

PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Veronica Reingold and Steven Rice





- Belghast 1
- Amber 2
- Lisa 3
- Kaeya 4

Genshin Impact - miHoYo

Lv. 20 3551 / 3771





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Bracer

Warming Seelie

Scarlet Quartz

Ancient Rime

Subzero Climate...

Elemental Reaction: Bloom



Fatui Skirmisher - Pyroslinger Bracer

Fatui Skirmishers that shoot Pyro projectiles in battle. They receive some kind of **elemental buff**. Perhaps using an **element that reacts with Pyro** could make quick work of their buff.

Previous

Next

UID: 896534789



r/Genshin_Impact • 2 yr. ago

Expensive-Session152



Do i need to read this?

Guides & Tips

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Im new. im too lazy to read. do i need to read all of this?

↑ - Created
↓ - Used to Obtain
↕ - Alternative Method
↑ - Used to Create
↑ - Produces
↓ - Drops

Minecraft Production Web

Zone_Control
Fug/ATX
bubodiui
Version 1.6
For Minecraft version
1.8.1



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Making Games Accessible With AI

Veronica Reingold

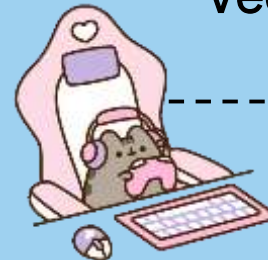
“Nonika”



MSc in Computer Science
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Researching Accessibility

Vector Scholarship in AI



nonika.ca

Steven Rice

PhD in Computer Science
University of Windsor

Robotics
Simulations
Artificial Intelligence

stevenrice.ca



Terminology

Accessibility	accommodations for individuals with disabilities*
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Approachability	early game: tutorials and communities
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Learnability	late game: tutorials and mastery
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Difficulty	game challenge and personal skills
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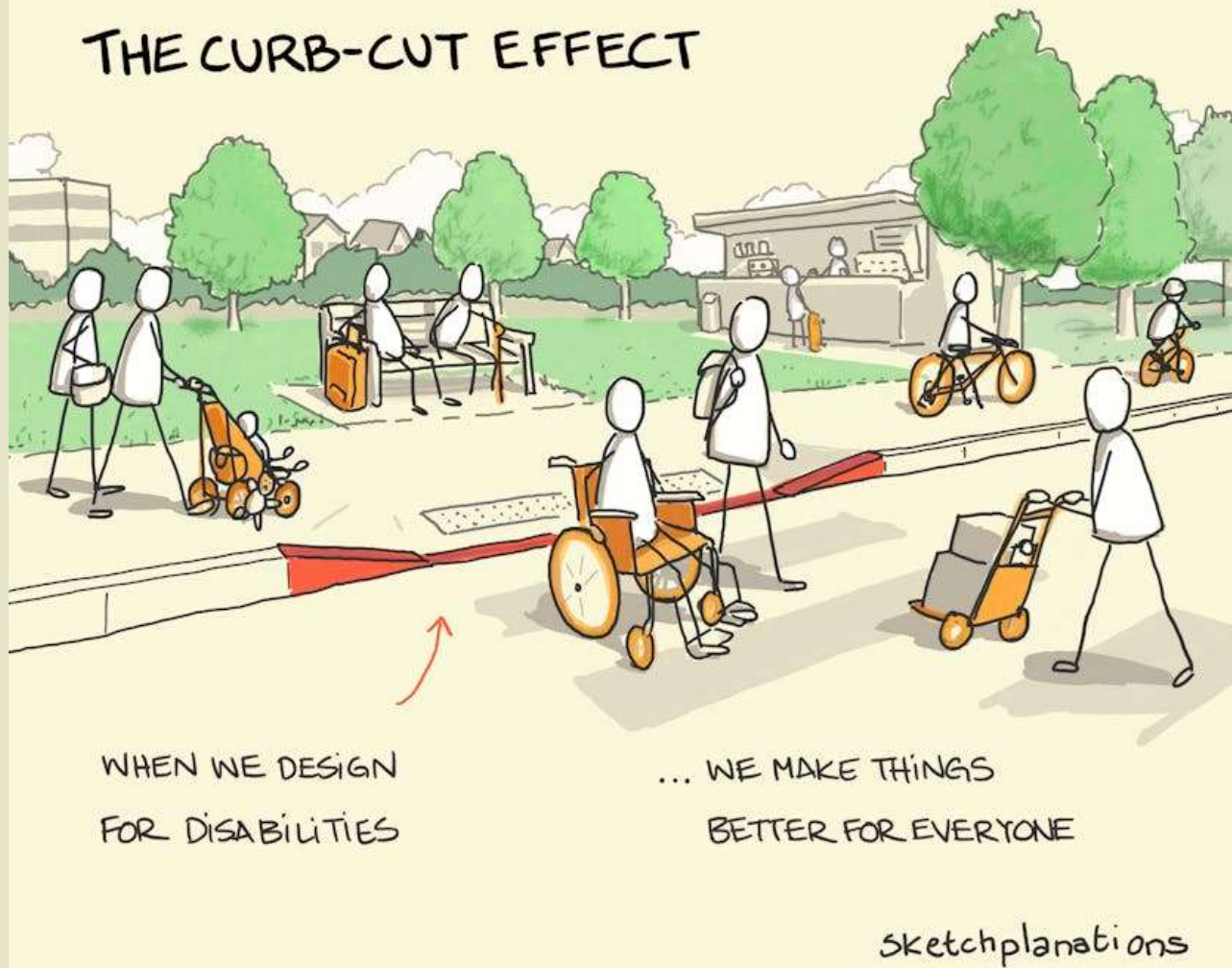
User Experience	effectiveness of game, HUD, and UI
-----------------	------------------------------------



