

PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Veronica Reingold and Steven Rice

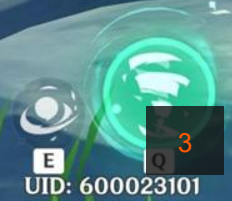




- Belghast 1
- Amber 2
- Lisa 3
- Kaeya 4

Lv. 20 3551 / 3771

Genshin Impact - miHoYo





Tutorials / All

Archive entries unlocked: 56



Search tutorials

Recently Unlocked

Fatui Skirmisher - Pyroslinger Bracer

Fatui Skirmisher -
Electrohammer Vanguard

Fatui Skirmisher - Geocharter
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



r/Genshin_Impact • 2 yr. ago

Expensive-Session152



Do i need to read this?

Guides & Tips

Tutorials / All

Archive entries unlocked: 56

Recently Unlocked

- Fatui Skirmisher - Pyroslinger Bracer
- Fatui Skirmisher - Electrohammer Vanguard
- Fatui Skirmisher - Geochanter 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**.

PreviousNext

UID: 896534789

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

↑ -Used to Manufacture
↓ -Used to Obtain
↔ -Alternative Method
→ -Used to Create
→ -Produces
↑ -Drops

Minecraft Production Web

Version 1.6
FugiATX
bubodiui
For Minecraft version
1.8.1



PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Veronica Reingold

“Nonika”



MSc in Computer Science
University of Windsor

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*
---------------	---

Approachability	early game: tutorials and communities
-----------------	---------------------------------------

Learnability	late game: tutorials and mastery
--------------	----------------------------------

Difficulty	game challenge and personal skills
------------	------------------------------------

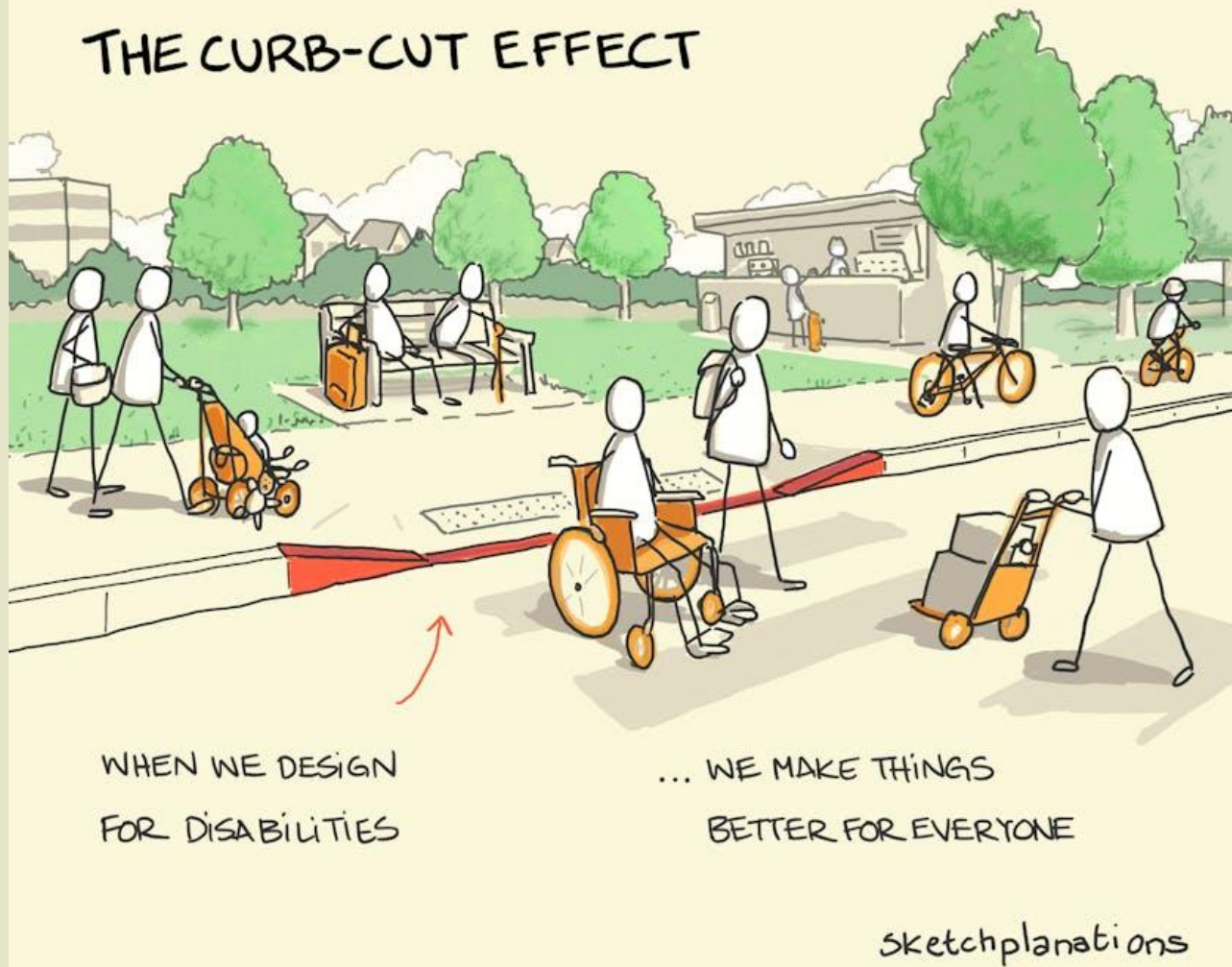
User Experience	effectiveness of game, HUD, and UI
-----------------	------------------------------------



