Modding as an Open Source Approach to Extending Computer Game Systems

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Overview

- Introduction

- Software Engineering (SE) of games via software extension

- Types of game mods

- Game modding tools and support

- Opportunities for Modding and SE

Introduction

- Modding is a form of *end-user* software engineering

- Modding is a form of *learning* via practice, self-tutoring, and self-organized projects

- Game mods cover customizations, tailorings, and remixes—*software extensions*—of game embodiments

- Modding is to games, like OSS development is to SE

- Modding is a leading method for developing or customizing game software, by independent game developers

Software extensions used in game modding

- Module
    - addition, update, removal, re-interconnection
    - plug-ins
- Architecture
    - Multi-version system (re-)configuration
- Domain-specific languages (scripting) and software product lines
    - reused game platforms/engines
- Open source software development (OSSD)
    - common approach for learning game development
    - "Games" is second largest project trove at SourceForge

SOURCEFORGE   Find Open Source Software   **Browse   Blog   Support**

SourceForge.net >   Software Map

Browse Software

⊡ **Clustering** (959)   ⊡ **Hardware** (3088)

⊡ **Database** (13908)   ⊡ **Multimedia** (34260)

⊡ **Desktop** (7524)   ⊡ **Networking** (8713)

⊡ **Development** (66433)   ⊡ **Security** (7548)

⊡ **Enterprise** (7181)   ⊡ **Storage** (5348)

⊡ **Financial** (5426)   ⊡ **SysAdmin** (6155)

⊡ **Games** (42351)   ⊡ **VoIP** (794)

                                          ⊡ **Display All »**

Types of game mods

- **User interface customizations**
  - **in-game identity, themes, dashboard add-ins**
- Game conversions via scripting
  - repurposing game play mechanics and content
  - total conversions
- Machinima
  - repurposing game usage sessions for cinematic storytelling or play documentation
- Hacking closed game systems
  - overcoming security mechanisms
  - opening games to restricted markets
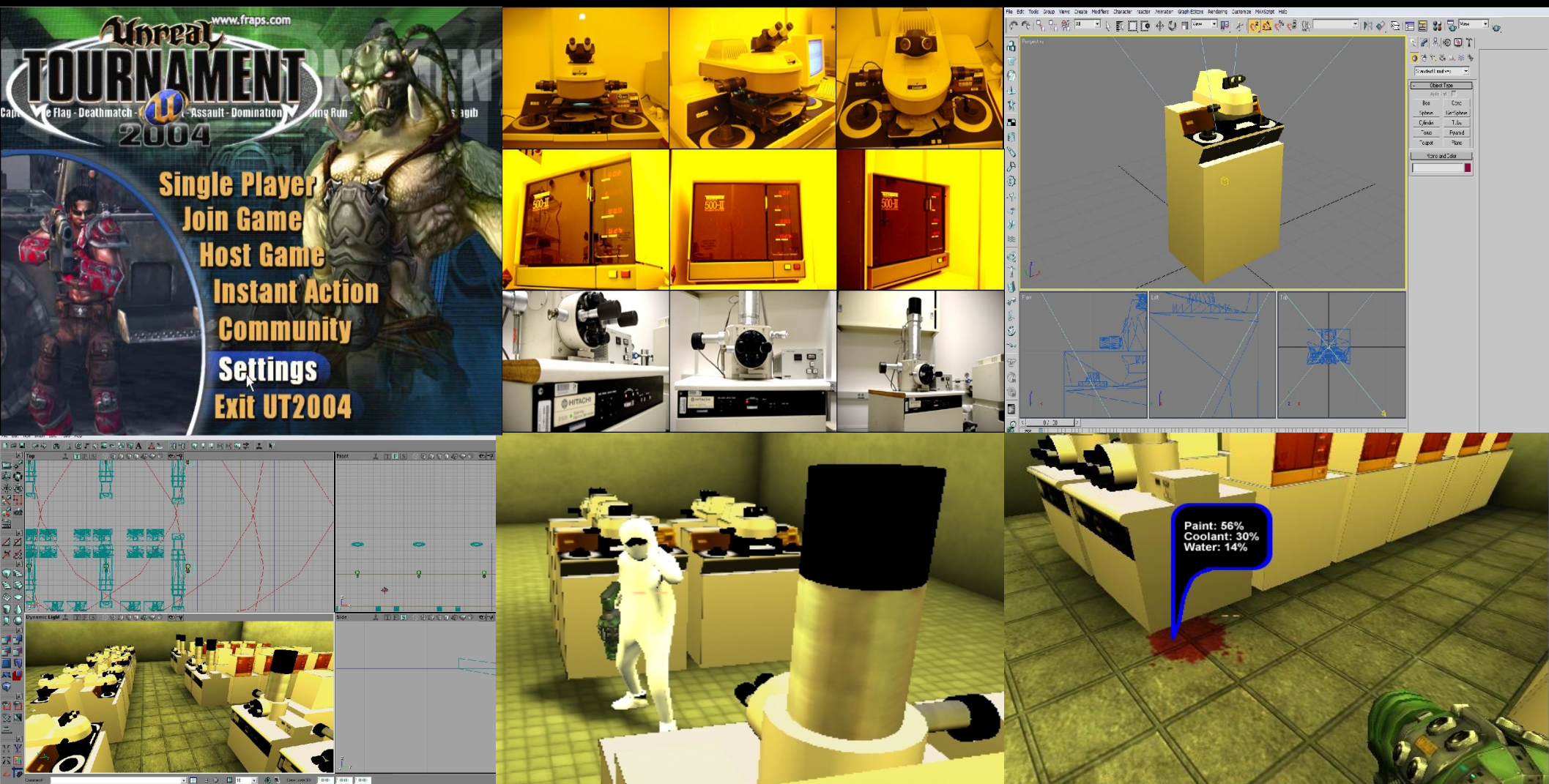
UI customization – identity, theming, dashboard add-ins