No matter what, you keep finding something to
fight for.

Curb-Cut Effect

Originally made made for wheelchair users, curb cuts are a fantastic example of how accessibility features benefit all users!



Myth:

Accessibility options make games easier.

Fact:

Accessibility options remove barriers without impacting difficulty.

“ Elevators make it too easy to get to the 12th floor. - Nobody

Guidelines

Video games feature an incredible diversity of genres, styles, difficulties, audiences, and game loops.

There's no one-size-fits-all standard to accessibility and user experience!

In real life

stairs → install ramp or elevator

In a game

??? → ?????

Guidelines

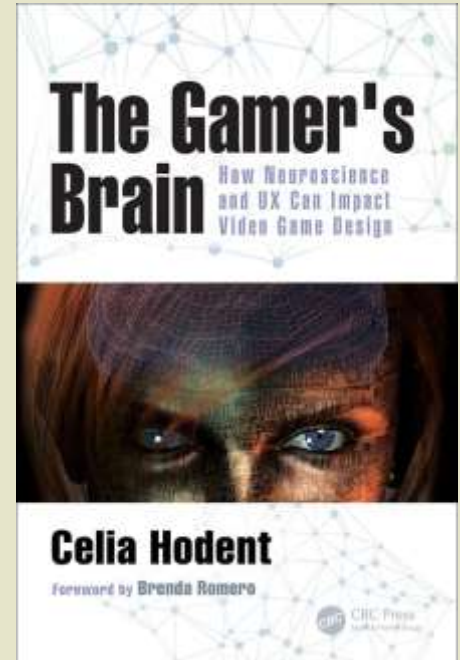
Keywords: Game accessibility, user experience, approachability, learnability, tutorials, etc.

Accessibility:

gameaccessibilityguidelines.com
accessible.games/accessible-player-experiences
caniplaythat.com

Games User Experience:

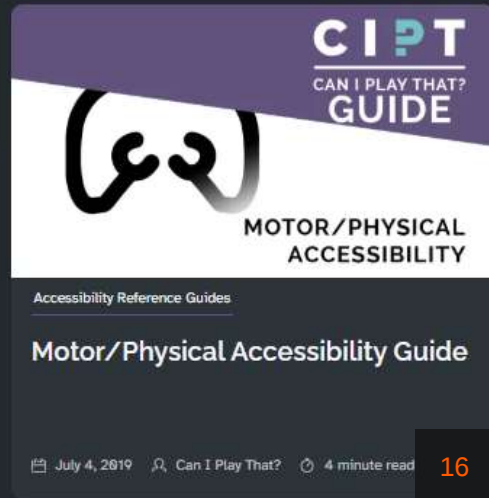
gamesur.com
thegamersbrain.com



Guidelines

Guidelines are grouped by disability for our convenience!