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

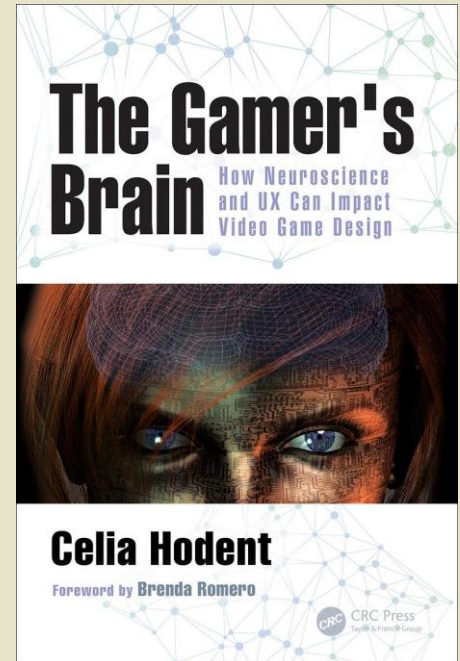
accessible.games/accessible-player-experiences

caniplaythat.com

Games User Experience:

gamesur.com

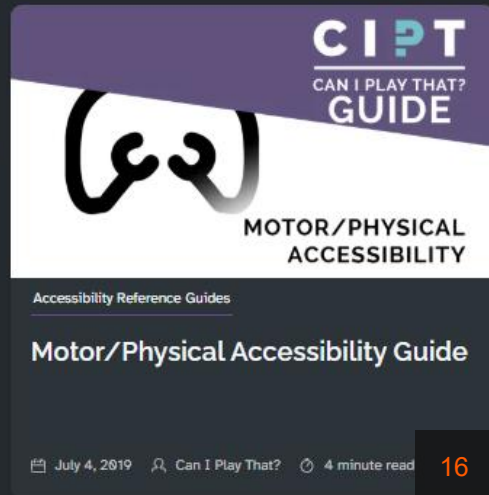
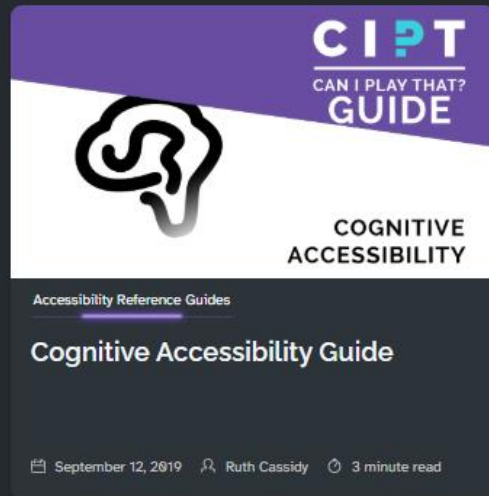
thegamersbrain.com



