MSI340 PROFESSIONAL PORTFOLIO 2024-25

PORTFOLIO FRAMING STATEMENT

A completed copy of this PORTFOLIO FRAMING STATEMENT must be included in your PORTFOLIO (70%) submission as PDF file.
See your MyFalmouth account for your hand-in deadline and the PORTFOLIO assessment brief for further details.
Please include full Harvard references on section-by-section basis. Note that the references are not included in the word count.

SECTION 1: PROJECT DETAILS

NAME: Michael Freeman | **COURSE:** BA(Hons) Creative Music Technology

ONEDRIVE URL:

Where needed for your PORTFOLIO submission, please include a URL to a shared and accessible OneDrive folder (see Assessment Brief and guidance for details).

MSI340_Professional_Portfolio_Michael_Freeman_PORTFOLIO_SUBMISSION

TITLE OF YOUR PORTFOLIO: Printed Circuit Beats

PORTFOLIO CONTENTS

Please detail the contents of your PORTFOLIO submission (e.g. number, duration, and title of tracks; performance length; artwork) and **what you want to be assessed on** (e.g. songwriting, production, performance) for each given piece of work.

Contents

- 45-minute DJ set creative performance (as performed in AMATA Studio K 14th May 2025).
    - Poster and various publicity materials.
    - Creation of post-performance presentation of live performance recording.
    - Drafts of DJ set (practice recordings).
    - Drafts of poster.
    - AMATA showcase programme Image.
- Development of an Arduino device called “Magnetic DJ” that allows direct control of digital audio playback in DJ software without the use of time code vinyl.
    - Development of Arduino including sensor selection.
    - Arduino C++ code.
    - Development of Python scripts to talk to Mixxx.

Assessment

I would like to be assessed on the creative use of tracks in a 45-minute DJ performance.

As well as a poster and various publicity materials including Link stack site. Creation of post-performance presentation of live performance recording. Drafts of DJ set (practice

recordings). Drafts of poster. AMATA showcase programme Image. Various preparations for the performance including obtaining the correct professional equipment and tech spec as well as a Zotero script for properly referencing music tracks.

I would also like to be assessed on the development of an electronic project, designed by me. Arduino development including associated hardware and sensors. Arduino C++ code and Python code.

VALUE PROPOSITION (350-500 words)
Provide an account on the 'value' and 'currency' of your PORTFOLIO in relation to your current practice and future career plans, and their associated professional and artistic contexts. Essentially you are considering the question of 'why this particular body of work at this given moment in time?'

In 1995 I visited San Francisco. A trip that would profoundly affect the professional and artistic context of my journey as a DJ. A primary release in the British Down Tempo/Breakbeat/Trip Hop and Turntablism scene was the release of *Ninja Cuts: Flexistentialism* on Ninja Tune (Various 1996). I obtained this release in San Francisco. There was something about the whole ethos of the artwork and the phrase "flexistentialism" that attracted me. An ethos and approach to Turntablism that had originally been created in Britain by Coldcut riffing off the American Hip Hop scene. It was their *Beats + Pieces* in 1987 that was to prefigure the USA scene of Turntablism/Hip Hop/Trip Hop/Breaks. The States at the time in 87 was grooving to Disco sounds mutating into Acid House. It was no coincidence that Coldcut's pre–Ninja Tune record label was called *Ahead Of Our Time*.

I found that the mix tapes I was putting together back in the mid 1990's were in the style of these major San Francisco DJ's that were pioneering the scene that Coldcut had created. At the time I had only been partially aware of this. I found DJs such as Mark Farina and Ernie Munson that, to my astonishment, had mixes closely reflecting what I was creating in the UK. Farina produced *Mushroom Jazz* (Farina 1996). Munson also produced a series of these mixes such as *Psychedelifunky* (Farina 1996) available on his web site (Munson 2025). His DJ'ing also drifted into the Acid Breakbeat scene in the States. Some tracks in my performance were of that genre.

