Game feel
Principles of virtual sensation
Controller mappings
Game Feel

Steve Swink, *Principles of Virtual Sensation*
Game Feel Experiment

Demo

- Any (small) difference(s) in control + physics?
- Which version is more **fun** to control?
Game Feel Experiment

Results

- Result: no differences in control + physics ...
- What changed?
  - Maybe helpful / eye candy: motion trail
  - Eye candy / obfuscating: dynamic background
Game Feel
General

- Sensation of
  - Kinesthetic feeling (e.g. Super Mario)
  - Controlling some virtual avatar (direct / indirect)
  - Making the character an extension of your will

- Principles of virtual sensation / Game Feel
  - Based on gamasutra essays/papers by Steve Swink
    http://www.steveswink.com/

- Deeply embedded in Human-Computer-Interaction (HCI) research

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Andy Nealen, Rutgers, 2012
Principles of Animation
Thomas & Johnston: The Illusion of Life

- Squash and Stretch
- Timing
  - spacing actions to define the weight and size of objects
- Anticipation
  - the preparation for an action
- Staging
  - presenting an idea so that it is unmistakably clear
- Follow Through & Overlapping Action
  - the termination of an action and establishing its relationship to the next action
- Straight Ahead Action & Pose-To-Pose Action
- Slow In and Out
- Arcs
- Exaggeration
  - Accentuating the essence of an idea via the design and the action
- Secondary Action
- Appeal

http://www.siggraph.org/education/materials/HyperGraph/animation/character_animation/principles/prin_trad_anim.htm
Game Feel
Towards a More Formal Definition

- We often use physical analogies
  - The game feels: floaty, smooth, slow, loose
  - Best/Worst Game/Control/Camera ever
- How to delineate animation and virtual sensation?
1. Predictable Results (Input + Response)
   - Allowing a sense of mastery and control by correctly and consistently interpreting player input

2. Novelty
   - There are an infinite number of results from the same input

3. Good Feedback
   - Enabling mastery, control, and learning by rewarding player experimentation

4. Low Skill Floor, High Skill Ceiling
   - Making the mechanic intuitive but deep; it takes minutes to pick up and understand but a lifetime to master
Principles of Virtual Sensation (2)

- 5. Context
  - Giving a mechanic meaning by providing the rules and spatial context in which it operates

- 6. Impact and Satisfying Resolution
  - Defining the weight and size of objects through their interaction with each other and the environment

- 7. Appealing Reaction
  - Producing appealing reaction regardless of context or input
1. Predictable Results (1)
Principles of Virtual Sensation

- Design **clear, simple and consistent** player controls
- Pitfalls
  - Mapping inputs to results that are too difficult to process
  - Creating mappings that are unnatural or counterintuitive
  - Overwhelming the player with states and possibilities
- These pitfalls make consistent results seem random
1. Predictable Results (2)  
Principles of Virtual Sensation

- Use Natural Controller Mappings
  - E.g. “genre conventions”

- Exceptions
  - Some experiments, Resident Evil 1-3, GTA IV
1. Predictable Results (3)

Principles of Virtual Sensation

- Clearly differentiate between player states
- What are player states? Example:
  - Mario’s controls on the ground as opposed to Mario’s controls in the air
- (Discernable) state changes are important
  - Expressivity and improvisation + Increase reaction sensitivity
- Too many states may cause confusion
  - Feel of control is lost
  - Example: Tony Hawk Skateboarding series

Demo
Expressivity and improv with digital (!) input
- Compare Donkey Kong to Super Mario Bros.

SMB achieves *analog* feel through simple (Euler) time integration (see XNASandbox)
- But be careful: choosing timesteps and spring stiffness

One more example: *Precision* (a Cactus game)
1. Predictable Results (5)

Consider direct vs. indirect input methods, or a combination thereof

Some examples

- **Ico**: Great sense of emotional ties
- **Lost Winds**: Control player indirectly via control of air flow
We have very little time to hook the player
  ▪ If they don’t feel successful and oriented within the first couple minutes, we’ve lost them

The lowest order feedback loop is the virtual sensation
  ▪ The moment-to-moment control
  ▪ If it doesn’t feel good at an intuitive level they’ll stop playing

Virtual sensation + predictable results are the gatekeepers to all other game experiences
2. Novelty

Principles of Virtual Sensation

- Infinite number of results from the same input

Examples

- Improve character abilities over time (Metroid, Mega Man, etc.)
- Deterministic physical simulations
- Interesting player states and combinations thereof