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

La Bonne Aïe

1:26

ATTACK OBJECTIVE A

HEX



SUPERFLY

SUPERFLY



ROJO

HEALING +6

0%



111/200

Overwatch - Blizzard Entertainment

18

Learning



TUTORIAL

SECRET MISSIONS



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



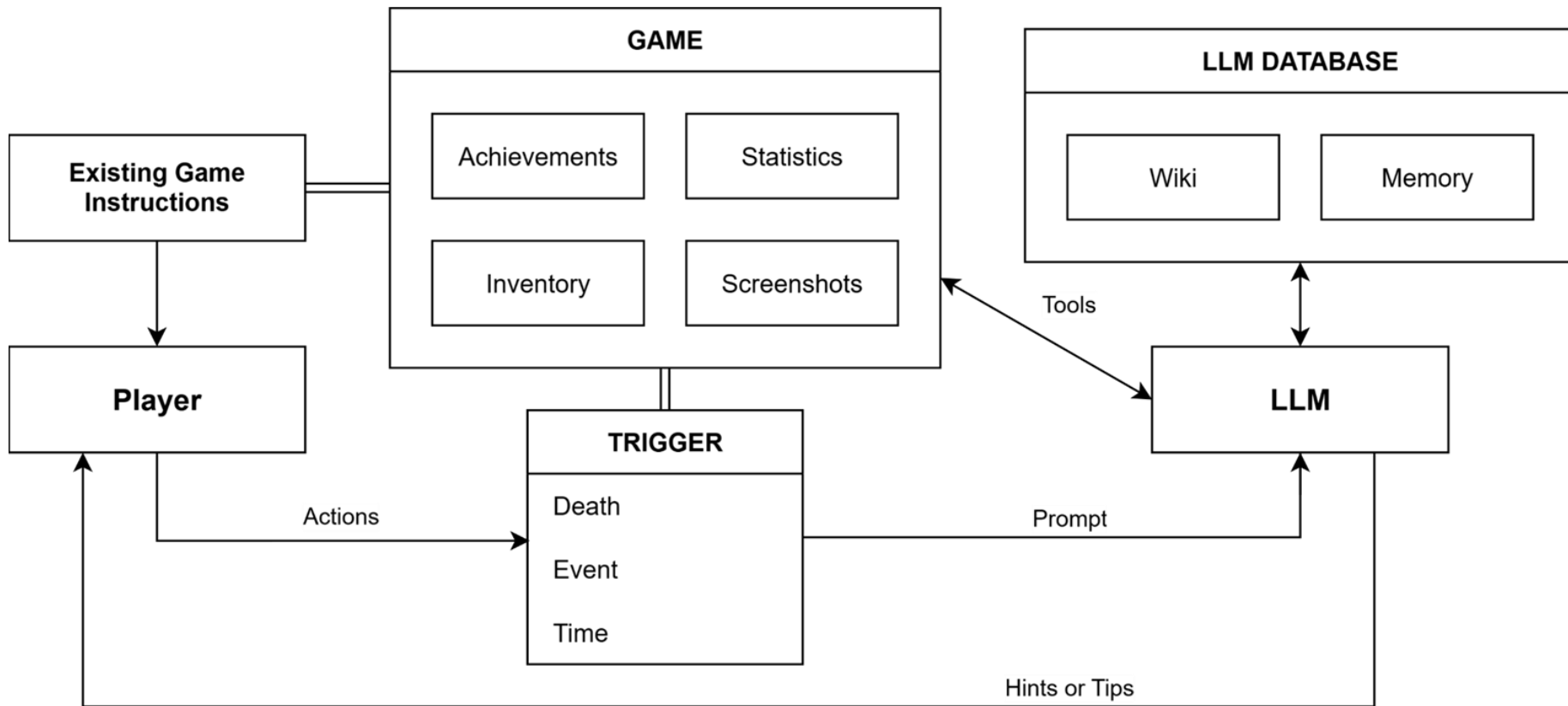


AI Assistance