Our focus today is on cognitive accessibility and assistance—things that impact both disabled and non-disabled gamers!



Perception



Attention



Learning



Stand on the glowing point nearby
and adjust your viewing angle to
line up the pattern correctly.
This will let you access this
area's secret mission.

Memory

 Cricket's Head

↑ +0.5 Damage up

↑ +50% Damage
Multiplier

 Red Patch

↑ Chance to get +1.8
Damage up when getting
hit

COLLECTIBLES

 2 of Spades

- Duplicate your keys

TRINKETS

 Speed Up

↑ +0.15 Speed up

CARDS

PILLS



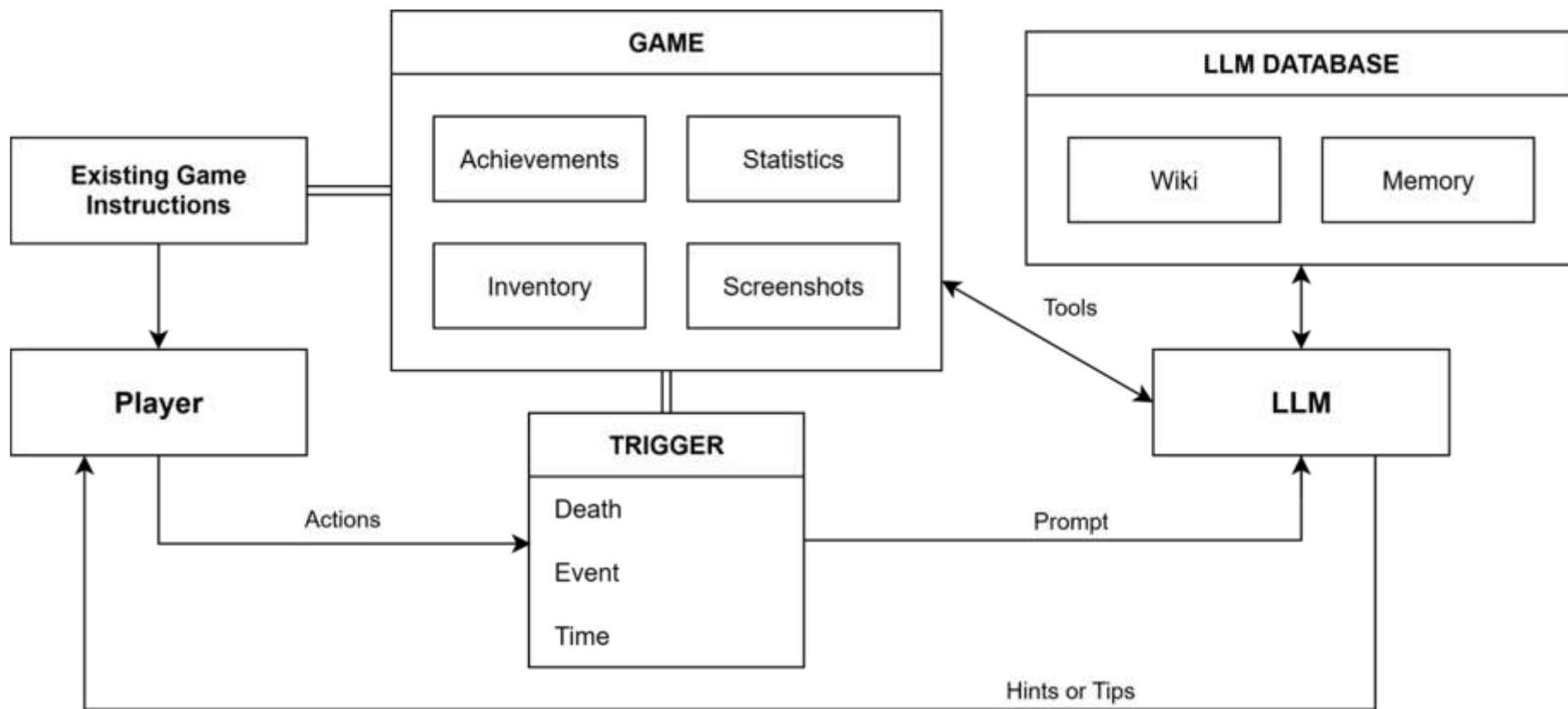


AI Assistance

Large Language Models (LLMs) are great at summarizing!

