COMP140: Creative Computing Hacking

Heuristic Analysis

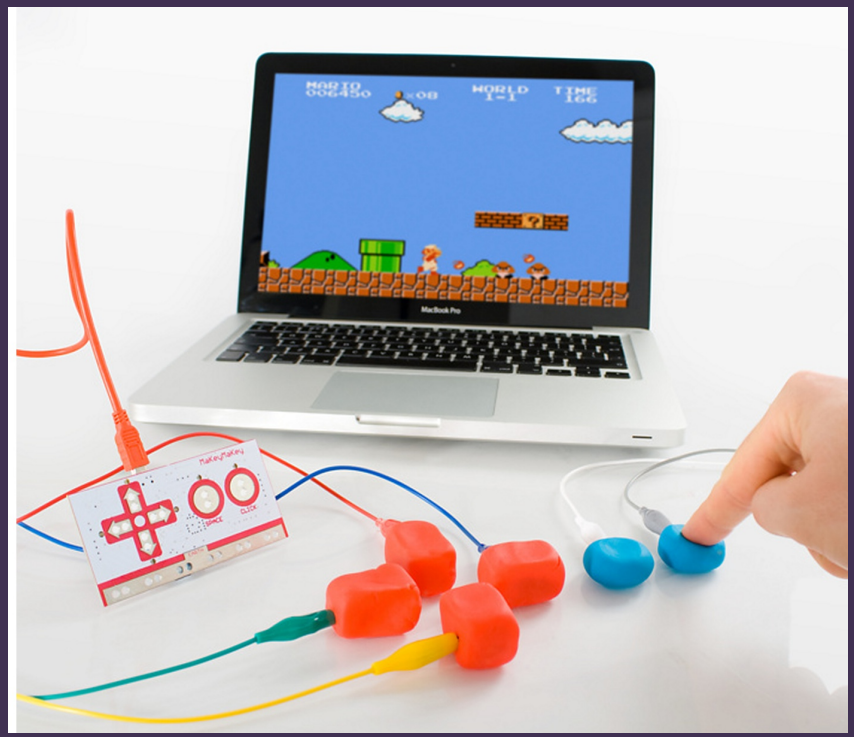
Lecture Objectives

Today's lecture will build upon the practical design of your game controller, focusing on:

- Practical guidelines on one design evaluation technique: heuristic analysis

This will be followed up by a practical in which you will identify heuristics and apply them to a peer's game interface.

Important Notice



Remember to bring your *Makey Makey* kit and associated materials to these lectures for practical support toward the end of each of these sessions.

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Usability Evaluation and Heuristic Analysis

Learning Outcomes

In this section you will learn how to...

- **Explain** what heuristic analysis is
- **Recognise** key heuristics for game interfaces
- **Describe** the application of heuristic analysis to game interfaces

Further Reading

- Nielsen, J. (1993) *Usability Evaluation*. Academic Press.
- Pinelle D., Wong N., and Stach, T. (2008) 'Heuristic Evaluation for Games: Usability Principles for Video Game Design'. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, pp. 1453-1462.

Usability Evaluation

- Experts use their knowledge of users and technology to review software usability.
- Expert critiques can be formal or informal reports.
- Heuristic evaluation is a review guided by a set of heuristics.
- A `heuristic' is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently. These rule-of-thumb strategies shorten decision-making time and allow people to function without constantly stopping to think about their next course of action.

Socrative `JBYPC3BBY`

- In pairs.
- Quietly discuss why it is important to 'evaluate' a game controller design for 2-minutes.
- **Explain why** evaluation is important in your own words.

Heuristic Analysis

- Previously, published usability guidelines had hundreds or thousands of rules.
- Tended to be inflexible and many rules were context-specific.
- HCI scholars desired more fundamental and elegant principles.

Heuristic Analysis

- In 1990s Jacob Nielsen conducted empirical analyses of key usability challenges.
- From this, he and other scholars derived sets of heuristics.
- Heuristics tend to be adaptable as technology changes and new evidence is found.