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

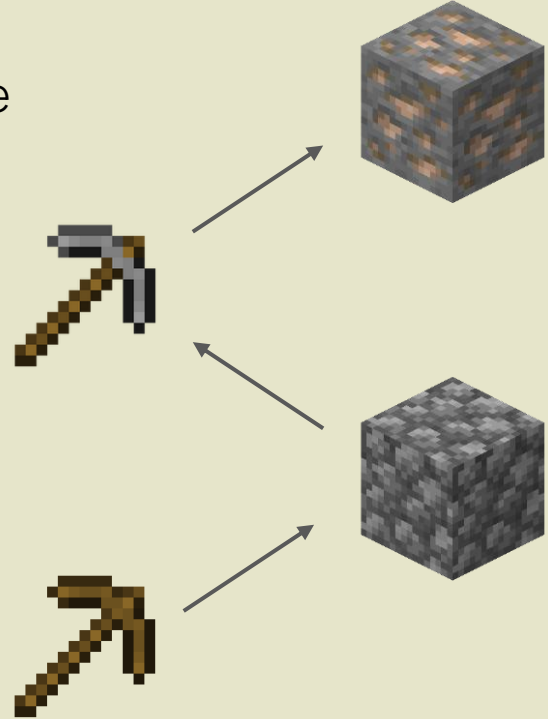
- Determined by the LLM
- Have weights or desires to achieve them

Actions → What the player can perform

- Costs associated

Planning → Potential action path to achieve goal

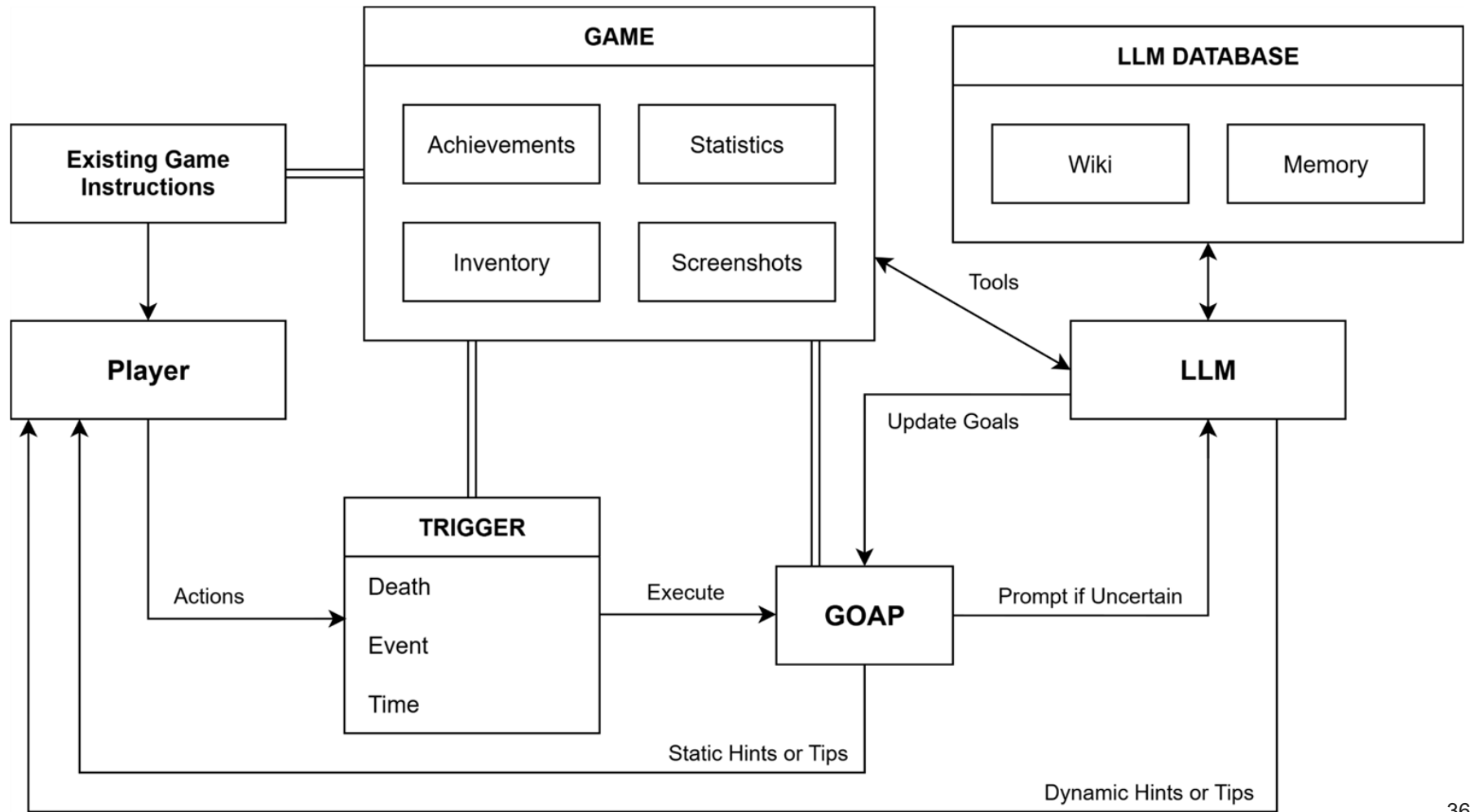
- Prioritize lowest cost path/steps
- Reevaluate if player is struggling