Can we use LLMs to search the web and game wikis to provide contextual assistance to players?





Game

Achievements

- Items unlocked
- Mechanics mastered
- Monsters killed

Statistics

- Kills, deaths, items, etc.

Inventory

- Equipped or in storage

Screenshots



LLM Database

Tutorial/Wiki:

- Items
- Mechanics
- Enemies
- Tips

Memory:

- Enemies encountered
- Resources acquired
- Game/player state save



Trigger

Event:

- Taking damage
- Nature/monster effect

Death:

- One or more causes

Time:

- Time of day
- Additional calls via timer

Manual



LLM Tools

Read - Text/Image

Database:

- Game tutorial
- Wiki
- Memory

Game State:

- Achievements
- Statistics
- Inventory



LLM Tools

Write

Print message to HUD

- Memory
- Attention

Highlight Item/Creature/etc.

- Perception
- Attention
- “Show, don’t tell”



Considerations

- Memory allocation
- Developer and player control
- Consistency

How can we get consistent, predictable assistance in a constantly-changing environment?

Spaced Repetition



LifeHack



+

Arrow hits
Skeleton shoots
Player hurts
< Footsteps

Considerations

1. Players get distracted easily (attention)
2. Players forget things due to those distractions (memory)
3. Players' goals change constantly



Remember—players need to learn from trial and error:

- Support player with their main goal
- Provide a consistent tip to achieve the main goal
- Track player progress
- Reevaluate tip depending on progress

What can we use to implement this?

Goal-Oriented Action Planning

Goals → What the player is/should be trying to achieve

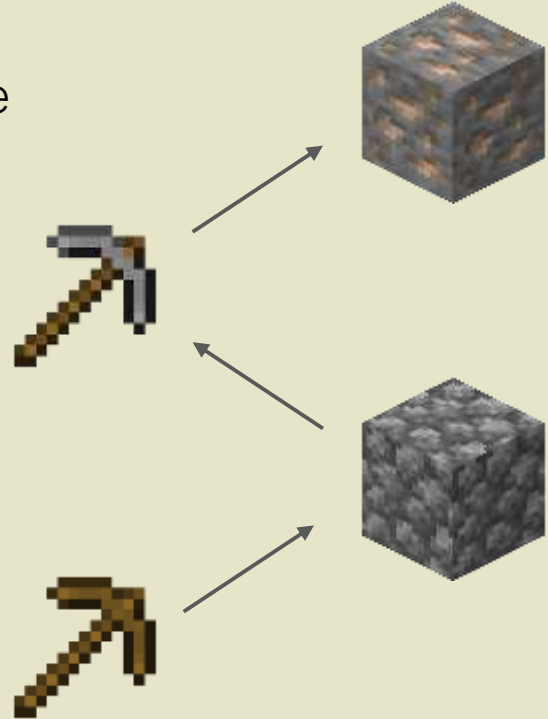
- Determined by the LLM
- Have weights or desires to achieve them