There's a lot of authenticity here. For example, notice Ernie Munson's personal signature at the bottom of his web page (Munson 2025).

Figure 1

I've rarely seen an artist sign their page like this. In this vein, Mark Farina also includes artwork on his mix tape *Waka Share Pt.1 / Basic Foods* (Farina 1993) that I found reflected my own mix tape art work in the same period.

Figure 2

Compare with the authors mix tape stylized lettering and artwork.

Figure 3

Especially "*Blue Jam*" and "*Funkaneity*".

For my career the performance has been an important part of getting me back into an active career as a DJ and looking further ahead as a musician. This is because after originally DJing for a decade it was then that I spontaneously started recording my own music. Also, at one point I was developing visuals for the performance. Even though they were not used in the end, it reminded me of an important visual element for what inspires me as an artist. The performance also furthered my professional use of Mixxx DJ software, and a MIDI enabled scratch mixer which has been important as I was originally trained using an analogue mixer and vinyl. Even though I am well versed with computers I had not ironed out many technicalities. For example, I did not appreciate that the post fader Mixxx effects are cut by an analogue mixer and a MIDI enabled mixer is required to take advantage of an echo effect continuing after fading out a channel. The Arduino development has been very important in confirming the direction of a future product

allowing me to zero in on a successful approach that will, in the future, be developed into a marketable product.

References

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VARIOUS ARTISTS. 1996. *Ninja Cuts: Flexistentialism* [sound recording: vinyl]. Ninja Tune. Available at: https://www.discogs.com/release/1013-Various-Ninja-Cuts-Flexistentialism [accessed 29 May 2025].

Figures

Fig. 1: MUNSON, Ernie. 2025. 'Rebirthday'. *beatone* [online]. Available at: https://www.beatone.life/ [accessed 29 May 2025].

Fig. 2: FARINA, Mark. 1993. *Waka Share Pt.1 / Basic Foods* [sound recording: tape]. Self released. Available at: https://web.archive.org/web/20220818232049/http://simfonik.com/2009/04/mark-farina-waka-share-basic-foods/ [accessed 29 May 2025].

Fig. 3: Author's mix tapes. Photo by the author.

CREATIVITY (350-500 words)
Provide an account of how your submission demonstrates a sustained creative engagement with your PORTFOLIO ideas, materials, working processes, and presentation of work.

For the performance I began investigating the Florida Breaks scene in the USA.

> *"It is technically a Breakbeat genre but it came from Freestyle and Electro. Florida Breaks is the quintessential 90s genre. It has breakdowns, builds, and anthems. It has breakbeat samples and 808 bass and acid (sometimes)."*
>
> (Ishkur 2025)