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

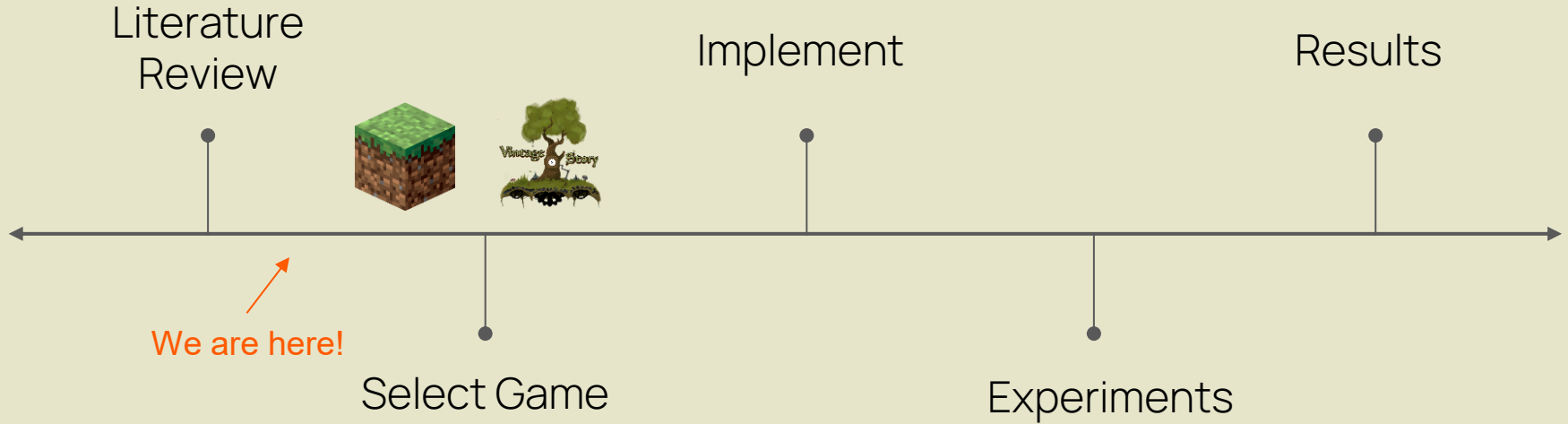
Accessibility

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.