Actions → What the player can perform

- Costs associated

Planning → Potential action path to achieve goal

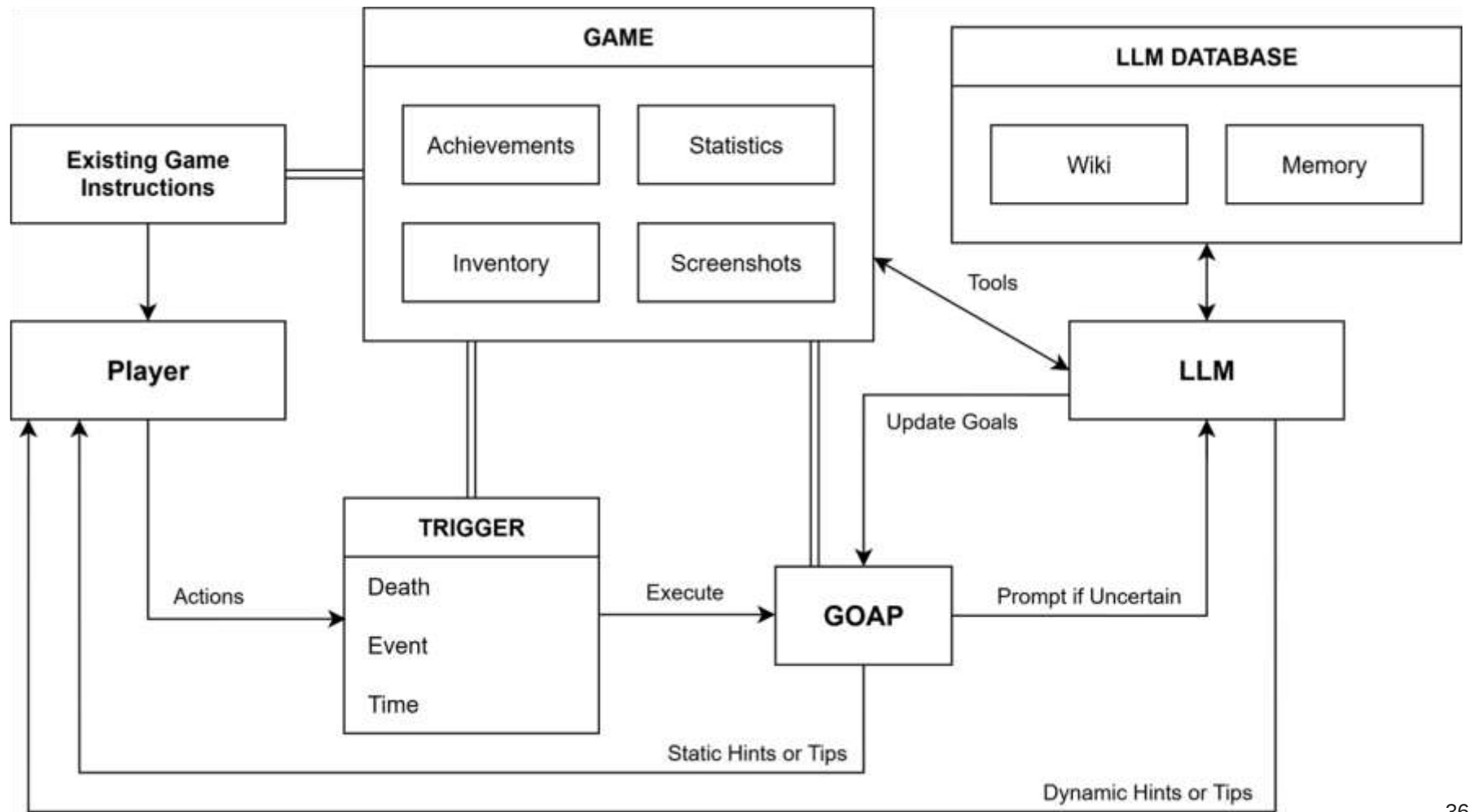
- Prioritize lowest cost path/steps
- Reevaluate if player is struggling



Goal-Oriented Action Planning

Is the player making progress towards our given objective?

- Yes → Hints on next steps as needed
 - Save plan for future repetition
- No → Determine a new objective and plan
 - Was the LLM wrong?
 - Did the player change objectives?
 - Is the current plan/tip not successful/helpful?



Pros and Cons

Pros

- More consistent
 - Less hallucinations
- Less resources
- Control over assistance

