



Less is More: Designing Awesome AI

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INDEPENDENT GAMES
SUMMIT

GAME DEVELOPERS CONFERENCE™

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HI. I'm Kim. Let's be friends!



I'm a game dev

I specialize in human perception in games
(PhD in software engineering & AI)



Most recently I've been working on

ROCKETSROCKETSROCKETS

(which I'll talk about shortly)



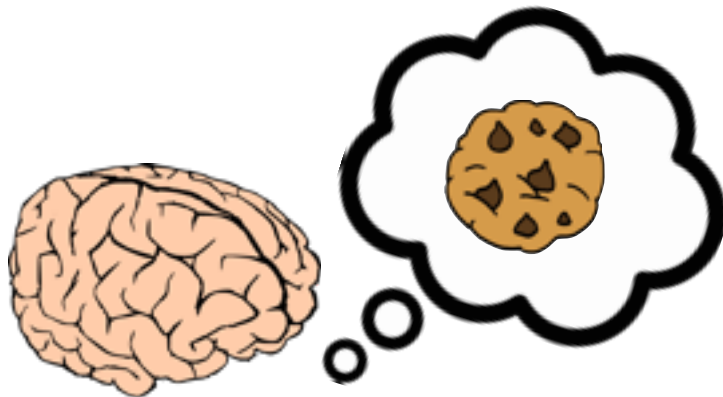
let's talk about AI



One job.
Create an experience.
Everything else must support that.



AI is no exception



Good AI can add
depth, challenge, humour,
agency...

Half-Life 2





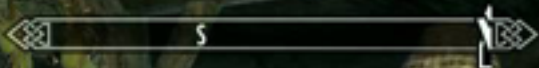
Thief



Sims



Bad AI is a
threat to flow and immersion



Lucan Valerius

Did something happen?

What have you got for sale?

Do you sell spells?

Skyrim

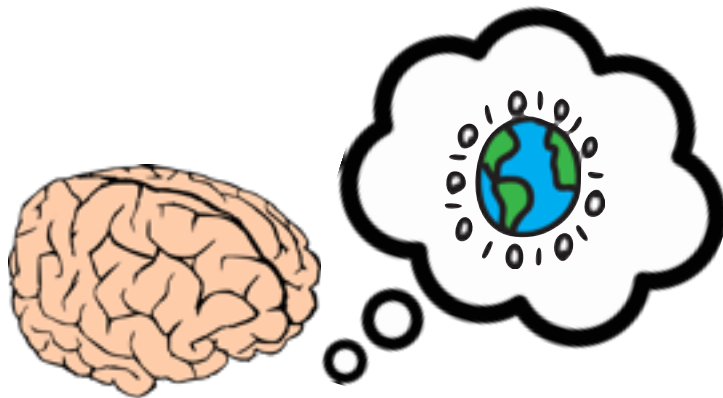
B Exit

GoldenEye 64

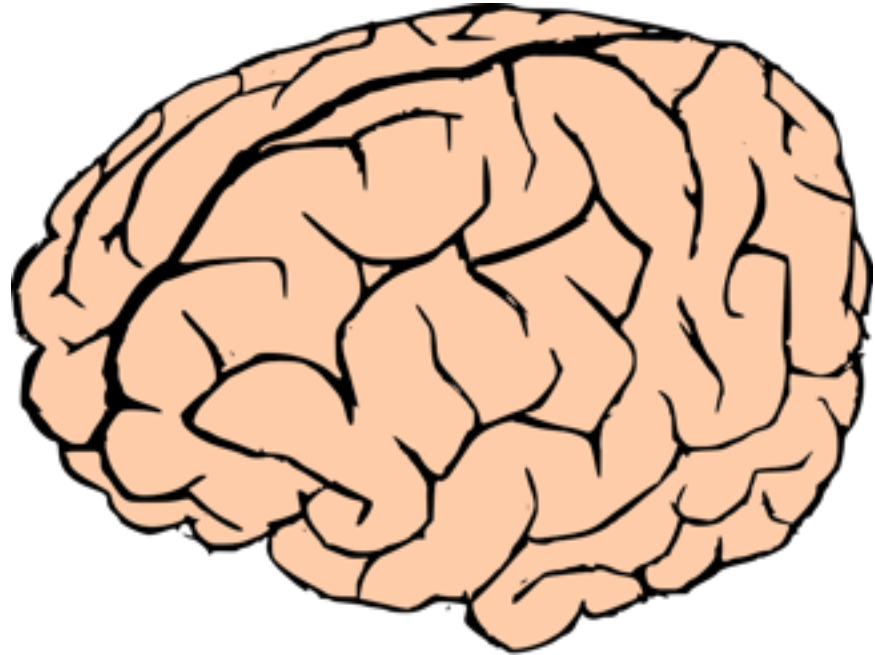
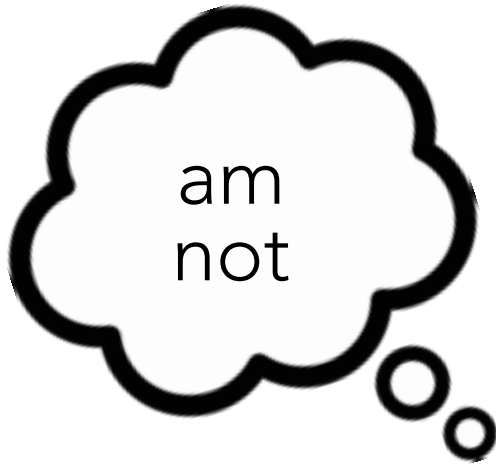