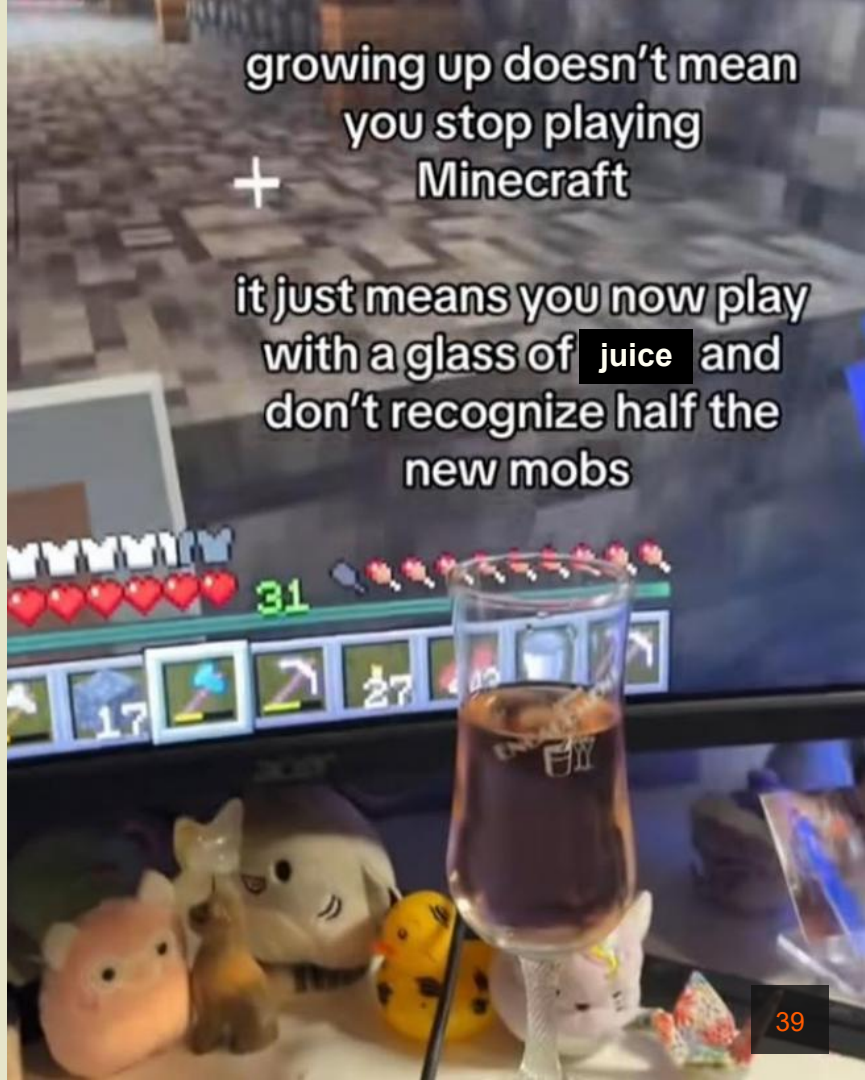
Timeline



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

Pov: you and your friend went exploring and can't find your way home



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



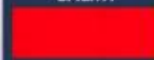
BRIGHTNESS



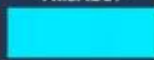
COLOR BLIND OPTIONS



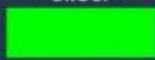
ENEMY



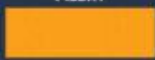
FRIENDLY



GROUP



ALERT



COLOR BLIND MODE



OFF



COLOR BLIND STRENGTH



1 friend playing Overwatch

Overwatch - Blizzard Entertainment

BACKSPACE

RESTORE DEFAULTS

ENTER

APPLY

ESCAPE

BACK

44

1:45 ESCORT THE PAYLOAD

ESCORT

5 PLAYER KILL STREAK!

ELIMINATED MARSHALL 37

ELIMINATED NEPOLLINGER 100

0%

IRONWOLF230
SHEFFIELDJOE
SHEFFIELDJOE
SHEFFIELDJOE
SHEFFIELDJOE