Cons

- Quantifying goals - can this always be done?
- More coding

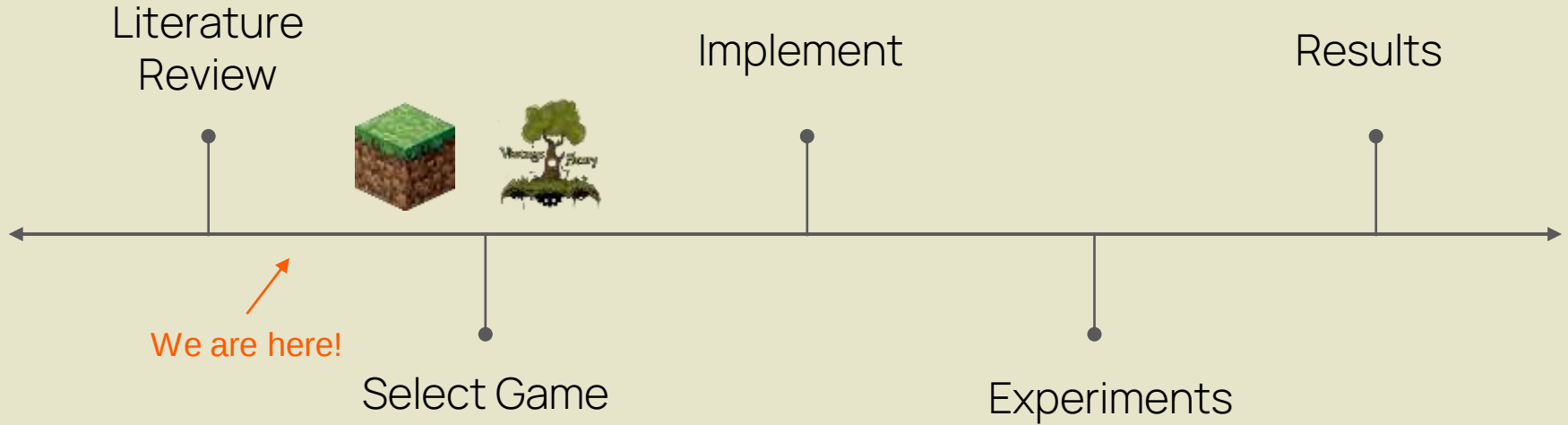
Accessibility

Camera Assist	◀	Off	▶
Vehicle Camera Assist	◀	Off	▶
Aim Mode	◀	Hold	▶
Lock-on Aim	◀	Off	▶
Sticks While Aiming	◀	Default	▶
Repeated Button Presses	◀	Tap	▶
Subtitles	◀	Off	▶

Reset Defaults

Complete minigames by either tapping the prompt button rapidly or holding it down.