Heuristic Analysis

Nielsen's (1990) Original Heuristics:

- Simple and Natural Dialogue.
- Speak the User's Language.
- Minimize memory load.
- Consistency.
- Feedback.
- Clearly Marked Exits.
- Shortcuts.
- Good Error Messages.
- Prevent Errors.
- Help and Documentation.

Heuristic Analysis

Nielsen's (1993) Revised Heuristics:

- Visibility of System Status.
- Match Between System and the Real World.
- User Control and Freedom.
- Consistency.
- Error Prevention.
- Recognition Over Recall.
- Flexibility and Efficiency.
- Aesthetic and Minimalist Design.
- Help Users Diagnose and Recover from Errors.
- Help and Documentation.

Heuristic Analysis

Shneiderman *et al* (2010) 8 "Golden" Rules:

- Strive for Consistency.
- Cater to Universal Usability
- Offer Informative Feedback.
- Design Dialogs to Yield Closure.
- Prevent Errors.
- Permit Easy Reversal of Actions.
- Support Internal Locus of Control.
- Reduce Short-Term Memory Load.

Socrative JBYPC3BBY

- In pairs.
- Quietly discuss how game controller design for 10-minutes.
- **List ONE** adapted heuristic **and explain why** it should be included.

Heuristic Analysis

Pinelle *et al's* (2008) Game Heuristics:

- Consistent Responses to Player's Actions.
- Permit Customisation of Game Settings.
- Predictable and Reasonable Agent Behaviours.
- Provide Manageable Controls with Appropriate Sensitivity and Responsiveness.
- Provide Clear Information on Game Status.
- Provide Instruction, Training, and Help.

Heuristic Analysis

Pinelle *et al's* (2008) Game Heuristics:

- Unobstructed Views of Information Needed to Inform Player Actions.
- Permit Skipping of Non-Playable Content.
- Intuitive and Customizable Input Mappings.
- Provide Easily Interpreted Visual Representations
- Minimize the Need for Micromanagement.

Heuristic Analysis Method

- Heuristic evaluation is referred to as `discount' evaluation when 5 evaluators are used
- Empirical evidence suggests that on average 5 evaluators identify 75-80% of usability problems.

Heuristic Analysis Method

- Select set of heuristics
- Brief evaluators

Heuristic Analysis Method

- Conduct evaluation:
  - Each of the 5 evaluators works and takes notes separately.
  - Each evaluator takes one overall pass of the system to get a feel for it.
  - Each evaluator takes a second pass to focus on specific features.
  - If done well, should takes approximately 1-2 hours.

Heuristic Analysis Method

- Conduct debriefing session:
  - The 5 evaluators work together to identify and prioritise problems.
  - They then report their results collectively to the designer.
  - If done well, should takes approximately 1 hour.

Heuristic Analysis Method

Advantages of this approach include (Budd, 2007):

- Few ethical and practical issues as players not involved.
- Computing professionals are readily available.
- Excellent cost-benefit ratio.

Heuristic Analysis Method

Disadvantages of this approach include (Budd, 2007):

- Variable quality as best experts require in-depth knowledge of genre and target players.
- Important problems are sometimes missed.
- Many trivial problems are often identified and over-emphasised.
- Experts have biases.
- Experts disagree with each other.

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Practical Activity

Heuristic Analysis Task

- **Review** the heuristics at `https://www.nngroup.com/articles/ten-usability-heuristics/`.
- Self-organise into pairs.
- **Setup** your game and novel game controller.
- **Demonstrate** the prototype to a peer.
- **Conduct** a heurstic analysis of your peer's game interface, following the guidence at: `https://www.nngroup.com/articles/how-to-conduct-a-heuristic-evaluation/`

Coursework Progress

- **Complete** the heuristic analysis.
- **Complete** the final version of the prototype game controller.
- **Prepare** for final submission on LearningSpace.