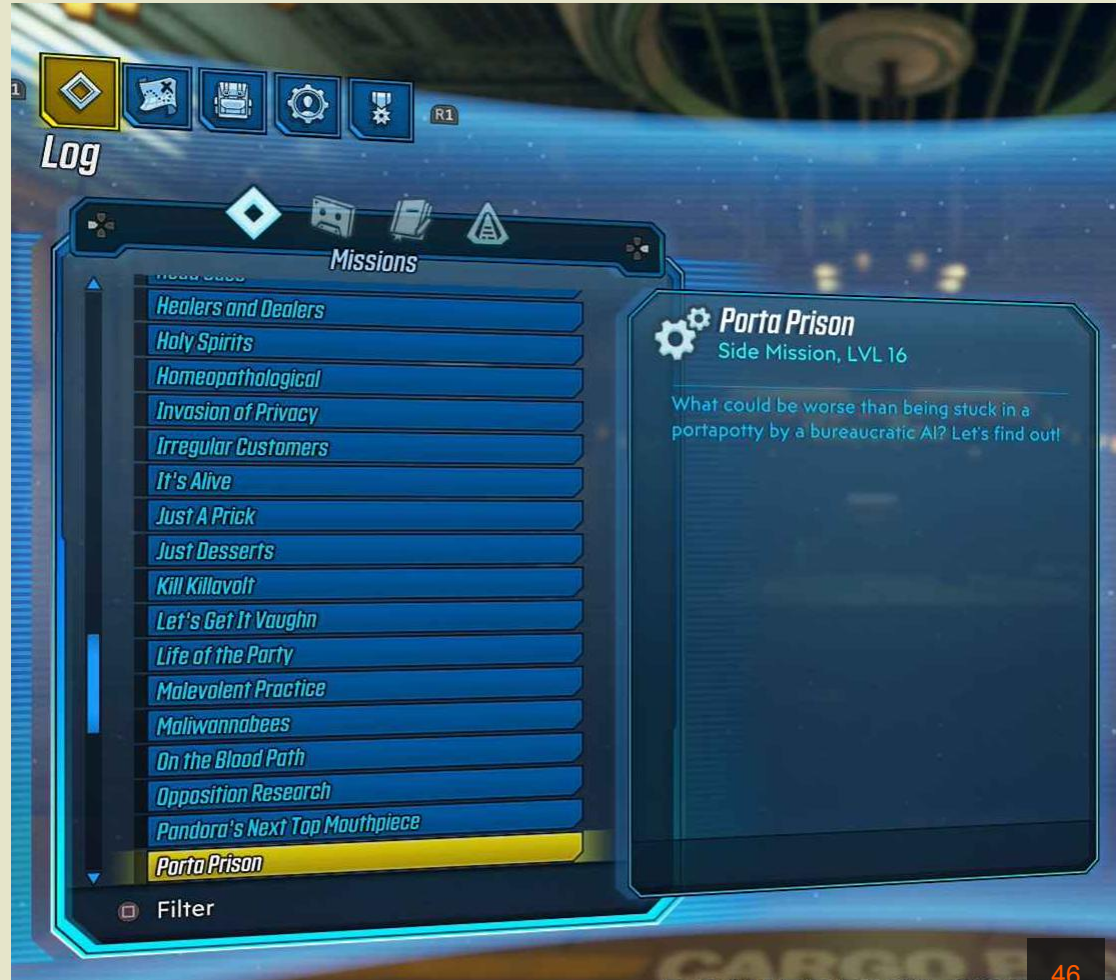
7/200

Overwatch - Blizzard Entertainment

45

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.

171

ITEM SCORE

LVL REQ. 5

True Monocle

LEGENDARY

DAMAGE

83

▼

ACCURACY

99%

▲

HANDLING

83%

▲

RELOAD TIME

3.0s

▼

FIRE RATE

1.12/s

▲

MAGAZINE SIZE

4

▼

One is enough.

+74% Weapon Damage

+15% Weapon Fire Rate

+57% Weapon Accuracy

14.6x Weapon Zoom

Critical Hits ricochet 1 bullet at the nearest enemy.

JAKOBS

221

ITEM SCORE

LVL REQ. 14

Trick Muckamuck

RARE

DAMAGE

137

▲

ACCURACY

94%

▼

HANDLING

34%

▼

RELOAD TIME

2.8s

▲

FIRE RATE

1.01/s

▼

MAGAZINE SIZE

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

47

PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Thank you for listening & stay tuned!



Nonika

nonika.ca



Steven

StevenRice.ca