AI is a perception problem
It's our job to manage that
perception



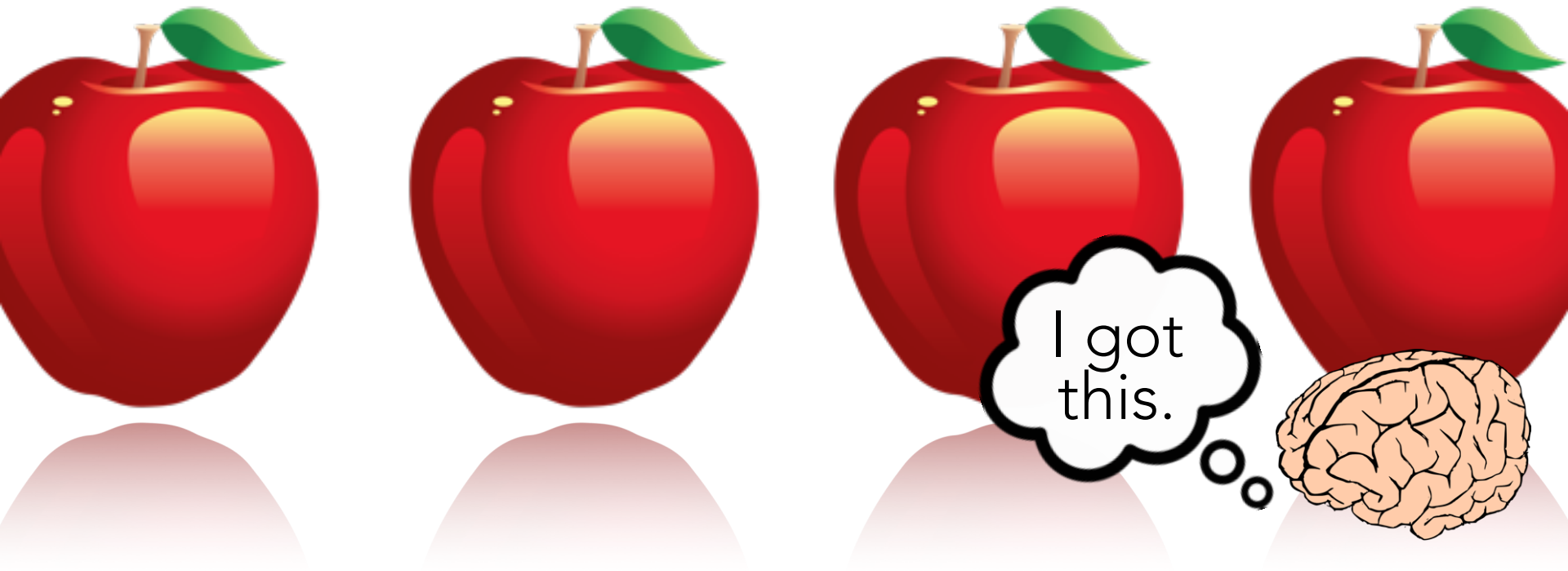
But! First we need to know a few things about how brains perceive the world



brains are stubborn

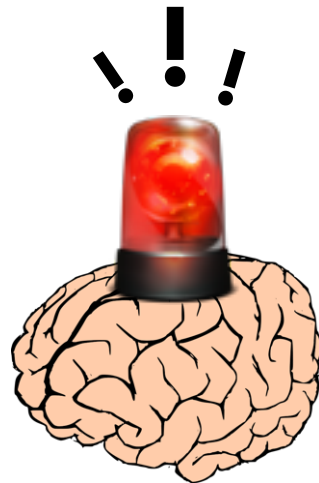
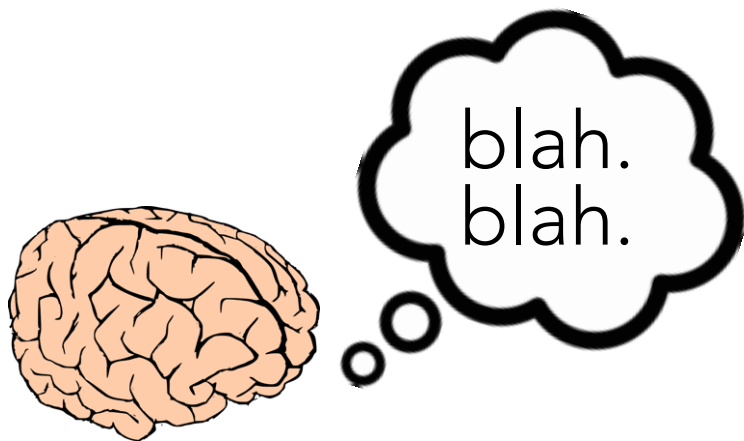