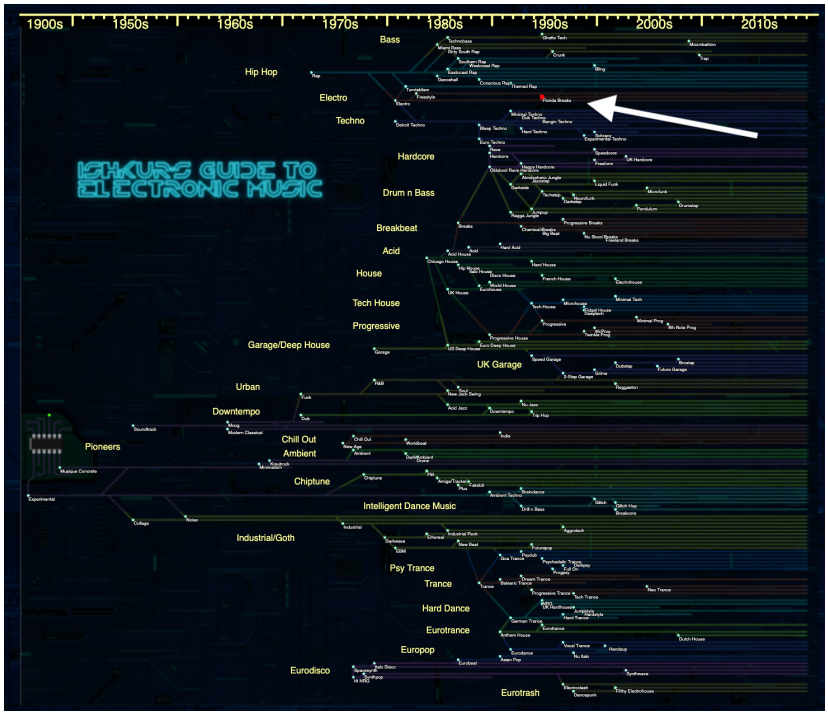

Figure 1

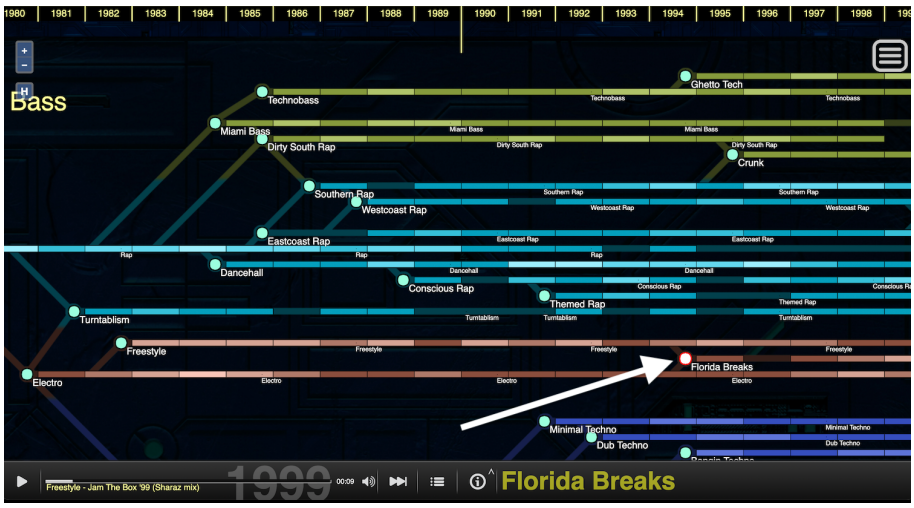

Figure 2

DJ Icey is a prevalent performer in that scene (Discogs 2025). The work *Generation Ecstasy* by Simon Reynolds (Reynolds 1999: 424) cites canonical releases such as *Sunshine State of Mind* (Various 1997) and *Funky Desert Breaks* (Kelley 1996) that document the scene.

This led to developing a Breakbeat/Boom Bap/Florida Breaks/Conscious Rap set. However, for a midday performance this seemed too intense and was not allowing me to bring in the Turntablism elements I am most skilled at. So, I started returning to key discoveries that I'd previously made. DJ Food's *A Recipe for Disaster* (DJ Food 1995) is breakbeat orientated but downtempo and has an interesting remix of Inosan which was released a year later (DJ Food 1996). As well as "battle records" such as releases by DJ Rectangle (DJ Rectangle 1998) that contain samples from Kung Fu films and other sources that can be scratched and cross faded into the mix. Another downtempo work *A Mother (For Your Mind)* by Herbaliser (The Herbaliser 1997) came to the fore as well. Creatively this allowed the development of a set of eclectic material suitable for a midday performance that moved towards some of the more dancefloor orientated releases towards the end of the mix. As well as using DVS vinyl to beat match and scratch samples in, which also included leveraging the digital (MIDI) Numark Scratch mixer to have a post mixer echo/reverb effect (Mixxx DJ software effects) on the scratched and cross faded in samples that I would not normally be able to do with an analogue mixer.

