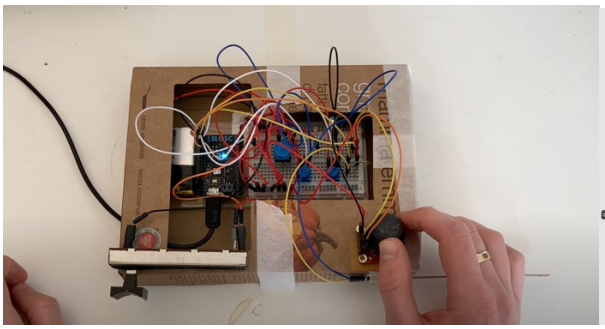
CPC Mini-project 2

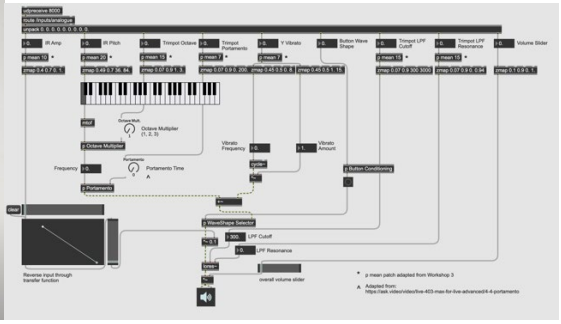
Physical Computing Interface

Final Submission: Blackboard. May. 02nd 2023
At 13:59

Module: Creative and Physical Computing (UFCFLL-30-2)
Component: B
Weighting: 50%
Contact Time: 3 hrs per week
Reading/Coursework preparation: 5 hrs per week
Module Teaching email: philip3.phelps@uwe.ac.uk

Assignment Overview





(image left from MT student 2021 || image right from MT student 2021)

This assignment is an exciting opportunity for you to get to grips with physical computing and interaction design for musical and visual expression. It's a new form of creativity and a real challenge, but there is space show your ingenuity and develop your technical understanding of the critical aspects of real-time audio-visual interactions.

You are required to design, create, and document a physical interface to control an audio and optionally visual process. Your work must focus on the interaction design, electronics, signal conditioning and mapping decisions that go into the development of the interface. **You must clearly explain your interaction design decisions and decision making process.**

In order to do this, you will carry out the following activities **individually**:

- Activity A – Research into methods, techniques and tools used by contemporary artists and designers to create expressive physical computing interfaces.
- Activity B – Design and implement an engaging interactive physical computing experience using x-OSC and associated electronics components.
- Activity C – Design and program the signal conditioning and mappings that convert user interactions into audio-visual process controls using MAX/MSP/Jitter.
- Activity D – Demonstrate your work in action, and explain your interaction design decision-making process in a video..

Deliverables

The following is a list of the specific deliverables that must be submitted in order to fulfil the requirements of the brief. You will submit and be assessed **individually** on:

1. A MAX/MSP/Jitter patch mapping sensor inputs to audio or audio-visual outputs. Submitted as a **.zip file** via Blackboard.
2. A script describing the design and evaluation of the project (~500 words).
3. A short one-take video demonstrating the interface in operation, and evaluating the project. This should be hosted on a video service such as YouTube or Vimeo. Submitted as a **URL** via Blackboard.

Marking breakdown

- Physical Interface: 40%
- Signal Conditioning and Mapping Patch: 40%
- Demonstration and Evaluation Video : 20%

Important dates

- **May 02nd 2023 at 13:59 – Blackboard submission.**

Deliverable Specifications

CPC Mini-project 2 – Physical Computing

The interface you are tasked with making must be created using the electronics parts in the provided kit. You may use these parts on their own or attach them to other physical objects to form part of your interface. All user interactions (including any feedback) should take place via your interface which **must not** require the user to use standard computer interfaces (QWERTY keyboard, mouse etc.).

Details of the audio-visual processing are **not** the focus for this assignment. You are free to use existing audio plugins or example Max/MSP/Jitter audio processes found elsewhere (credited appropriately). It is not important to create the audio or visual processing component of the system from scratch.