Brains are hardwired to find patterns





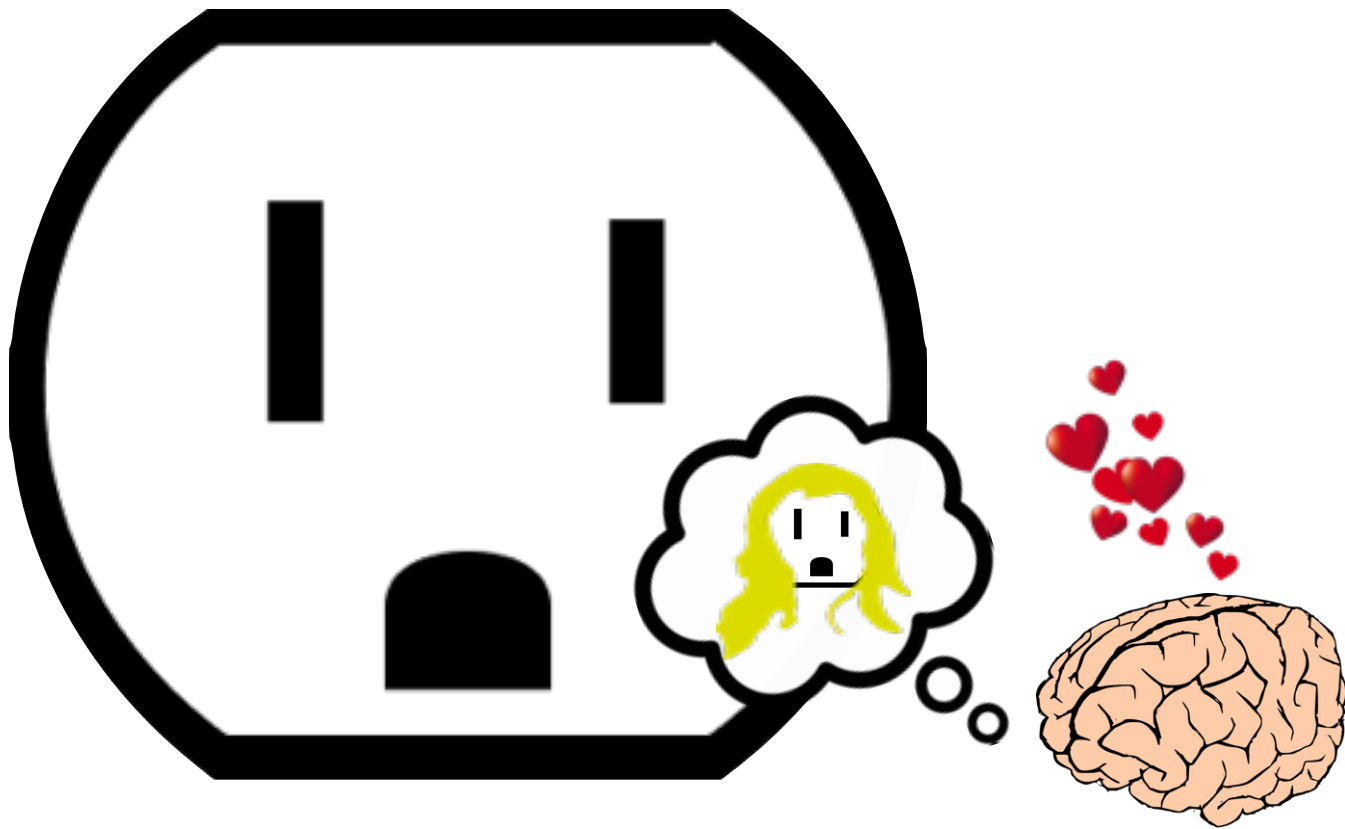
The smallest hint of repetition can be detected by the brain