When I was creatively developing the DJ set this flowed into becoming excited by what I was doing with the Arduino development. Magnetic DJ could be an interesting creative product in the current trend of moving beyond being reliant on timecode vinyl that still ties the DJ to outmoded phonographic needles. This frees the DJ to be super gestural when not constrained by having to keep a phonograph needle in the groove. What had started as using an encoder physically connected to a DJ turntable moved onto using a contactless sensor; a magnet picking up the rotation of the turntable, which is picked up by a magnetometer sensor, which then controls the digital transport of the Mixxx DJ software. As part of investigating synthesizing the DVS control signal in Python code, I found that it's quite trivial to do. With the ability to have the full range of control that a DVS (timecode/control signal) system has, but by using Python code, a whole world of creative possibilities is opened. From programmatic control of the Mixxx transport, to connecting other physical control surfaces and control techniques that communicate with the Python script which is acting as a virtual DVS control signal.

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PROFESSIONALISM (350-500 words)

Make a critical evaluation of the quality of your output against relevant industry standards and recognized external arbiters of best practice within your specific discipline. Detail how you have **managed the development and presentation of your PORTOFOLIO.** NOTE: This does not relate to your STRATEGY work.

The following is a list of recognized professional artists that have informed my practice along with examples of their professional output.

- Coldcut - Journeys by DJ mix (Various 2001).
- DJ Food AKA Strictly Kev AKA Kevin Foakes (Foakes 2025b, 2025d, 2025e, 2025f, 2025g, 2025h, 2025i, 2025j, 2025k).
- Openmind (Foakes 2025c).
- Solid Steel (Foakes 2025b).
- DJ Vadim (Foakes 2025a).
- DJ Qbert (*Q-Bert Mega Mix:* 2023).

- Invisibl Skratch Piklz (*Invisibl Scratch Piklz Boiler Room Oakland DJ Set* 2018)

Other professional DJs are Deep Dish, Sasha, Hernan Cattaneo, John Digweed, Nick Warren, Anthony Pappa, and G-Pal.

> "*So when Tim (Fielding) phoned up and said, "Would you like to do a Journeys By DJ," I thought, "This is really a chance to show those bastards how it should be done" – what could be done. Coldcut was at a bit of a low ebb at the time, so I wanted to strike back. Show those motherfuckers what a mix is actually about and what DJ culture is actually about*."
>
> (Clay 2015)

In the field of DJing, Turntablism, Breakbeats, Hip Hop, scratching and sampling, it was Coldcut's 1995 Journey's by DJ release (Coldcut 1995) that became a clarion call to me, showing the wild possibilities that eclectic and creative DJ'ing could achieve.

> *"[…] 70 Minutes recalibrated my understanding of what mixing records could involve. A new standard that defined the practice for years to come […]"*
>
> (Fintoni 2020)

The mix became a recognized milestone in the context of creative DJ'ing, providing a major alternative experience to what Coldcut refer to as "McDance" (Clay 2015). My performance drew on these various inspirations and sources; however I felt I did not match some of the professional standards exhibited by them. I would have liked to have created more extensive scratching and cut ups. But the eclectic selection of tracks I used matched the interesting approaches of these artists. I am also not primarily an expert in Hip Hop style scratching where recognised scratch styles are used with names for them and so forth. I tend to innovate on the fly within a mix depending on the material being played. I also focus more on interesting effects such as the way I crossfaded samples into the mix with echo effects added. But I was happy with the overall professional presentation of the DJ set which included a light show and publicity.

Management of the portfolio included producing a stage mock-up. A final tech spec was also produced.