An important aspect of the assessment is the clear expression of your interaction design decisions and decision making process for your final interface and signal conditioning. Why did you choose these specific interaction mechanisms, sensors, mapping, signal-conditioning, etc? What other alternatives are possible? Why are these other choices worse/better?

This assignment provides you with an opportunity to demonstrate your ability to apply the theory and methods taught in the lectures and practical sessions for this module. It also provides space to build a music or audio-visual interface on a greater scale and depth than has been possible in the practical sessions.

The **minimum requirements** are as follows:

- A physical interface for controlling an audio or audio-visual instrument using components provided in the kits – x-OSC, sensors, LEDs etc.

- The interface can simply consist of the board and sensors, or you may attach sensors to objects and potentially even create your own object to embed sensors in.

- A simple MAX/MSP/Jitter patch that maps sensor inputs to sonic or audio-visual output in a creative and engaging way. This can be composed of various sub-patches sourced from the workshops or the web, as long as these are properly credited.

- The MAX/MSP/Jitter patch should incorporate elements of signal conditioning and mapping covered in the lectures such as filtering; scaling and shifting; thresholding; calibration.

- You should utilise elements of the design approaches and rules covered in the sessions such as elements of User-centred Design; Fitts' Law; Hick-Hyman's Law; Mapping transparency.

You may use MAX/MSP/Jitter to control a Digital Audio Workstation (DAW) via internal MIDI that then creates the sound. But the DAW files must also be submitted.

If you are struggling to think of an idea, you can use and extend the Week 2 Exercise 1.5 – Building a Slidey-Theramin as the basis of your project.

Video

- You **must** provide a script, which you then read through as a **video** (between **3-5 minutes** long) documenting the design and evaluation of your project.
    - You **must** prepare and rehearse a *script (~500 words)* or at least prepare *prompts* for concise un-improvised narration. You **may** show diagrams or bullet points.
    - You **must** upload your script to Blackboard.
    - Your video **must** be uploaded to either Youtube or Vimeo (unlisted, but with URL to view submitted to Blackboard).
    - Your script/video **must** justify and evaluate your design, and **must** discuss the intended users and purpose of the piece.
    - You should compare and contrast your own work with the work of contemporary artists/designers that have inspired you in the evaluation.
    - Your script/video **must** demonstrate the features of your piece in action, ensuring all features are clearly demonstrated, any on-screen details are in focus, that audio and narration is clearly audible in the video.

Your video grade will be based on justification of design decisions and demonstration of app functionality. **Editing quality is not assessed**. Your video **may** be presented in a single take, **do not** spend time on advanced editing, spend it on thoughtfully preparing what to show.

Marking Guidance

A full rubric is provided below.

Physical Interface (40%)

- Functionality (20%)

  Your electronics are robustly designed and implemented such that the interface can be used freely for sustained periods without breaking. You have clearly given thought to how the sensors work with/within the object(s) that your interface comprises of.

- Design and Creativity (20%)

  You have demonstrated understanding of interaction design methods and used your own ideas to create a physical interface that uses novel means of sensing human interactions.

Signal Conditioning and Mapping Patch (40%)

- Functionality (20%)

  Your MAX/MSP/Jitter patch (and any associated DAW files) is well structured and works without any errors. Patches and sub patches are well organised, mappings are well designed and work reliably through the signal processing functionality covered in the lectures.

- Design and Creativity (20%)

  You demonstrate clear understanding of interaction design principles and have coupled these with your own ideas to create interesting and novel ways of creating an expressive sound or audio-visual system when the physical interface is attached.

Script/Video (20%)

- Demonstration (5%)
  - What are the key features of your piece?
  - What forms of interaction does your piece employ?
- Design and Inspiration (5%)
  - Quality of research:
    Have a variety of sources been used? Have books, websites and journal articles been read in detail?
  - Demonstration of how research informed design:
    How clear is it that the research has directly influenced the outputs?
- Evaluation (10%)
  - Critical analysis of work created:
    Reflect on whether the work was successful and why.
  - Thoughts on how to improve the work:
    Outline what you would do to make the work better in the future.

Submission Details

All work must be submitted by 13:59 on May 02nd 2023 via Blackboard.

Ensure that you test your work on multiple machines, screen-sizes and browsers. Links must work and file permissions must be such that the material is available to mark online. Work that assessors cannot access cannot be marked.