Things stand out when they don't fit

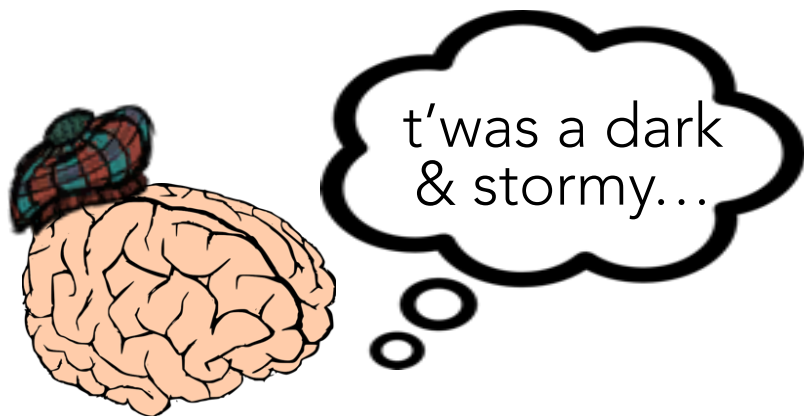






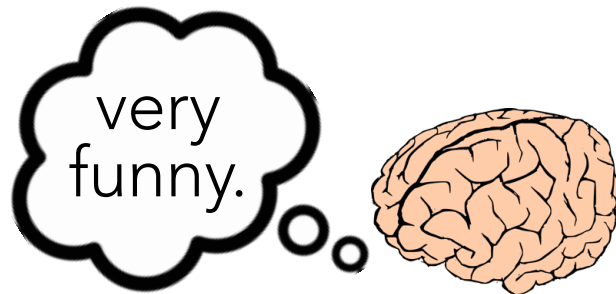
Brains are storytellers

Given even the most flawed input
brains will weave a narrative to fit

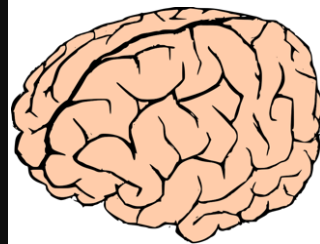




Uncanny Valley



As you increase fidelity you
increase your responsibility to
uphold that fidelity