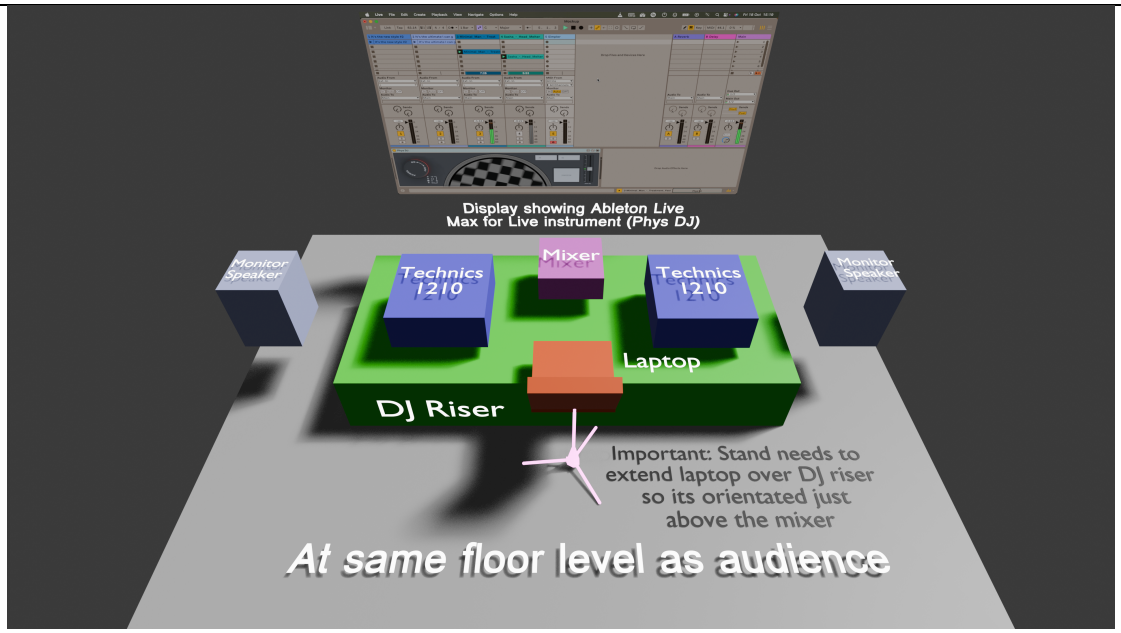

Figure 1

I also produced a planner early on in the module that took [the form of a 3D visualization] as part of learning Verge3D (Soft8Soft 2025) when I was still considering producing visuals for the performance.