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Total conversion – from *first person shooter* into semiconductor fabrication and diagnostics training game


FabLab Demo Reel

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  - total conversions
- Machinima
  - repurposing game usage sessions for storytelling or documentation
- Hacking closed game systems via reverse engineering
  - overcoming security mechanisms
  - opening games to restricted markets
  - Enables game "piracy" and additional revenues

Hacking autonomous/electric vehicle games?
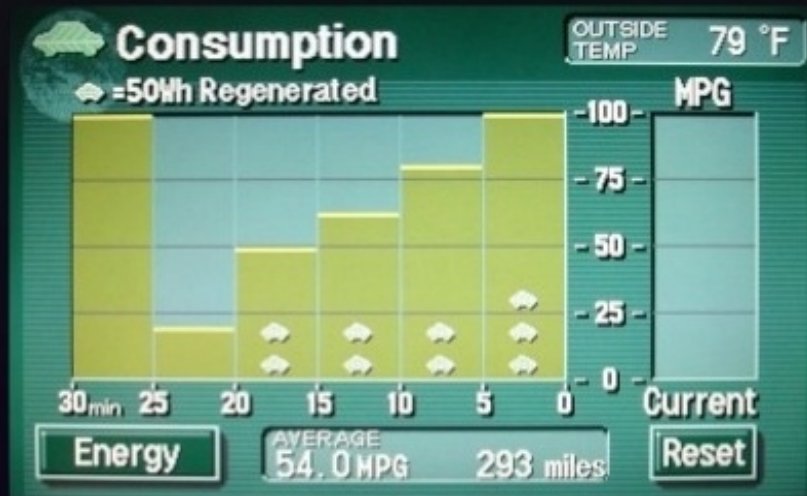
Nissan Leaf

Toyota Prius

Ford Focus

Hacked arcade system -- *OutRun @ UCI*

OutRun: Augmented Reality Driving Video Game (YouTube)

Game modding tools and support

- Game engine based software development kits (SDKs) are widespread
    - *Unreal Development Kit* (UDK) now available as "freeware"
    - *Doom* and *Quake* engines now OSS
        - Game content assets are NOT OSS
    - Dozens of good quality OSS game SDKs available
- Meta-modding tools also appearing
    - *Garry's Mod* kit for *Half-Life* product line

Payoffs of Game Modding

- Modding tools and techniques can substantially increase retail game sales and industry revenues!

- Mods, modding, and modding technology is an *engine of innovation* for independent game developers

Conclusions

Game modding demonstrates the practical value of (open source) software extension as a user-friendly approach to custom game development.

Modding demonstrates the success of end-users learning how to extend software to create custom games or game-based applications/products.

Game modding represents a viable form of end-user engineering of complex software that may be transferable to other domains.

Large-scale studies of OSS may often be examining game software development projects.