A suggestion of behaviour is better than a complex model

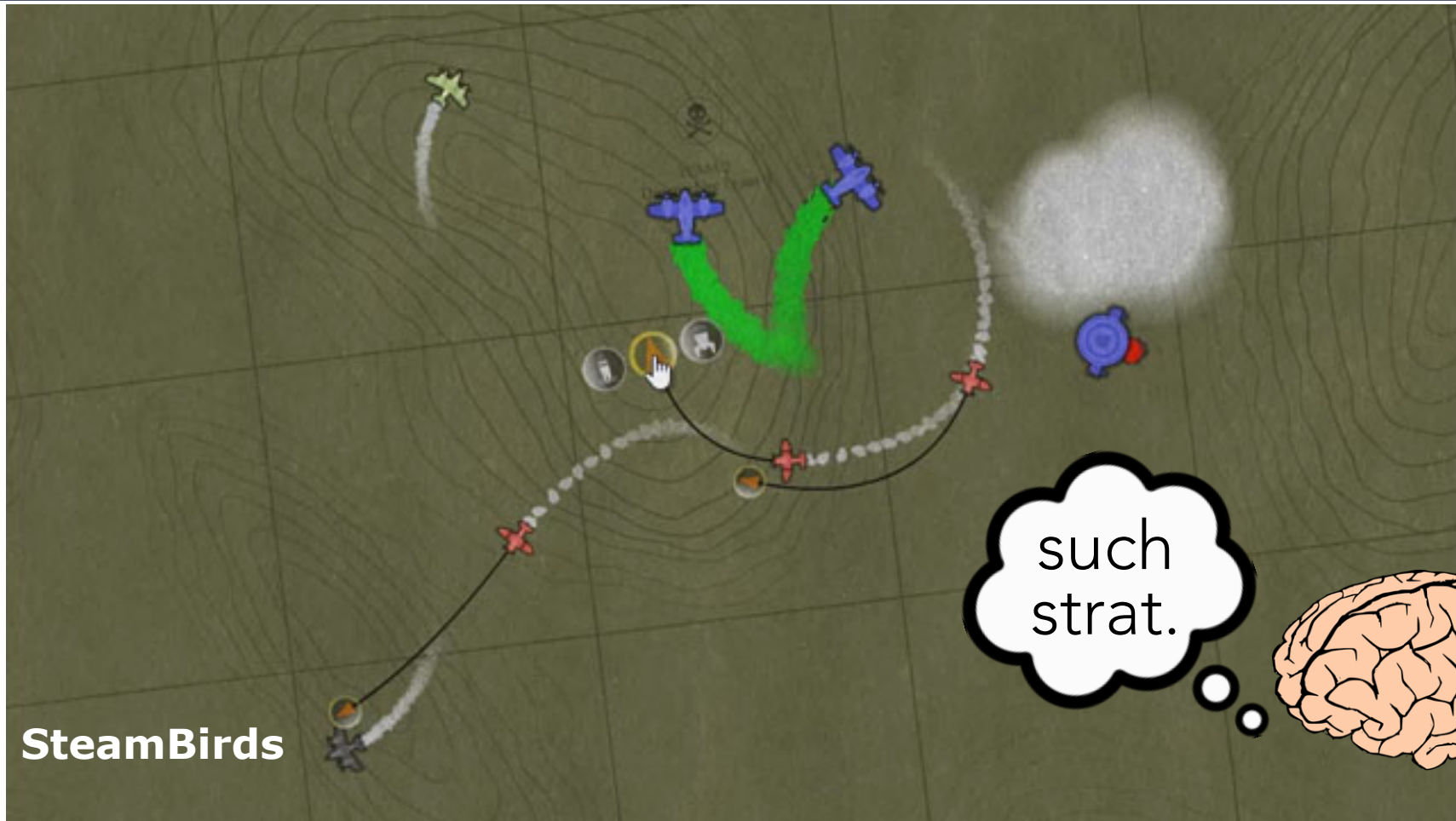
Brains assume the complexity is there







But only if the behaviour is
consistent w/ the player's
mental model



SteamBirds

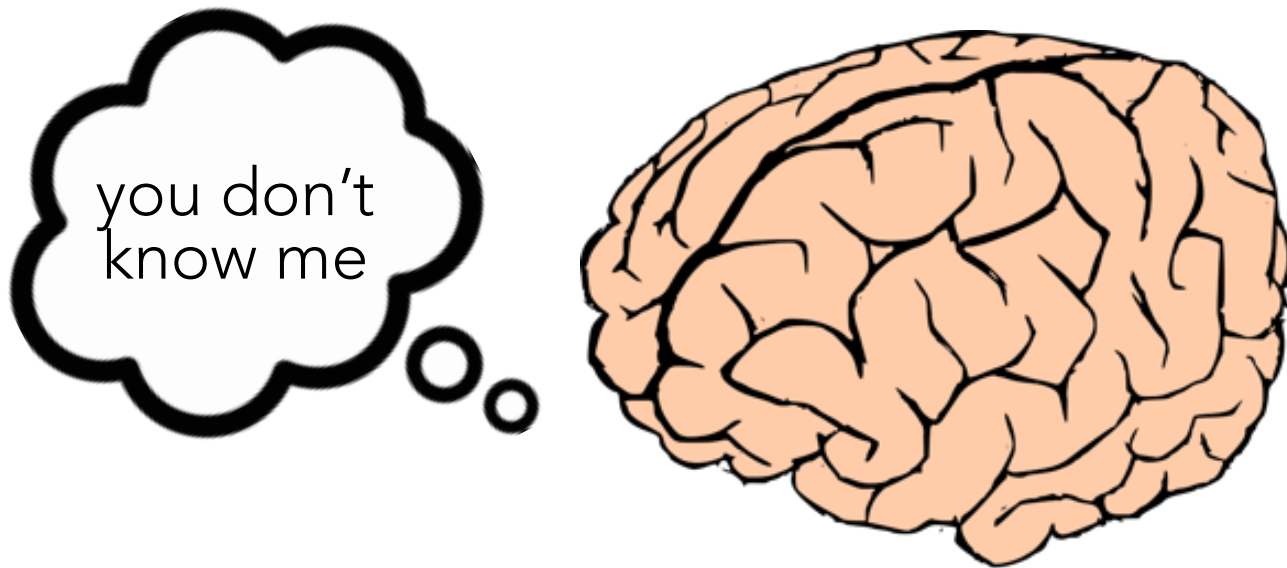
such
strat.



Dragon Age: Inquisition



Work with the brain:



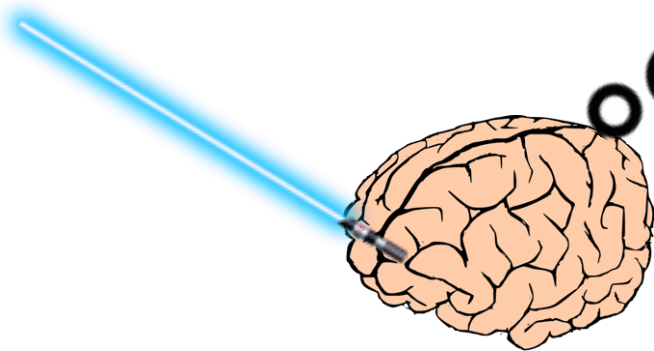
do less, get more!



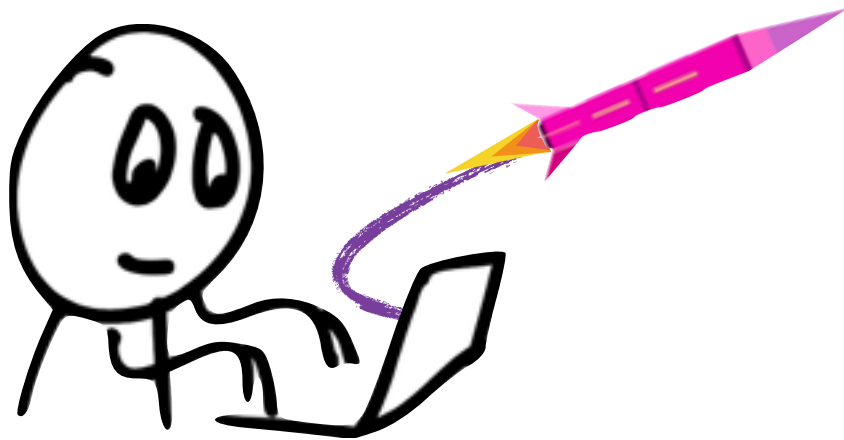
AI is a perception problem
It's our job to manage that
perception



Distill your AI needs.
Start simple.
Resist complicating.
Use the ~~force~~ brain.



More like
Hans Neuro,
amirite??