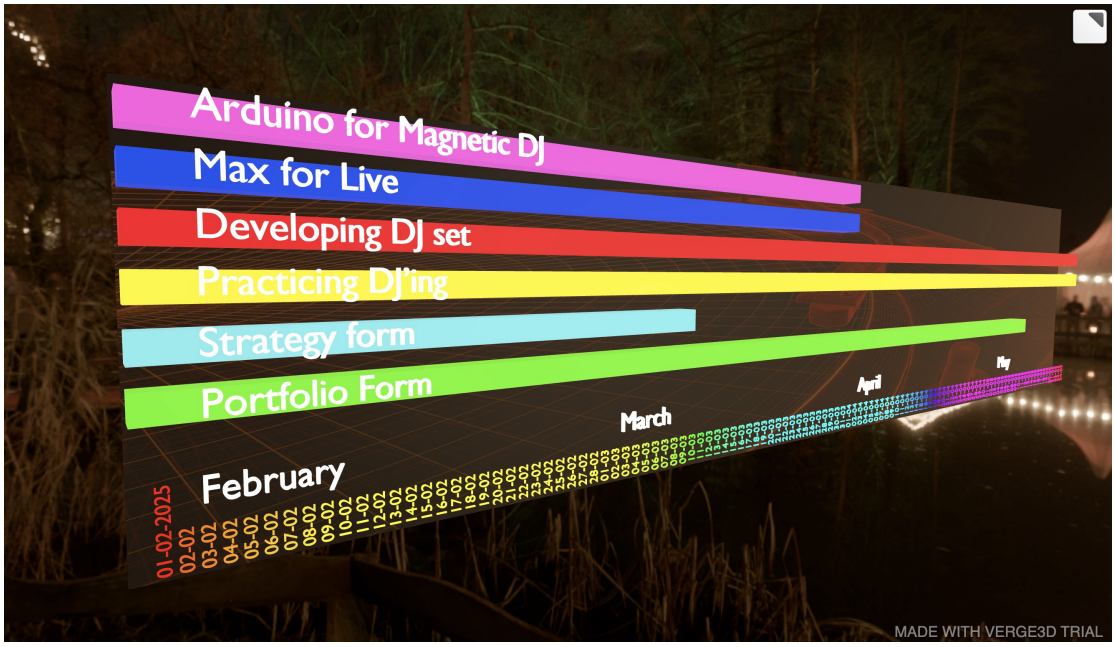

Figure 2

The Arduino approach to my product compares well with various professional approaches to innovation in DJ turntable/scratching product design (Vandel 2011) (Ediriwira 2016) (Norris 2025) (Bryan 2011) (Weissenbrunner 2024) (Hansen 2010). As well as making scratching more accessible due to the removal of the involvement of tonearm and needle removing the worry of needle jumping. The technology also enables and makes possible alternative approaches to music making. For example the Python vinyl timecode control signal synthesis opens an entire field of programmatic manipulation of DJ software transport manipulation as well as linking the Python approach to various physical input devices.

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Figures

Fig 1: Stage mockup image made by the author using Blender.

Fig 2: Still of 3D planner visualization using Verge3D.

RESEARCH (350-500 words)
Describe how you have researched, developed and activated, both production and devising strategies, appropriate to your project and developing professional/creative practice.

My approach to Magnetic DJ was inspired by Phase DJ (Phase 2025). I felt I could undercut their £345 price in the market. Compare to Serato timecode records which are around £35. Phase DJ is quite complex. Compare to the simplicity of timecode vinyl (Bastian 2015) (Tennant 2013) (Github 2025) (Katz 2012).

I used Grok as an assistant (Grok 2025a 2025b 2025c 2025d 2025e 2025f 2025g).

I started looking at using a Rotary Encoder to detect the rotation of the DJ turntable (Donaldson 2020) (Phidgets 2025) (Sandeep 2020) (Lingib 2025) (Robelix 2025) (Robelix 2012), forgetting that the actual DJ interface is the record with a slipmat under it. It's really the *record movement* that needs to be measured. I'd looked at using Hall Effect sensors to detect the magnetic field of the turntable motor (Drakerdg 2025), again forgetting that it's not the primary mover. I then discovered that the kind of high-resolution rotary encoder that I needed is absurdly expensive. I resolved this by discovering that *magnetometer sensors* (that detect "true north") can be adapted to detect the movement of a magnet held near to them (Industries 2025). This led to the breakthrough. I needed to attach a magnet in the center of the vinyl record, on top of a cylinder attached to the top of the vinyl record surface.