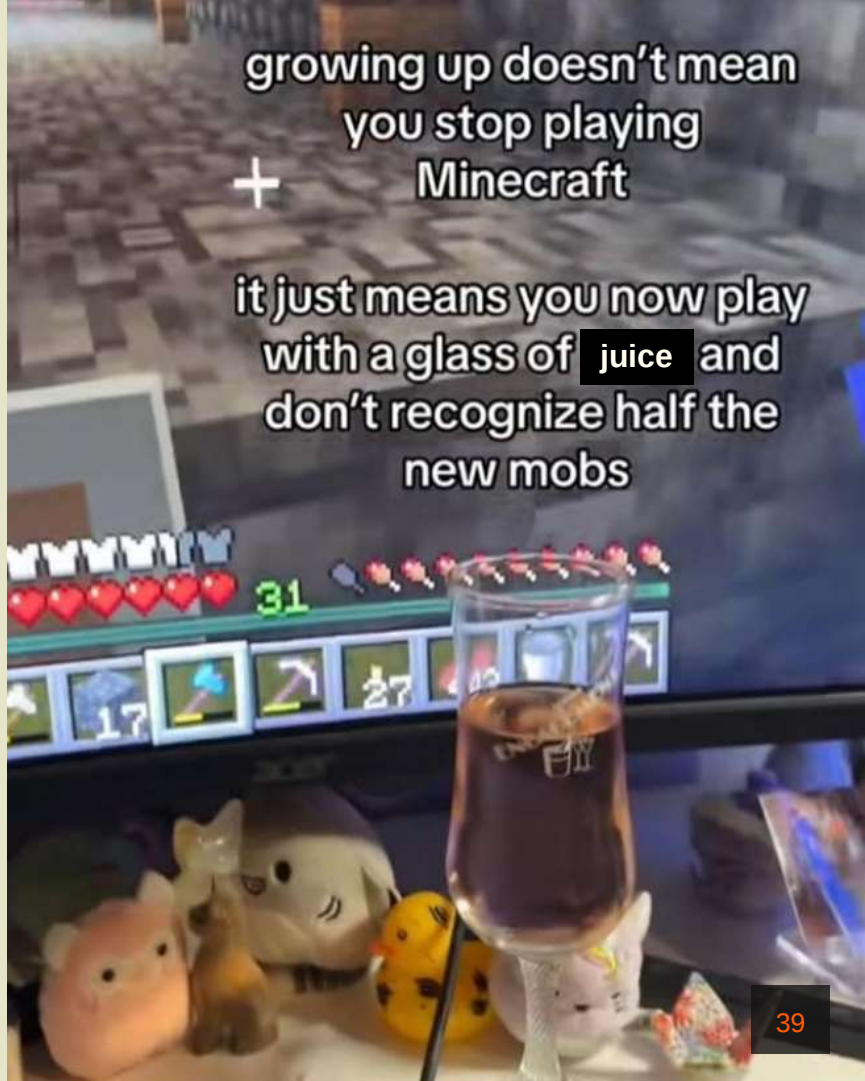
Timeline



Results

Answers to questions:

1. Is there a sweet spot for trial and error attempts?
2. What data is most helpful for LLM?
3. What's the best way to prompt?
4. Are tips accurate/helpful?
5. Do the tips alleviate cognitive load?
6. Do players find it helpful?
7. Is this worth implementing in games?



Identifying Stairs

How can you identify cognitive stairs in your game?

- The “challenges”?

A consequence of the fun parts of your game!



Identifying Stairs

Fun parts:

- Rich story
- Complex mechanics and items
- Gorgeous world to explore
- Farming and crafting

Cognitive consequences:

- Too much to remember
- Overwhelmed by options
- A lot to keep track of



Xaero's Minimap



Xaero's Minimap - Curseforge

5434, 66, 1985



3365, 63, 2066





OPTIONS

REDUCE BUFFERING

OFF

DISPLAY PERFORMANCE STATS

OFF

ADVANCED PERFORMANCE STATS



DISPLAY SYSTEM CLOCK

OFF

LIMIT FPS

DISPLAY-BASED



GRAPHICS QUALITY

HIGH



ADVANCED



GAMMA CORRECTION



CONTRAST



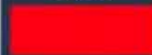
BRIGHTNESS



COLOR BLIND OPTIONS



ENEMY



FRIENDLY



GROUP



ALERT



COLOR BLIND MODE

OFF

COLOR BLIND STRENGTH



I found playing Overwatch

Overwatch - Blizzard Entertainment

BACKSPACE

RESTORE DEFAULTS

ENTER

APPLY

ESCAPE

BACK

1:45 ESCORT THE PAYLOAD

ESCORT

5 PLAYER KILL STREAK!

ELIMINATED MARSHYBAY2006 37

ELIMINATED MXPOLLINER 100

7/200

0%

IRONWOLF230
SHEFFIELDJOE
SHEFFIELDJOE
SHEFFIELDJOE
SHEFFIELDJOE

Traditional AI

- Guide main versus side quests
- Planner system suggests side quests before a new main quest
 - Quests along path
 - Time investment
 - Difficulty
 - Rewards



Generative AI

- Recap the story so far
- Summarize current task
- Item suggestions:
 - Strength
 - Comparison
 - Playstyle
 - Preference

←  r/borderlands3 • 3 yr. ago
Enermis

I don't understand how to compare weapons

[Question] ?

I have 2 weapons which i'm trying to compare. From my naive understanding the right weapon in the screenshot should outperform the left one in pure damage. However when i get a headshot/critical with the left one i do over 500 damage on average. While the one on the right only crits for about 200.



Weapon	Item Score	Lvl Req	Damage	Accuracy	Handling	Reload Time	Fire Rate	Magazine Size	Special Features
True Monocle	171	5	83	99%	83%	3.0s	1.12/s	4	+74% Weapon Damage, +15% Weapon Fire Rate, +57% Weapon Accuracy, 14.6x Weapon Zoom, Critical Hits ricochet 1 bullet at the nearest enemy.
Trick Muckamuck	221	14	137	96%	34%	2.8s	1.01/s	6	+21% Critical Hit Damage, +25% Weapon Damage, +19% Reload Speed, 4.8x Weapon Zoom, Critical Hits ricochet 1 bullet at the nearest enemy.

JAKOBS

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Thank you for listening & stay tuned!



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