Here's what I did for
ROCKETSROCKETSROCKETS



Super fast game,
lots of momentum,
close dogfighting,
bumping into things





Super fast game,
lots of momentum,
close dogfighting,
bumping into things





Meet Stanley



Fun Trivia!

Stanley's named after one of my favourite games, Stanley Parable. Go buy it. I'll wait.



Through Stanley's development
I had three rules:





1. Always have a working ~~build~~ brain
2. All behaviour is controller-based
3. Respect the player





Step 1: Watch people play

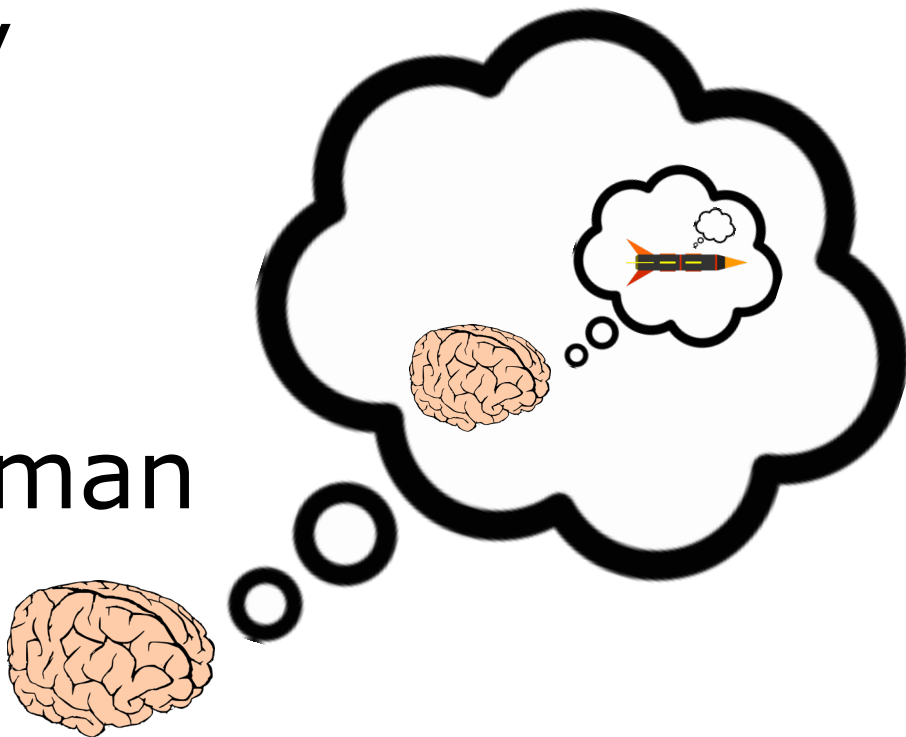
Three stylized rockets are positioned at the bottom left. The largest is pink with a yellow and orange flame. Below it are two smaller rockets, one green and one yellow, both with green flames.



Trying to get a sense
of how people play

and

how they might
expect another human
to play/not play





Broad behaviours:

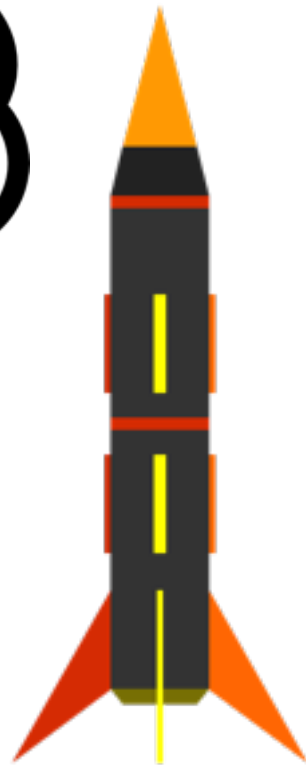
Chasing

Evading

Looping

Avoiding/non-engaging

Ramming



Step 2:
Start (smart) stupid

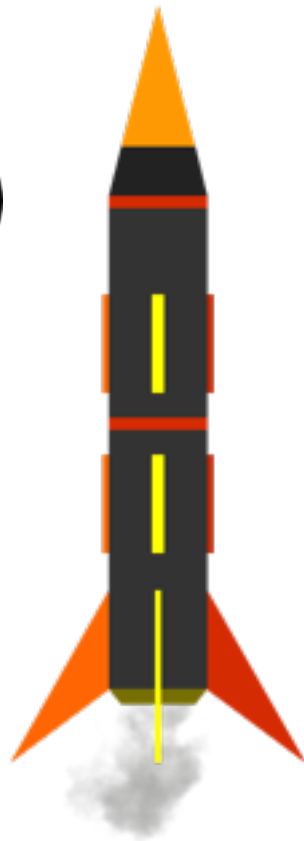


Stanley V1.0

Just follow the player

```
thisRocket.GetComponent<RocketControl>().UpdateControls(  
    (targetRocket.position -  
     thisRocket.position).normalized );  
// BAM rocket science, baby!
```

(Made with  unity)