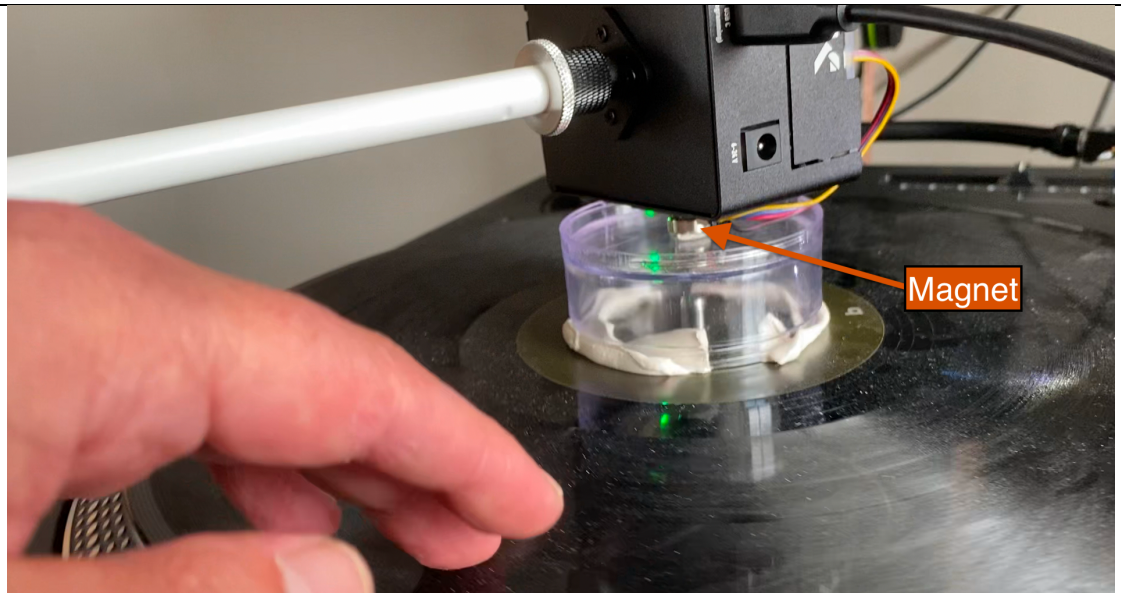

Figure 1

This allows the turntable spindle to go through the vinyl record hole as normal and then translate the movement of the record to the magnet which is picked up by the magnetometer above it on an arm as can be seen in the following mockups.