Submission format guides:

Study Support:
The following links provide detailed information on study skill provision and UWE academic policy. In submitting your final submission for examination you agree that you have read the following guides linked to below:

- Digital Media BSc Learning Policy:
- UWE Study skills: http://goo.gl/NalwD5
- UWE Word count policy: http://goo.gl/Qe8kbg
- UWE Referencing policy (UWE Harvard): http://goo.gl/Iu3S3L
- UWE Plagiarism policy: http://goo.gl/vAHWOp
- UWE Academic appeal process: http://goo.gl/Tf1nv3

Plagiarism Advice:

The usual university strictures about plagiarism apply to this assignment. It is good practice in academic writing to reference correctly the work of others that you may draw upon for your own. Please help us to clearly distinguish your original efforts by so doing.

If you use code from other sites, the sources must be referenced in your Bibliography. If you use any other site(s) as a source of ideas for your site, you must reference the source. If you copy code and/or ideas from another student's work, or even if you are helped by another student, you must reference/acknowledge the source.

- UWE Plagiarism policy: http://goo.gl/vAHWOp

References:

http://www.creativeapplications.net/ Inspiration!

https://guthman.gatech.edu/ Award winning!

Rubric

Deliverable	Deliverable Sub-section	FAIL: Fails to achieve module outcomes. 0-30%	FAIL: Marginally fails to achieve module outcomes. 30-40%	PASS: Achieves module outcomes. 40-50%	PASS: Achieves module outcomes. 50-60%	PASS: Achieves module outcomes. 60-70%	PASS: Achieves and exceeds module outcomes. 70-100%
Mini-project Physical Computing (80%)	Physical Interface (40%)	Interface not presented in video.	Interface is presented in a non-functional state in the video.	Interface is presented in a partially functional or intermittently functional state. Electronics are clearly not robustly put together. Little thought given to interaction design or creativity when designing the object.	Interface is presented in a functional state. Electronics are fairly robustly put together, though perhaps there are some errors or omissions that are obvious to the trained eye. Some thought given to interaction design or creativity when designing the object.	Interface is presented in a functional state, with some very good elements that can be identified. Electronics are robustly put together. Clear thought given to interaction design or creativity when designing the object. Clear demonstration of thinking beyond the workshop exercises to create an interesting expressive interface.	Interface is presented in a functional state, with excellent elements that can be identified. Electronics are very robustly put together and embedded within the interface for seamless interaction. Clear thought given to interaction design or creativity when designing the object. Clear demonstration of thinking beyond the workshop exercises and lecture materials to create an interesting expressive interface that goes beyond the requirements of the brief.
	Signal Conditioning and Mapping Patch (40%)	Patch not submitted or presented in the video.	Patch presented in the video but not submitted. Very basic signal conditioning and mapping shown.	Patch is just functional but has some fundamental errors meaning it only functions intermittently. Basic signal conditioning and mapping shown.	Patch is functional and runs without errors. Basic signal conditioning and mapping shown with some good elements that can be identified such as more complex or nuanced mappings.	Patch is functional and runs without errors. Complex conditioning and mappings that were covered in the later stages of the workshops can clearly be identified. Patch is well organised using sub patchers and presentation mode.	Patch demonstrates clear understanding of most or all mapping and signal conditioning techniques covered in the workshops. Mappings go beyond the main criteria of the brief to create a novel form of interaction
Design and Evaluation Video(20%)		No video submitted.	Incoherent/unreadable/illegible video submitted.	Very basic design research undertaken. Basic demonstration. Unclear as to how it relates to the project. Very little evaluation, analysis and reflection is provided. No sources provided.	Some design research undertaken. Basic links have been made relating it to the project. Satisfactory demonstration. Some effort at evaluation, analysis and reflection is provided. Limited number and range of sources provided.	Good design research undertaken. Very clearly linked to the project. Good demonstration showing all features clearly. Good effort at evaluation, analysis and reflection is provided. Good number and range of sources provided.	Excellent design research undertaken. Very clearly linked to the project. Comprehensive demonstration showing all features very clearly. Deep and insightful evaluation, analysis and reflection is provided. Large number and range of relevant sources provided.