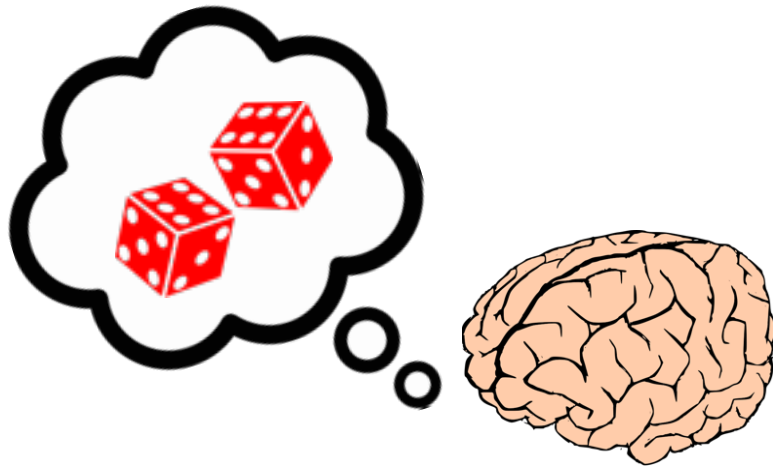
Step 3:
Identify (in)appropriate
behaviours and fix



- ◆ Stuck on walls
- ◆ Heavily scripted pathing
- ◆ Didn't react/interrupt behaviours
- ◆ Better reaction to mines/clusters
- ◆ Firing patterns change at distance
- ◆ Attacking "through" walls
- ◆ "Random" direction changes as evasion
- ◆ ...and more!



Intelligent randomness

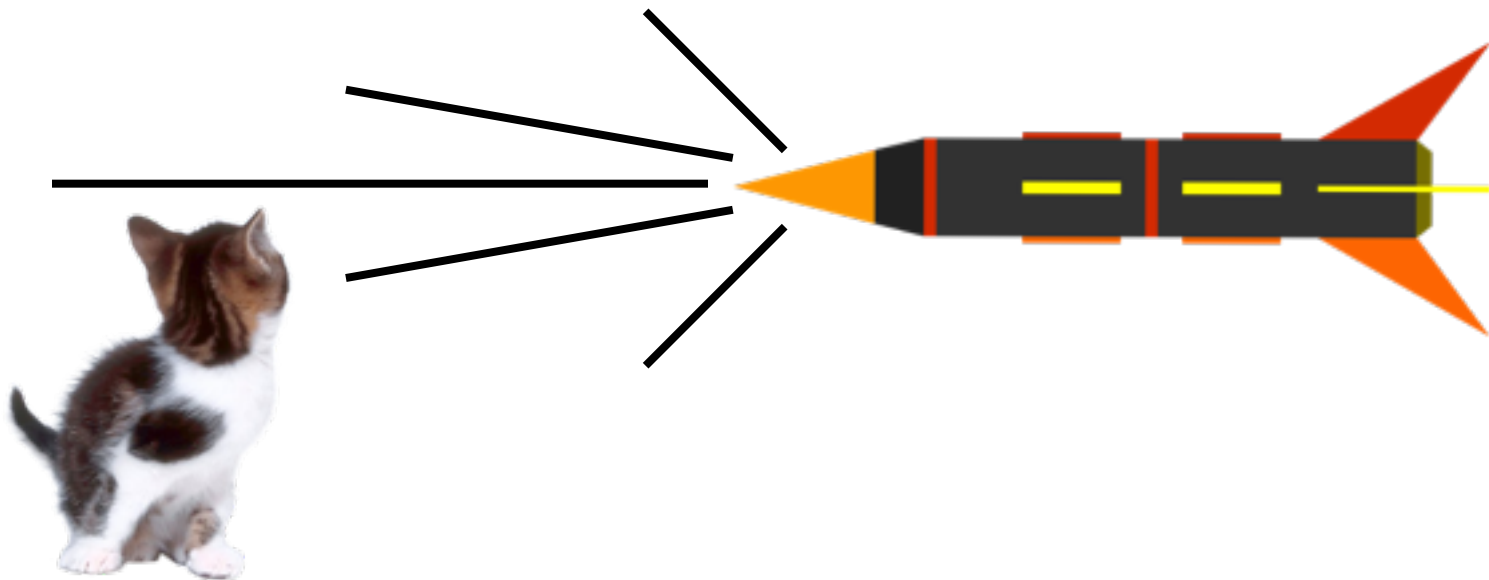


Is awesome still awesome
after X times?



