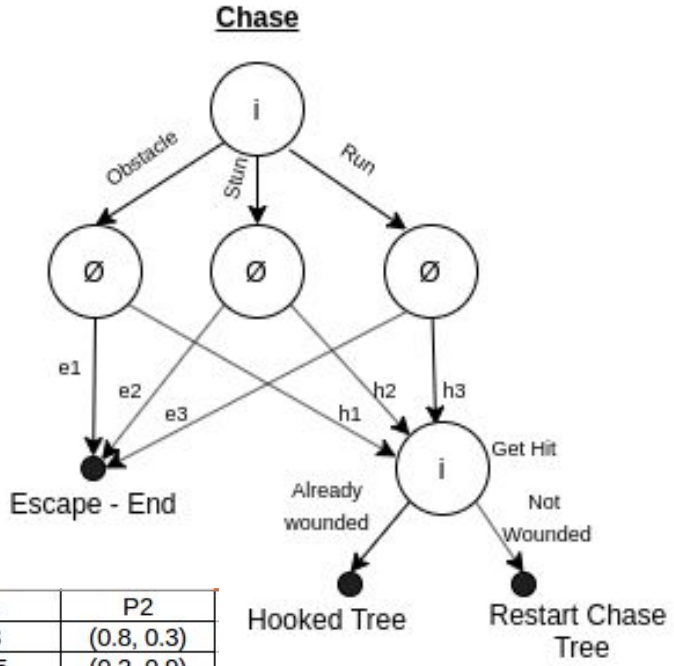

MAP SCOUT
+300
MAP SCOUT
MAP SCOUT
5

Survivor

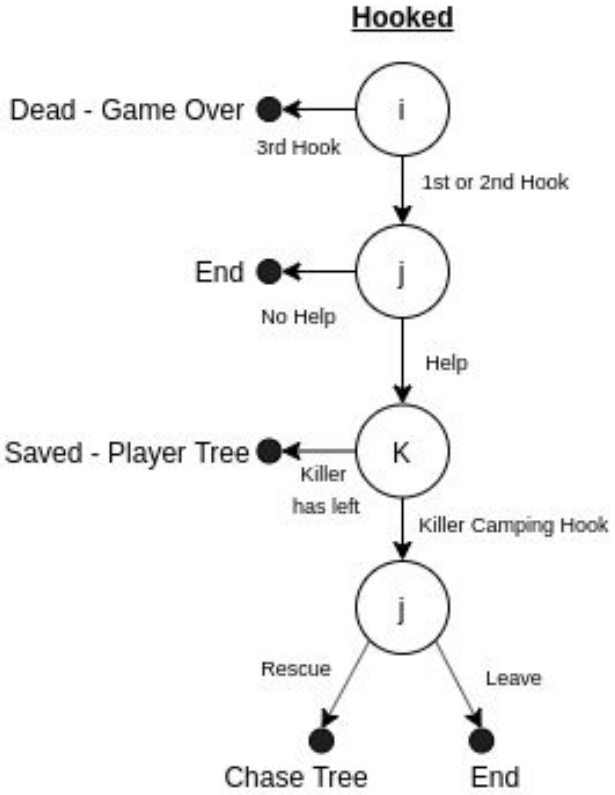


Killer





	P1	P2
e1	0.3	(0.8, 0.3)
e2	0.05	(0.2, 0.9)
e3	0.2	(0.5, 0.5)
h1	0.7	(0.2, 0.7)
h2	0.95	(0.8, 0.1)
h3	0.2	(0.5, 0.5)



Player Profiles

Selfless - Always puts collective's interests ahead of their own

Selfish - Always puts own interests ahead of the the collective's

Trust - Plays depending on how much trust they have for the others (starts off at some threshold say 70% trusting and will change over time)

Random - Makes decisions randomly

Adaptive - Learning player based on random forest (Probably will not have time to implement)

More Ideas??

Initial Takeaways

- Cooperative Action Vs. Solo Action; Importance of working together
- Freedom of actions between the single entity and the individual players
    - Changes in initial thoughts on action sets of the one player and the players respectively.
- The final overarching super game was theorized to be a zero-sum game between the one entity and the many players, but the scenario favors series of extensive games that do not lead to a zero sum scenario .