- Demo: Ski Stunt Simulator
3. Good Feedback (1)
Principles of Virtual Sensation

- Enable mastery, control and learning by rewarding experimentation
- Allow player to
  - Understand the structure and challenges of the game
  - Give immediate, clear and useful (Audiovisual) feedback
- Without immediate feedback there is no virtual sensation
3. Good Feedback (2)

Principles of Virtual Sensation

- Clearly communicate the **game state** to the player
- Example: Mario Kart
  - Powerslide: Smoke + Sound
  - Powerslide boost: Blue / Red Sparks

- Giving detailed audiovisual feedback results in consistent and measurable progress
  - Do not leave the player guessing and frustrated
4. **Low Skill Floor, High Ceiling (1)**  
**Principles of Virtual Sensation**

- Low skill floor = a virtual sensation is easy to learn  
- This is not a function of complexity  
  - A relatively complicated input scheme may be easy to learn thanks to  
    - A natural mapping  
    - Predicable results  
    - Avoiding state overwhelm  
    - Providing good audiovisual feedback

- Conversely, the opposite is also true 😞
4. Low Skill Floor, High Ceiling (2)

Principles of Virtual Sensation

- If controls are too complex to learn fast, use Helpers / Assists
- No longer physical, but rather physically plausible
- Examples
  - Jugglers (arc prediction and force attenuation)
  - Aim assist in 3D shooters on consoles
  - Grav Ball (simple ball pass control)
  - Forza Motorsport (oversteer control)
- Why overcomplicate the control scheme?
  - Let players do what they can, computer does rest
4. Low Skill Floor, High Ceiling (3)

Principles of Virtual Sensation

- High skill ceiling = mastering a virtual sensation is time consuming
- What is mastering a virtual sensation?
  - Try competing in Counterstrike or Ikaruga and you will know what I mean 😊
  - Both games are easy to get into, but take forever (literally) to master

- Design mastery as learning a layer of skills
  - Start with skill atoms, and combine them later
4. Low Skill Floor, High Ceiling (4)

Principles of Virtual Sensation

- Try tuning the relation between input and reaction sensitivity
  - Low Input, low reaction
  - Low Input, high reaction
  - High Input, low reaction
  - High Input, High reaction
4. Low Skill Floor, High Ceiling (5)

Principles of Virtual Sensation

- State switching
- Mario has Left, Right, Jump, Run
  - State switching creates many overlapping states
  - Holding jump button longer results in higher jump
  - Height of Jump also influenced by speed
- Other examples of state switching
  - Combos, Spatial states (demo)
Give a mechanic meaning by providing rules and spatial context

Examples
- Mario in empty space? Boring ...
- Turning a car on an infinite field? Boring ...

Demo
- Empty vs. Full vs. Med
- Perception
  - Zoom vs. Angled speed perception
  - Textured vs. Empty speed perception
5. Context (2)
Principles of Virtual Sensation

- Make use of player perception
- Provide a sense of scale and weight
  - Example: Shadow of the Colossus
  - Great use of speed (slow), sound (heavy) and visuals (particles, dust, size, style, etc.)
5. Context (3)
Principles of Virtual Sensation

- Context and gameplay aesthetics
- Example: Super Mario Kart vs. Mario Kart 64
  - Love SMK. Do not like MK64. Not challenging at all
  - Many love MK64: „fun to play with friends“
  - Think about your aesthetics early on!
6. Impact

Principles of Virtual Sensation

- Define weight and size of objects through interaction with each other + environment
- Allow player to
  - Extrapolate the physical laws of the virtual world
  - Make good, educated guesses
- Bad interaction modeling breaks immersion (flow)
  - Do this too often and the player will stop playing
- Adapt rendering style to physical style
  - Fake / Exaggerate them both 😊 (+ use particles)
7. Appeal
Principles of Virtual Sensation

- Produce appealing reaction regardless of context or input
  - Remember the demo in the beginning?

- Think about failure states
  - Ski Stunt Simulator crashes are fun, even if the goal were unclear

- Demo of cube movement
  - High input, high reaction is clearly the most fun in the absence of context
The Bottom Line

- **Goal**
  - Create a feeling of control and mastery
  - So powerful that it transcends context and platform and becomes a powerful tool for self expression

- Create a sense of **ownership**
  - Personal (time) investment
  - Replayability and evangelism
  - Mastery and resulting ability to improvise

- Adhere to these principles and you are more likely to succeed
Further Reading

- **Principles of Virtual Sensation**

- **Game Feel: The Secret Ingredient**

- **The Chemistry of Game Design**

- **Ron’s Rules for Playtesting**