Go simpler before complex

E.g. whiskers vs. navmesh





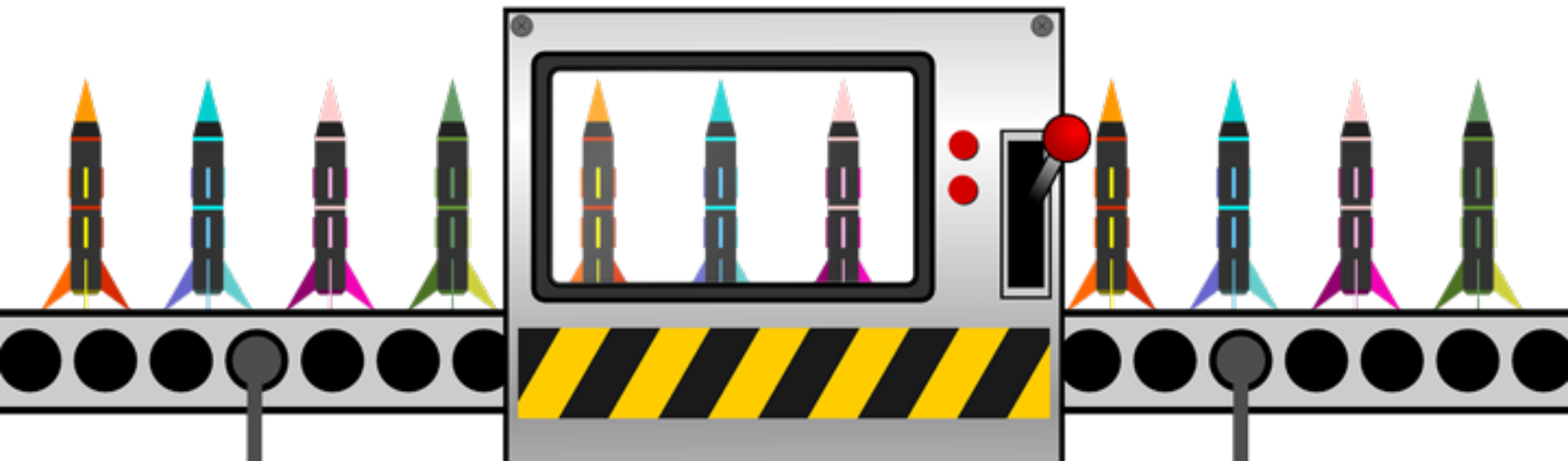
Game has a natural dance
that emerges

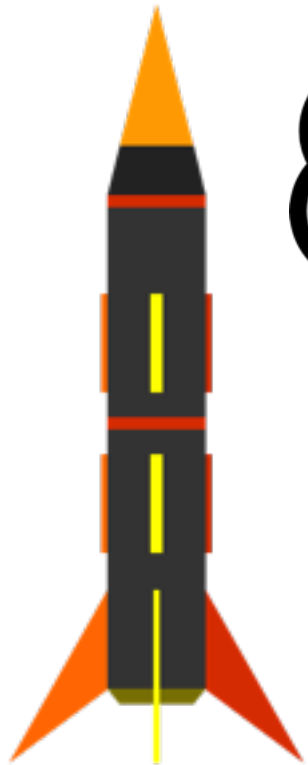
I was able to hide AI
repetition in natural
repetition





Step 3: Iterate





It seemed to work... O.o



Passed the 'rocket turing test'!





“Really enjoying [online multiplayer]
but I’d like to be able to choose
who I’m playing”

(game is local multiplayer only)



"So this is a game abo...d'oh my god

<minutes go by>

...wow, this AI is actually a worthy
opponent, I can't talk!"

(let's play videos)



"<various descriptions of complex hunting, evasive, responsive and vindictive behaviours>"

(that didn't exist)



“Great AI update!”

(no update made that month)



“Wow, this AI doesn’t suck!”

(blush)



"@#\$@&!!! Stanley!"

O:)



Process Summary

1. Support the core experience
2. Watch people play and get in their heads
3. Identify broad behaviours
4. Start simple
5. Figure out what the brain gives you for free
6. Try going simpler before you go complex



Remember

Once an AI has done something
stupid it is incredibly hard to
overcome that bias

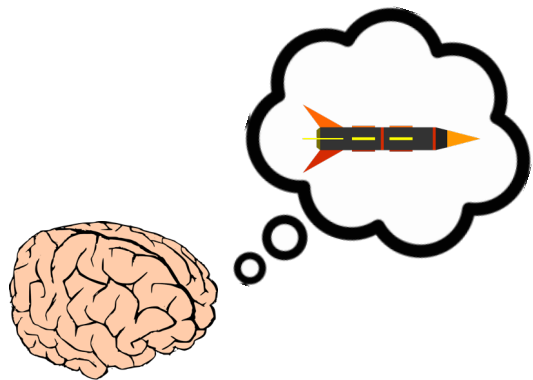


commit to something simple
easy to do a good job

commit to something complex
easy to screw up

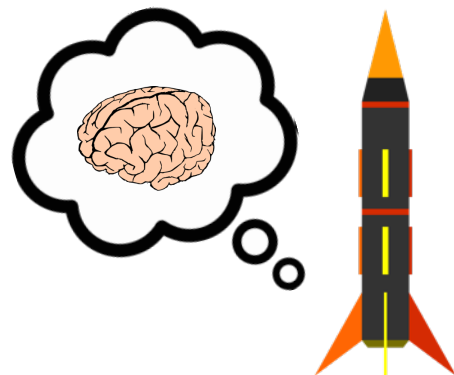


Less is more.



Thank you :)

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ROCKETSROCKETSROCKETS
launches May 1st, 2015 on Steam!