AI and Games Jam: Resources

A list of useful resources (asset packs, tutorials, etc.) that people can use to help guide them during the game jam.

AI Books

- **Game AI Pro**
  - ***Edited by Steve Rabin***
  - **A series of books with chapters written by developers across the games industry. The first three volumes are currently available online to read and download.**
  - **http://www.gameaipro.com/**

- **Programming Game AI by Example**
  - ***Mat Buckland***
  - **A book highlighting a variety of AI techniques with code examples in C++. Comprised of many common techniques and approaches required in small and large-scale AI for games.**

- **AI for Games**
  - ***Ian Millington***
  - **A larger textbook covering a broad set of techniques with pseudocode examples. Often a great starting point for students and hobbyists.**

- **Artificial Intelligence and Games**
  - ***Georgios Yannakakis and Julian Togelius***
  - **A high level academic textbook that covers a variety of AI techniques for deployment within games.**
  - **http://www.gameaibook.org**

- **Artificial Intelligence: A Modern Approach**
  - ***Peter Russell and Stuart Norvig***
  - **A larger and more comprehensive textbook on more theoretical AI. This does not address game-AI specifically but is essential reading for anyone looking for a holistic understanding of the field.**

- **Procedural Content Generation in Games**
  - ***Noor Shaker, Julian Togelius & Mark J. Nelson***
  - **A high-level academic textbook exploring specific techniques and applications for procedural generation.**
  - **pcgbook.com**

        - Warning: website is prone to being a bit broken.

- Procedural Content Generation in Game Design
    - *Edited by Tanya X. Short and Tarn Adams*
    - A collection of book chapters written by game developers and researchers on challenges and implementations of procedural content generation.

- Procedural Content Generation via Machine Learning
    - *Matthew Guzdial, Sam Snodgrass, Adam J. Summerville*
    - Overview of using ML techniques for content generation, complete with examples, pseudocode and a GitHub with resources.
    - https://github.com/PCGML-Book

- Unity AI Programming Essentials
    - *By Curtis Bennet and Dan Violet Sagmiller*
    - A functional overview of a large variety of AI's with varying purposes.
    - https://www.packtpub.com/product/unity-ai-programming-essentials/9781783553556

Game Engine Documentation

Unity

- Navigation Mesh Documentation
    - Documentation on Unity navigation mesh tools
        - https://docs.unity3d.com/Manual/nav-BuildingNavMesh.html

- AI for Beginners in Unity
    - Entry level overview series by Penny de Byl (Holistic 3D)
        - https://learn.unity.com/course/artificial-intelligence-for-beginners

- AI Planner (Preview Package)
    - An implementation of the trial-based heuristic tree search (general purpose MCTS) for use in the Unity engine. Still in development.
        - https://docs.unity3d.com/Packages/com.unity.ai.planner@0.0/manual/index.html

- Unity ML-Agents
    - The Unity developed toolkit for training agents using machine-learning approaches.
        - https://github.com/Unity-Technologies/ml-agents

Unreal Engine

- AI Documentation
    - The official documentation for AI parts of the Unreal Engine. This includes the navigation mesh volumes, environmental query system (EQS) and behaviour tree systems.
    - https://docs.unrealengine.com/en-US/InteractiveExperiences/ArtificialIntelligence/index.html

- Tom Looman
    - Looman runs a popular and well-managed tutorial series (both on his own website and over on Udemy) for Unreal Engine. Including several series on AI methods.
    - https://www.tomlooman.com/category/ue4/ai/

Website Tutorials

- Red Blob Games
    - Written by Amit Patel
    - Red Blob Games is one of the most comprehensive websites for exploring the application of a number of search algorithms, pathfinding, and procedural generation.
    - https://www.redblobgames.com/

- Alan Zucconi
    - Series of Unity-oriented tutorials, some of which about AI and Inverse Kinematics
    - Inverse Kinematics for Robotic Arms
    - Inverse Kinematics for Tentacles
    - Inverse Kinematics in 2D and 3D

Video Tutorials

A collection of specific videos and channels that might prove useful if you're starting out and want to build your own stuff.

- Table Flip Games (Unity Tutorials)
    - Navigation Meshes
    - Finite State Machines

- Holistic 3D (Unity Tutorials)
    - Building GOAP in Unity
    - Simple car AI
    - Navigation Meshes
    - Finite State Machines
    - 2D Crowd SYstems

- The GDC Vault
    - The game developers conference provides a myriad of talks and presentations on implementing specific elements of AI in games.
    - https://www.gdcvault.com

- Dave Churchill lectures:
    - Full Lecture Playlist
    - A* Lecture

AI and Games Videos

The AI and Games channel has a bunch of videos focussing on different topics. Most of these are very high-level and talk about some elements of design and development, but don't cover the low-level implementation of how to get these techniques to work.

- Navigation Meshes
    - AI 101 episode explaining what they are.
- Behaviour Trees
    - AI 101 episode explaining how it works in Half-Life.
    - AI of Alien: Isolation (revisited)
- Finite State Machines
    - AI 101 episode explaining what they are.
    - AI of Batman: Arkham Asylum
- Goal Oriented Action Planning
    - AI 101 looking at the AI of FEAR
- Director AI
    - AI 101 revisiting the AI of Left 4 Dead

Game Assets

Art

- Kenney (Free game art, UI, some sound)
  - https://kenney.nl/assets
- OpenGameArt (both 2D and 3D assets)
  - http://opengameart.org
- Mixamo (Animation library)
  - www.mixamo.com/
- Textures.com (I mean yeah, textures!)
  - www.textures.com
- Fontsource (you might need a font or two)
  - http://www.github.com/fontsource/fontsource
- Agora community has lots of assets for animators and artists
  - https://agora.community/assets

Audio

- GameSounds (it's sounds, for games)
  - https://gamesounds.xyz/

AI Code

- Ashblue's tools on Github, including:
  - https://github.com/ashblue/fluid-state-machine
  - https://github.com/ashblue/fluid-behavior-tree
- Pål Trefall's Fluid Hierarchical Task Network
  - https://github.com/ptrefall/fluid-hierarchical-task-network
- Luciano Ferraro's ReGOAP
  - https://github.com/luxkun/ReGoap
- Aron Granberg's A* Pathfinding Project (includes free version)
  - https://arongranberg.com/astar/
- Convai's Conversational AI Tools (i.e. GPT interface for NPCs)
  - http://www.convai.com
- Machine Learning / Hugging Face API
  - Documentation on integrating the Hugging Face API for Machine Learning/Deep Learning tools.
    - https://github.com/huggingface/unity-api
  - High-level overview of what you can do with trained AI models. You don't need to know how to build one yourself, you can take an existing one and see if it suits your needs.

        - https://huggingface.co/tasks
    - **For further tools in and around machine learning, check out the documentation by Hugging Face's Thomas Simonini:**
        - https://github.com/simoninithomas/awesome-ai-tools-for-game-dev