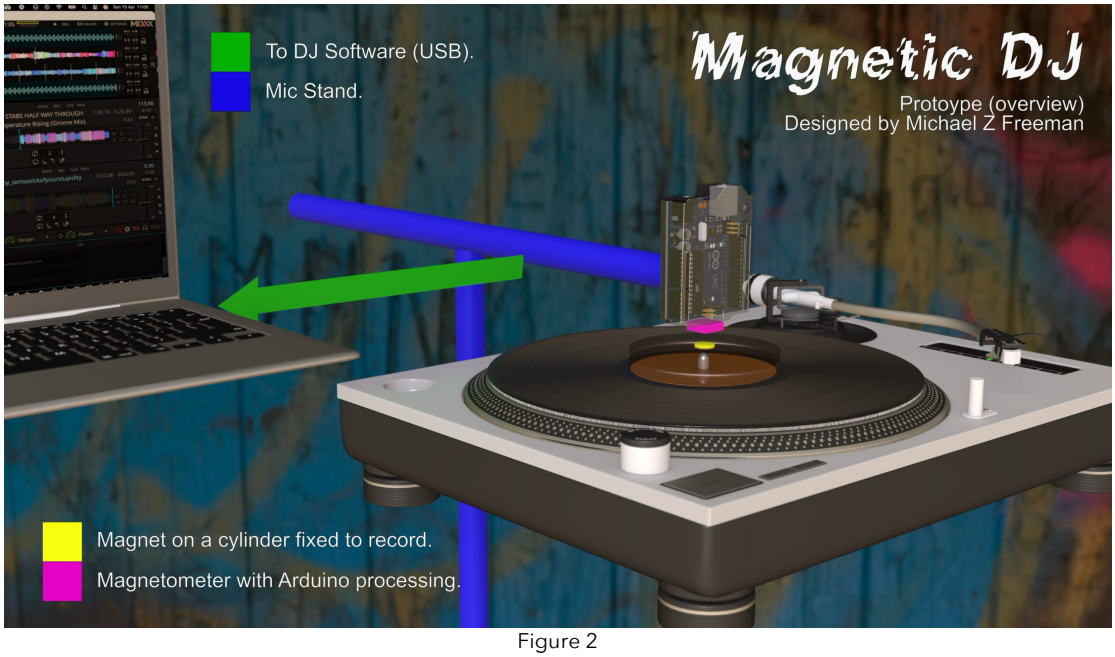

Figure 2

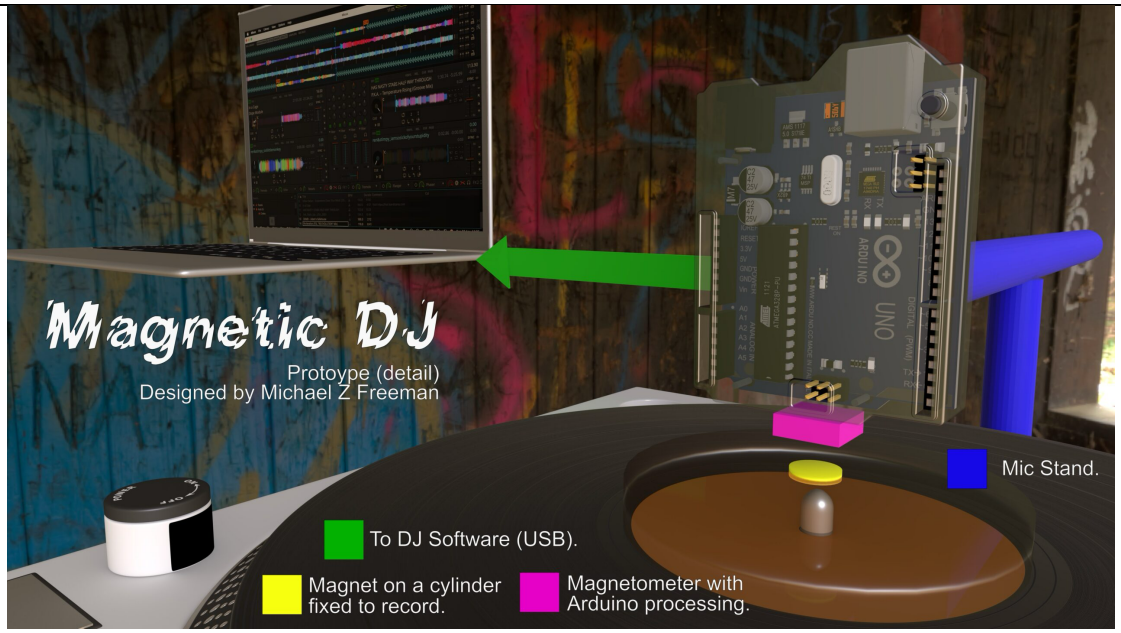

Figure 3

The magnetometer approach was worth pursuing to see if this implementation could be simplified. I managed to get output from the sensor working so that (even if imperfectly) it controlled Mixxx (Mixxx Development Team 2025). I also resolved the best way of controlling Mixxx is by using a vinyl timecode control signal (System 2012) (Nawrath 2013) and I found this can be synthesised in Python (Grok 2025f). However, the magnetometer approach was ultimately unsuccessful for several reasons.

1. Interpreting the sensor output in Z axis (sinusoidal sine wave) and having it linearised to an output that would drive Mixxx via Python; "*When the Velocity is 1.000, the record is spinning forward at normal speed. When the Velocity is -1.000, the record is spinning backwards at normal speed. If the Velocity is 0.500, the record is spinning forward but at half its normal speed. If the Velocity is 0.000, the record is stopped.*" (Carrier 2021) is mathematically complex to calculate. Even Grok fails to resolve this (Grok 2025g) and I am not a trained Software Engineer or Mathematician.
2. The magnetometer approach suffers from same problem that a standard vinyl needle suffers from. The sensor must be held rigidly or picks up vibration.
3. The sensor needs a powerful magnet which in a live and DJ environment it cannot be ruled out that the magnet might affect other equipment like USB sticks and so forth.

The solution is to return to my original gyroscope approach (Bryan 2011) (Tm847 2021) (Minhaj 2025) (RucksikaaR 2025) (Dejan 2019).

References

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Figures

Fig 1: Still from video of Magnetic DJ taken by the author.

Fig 2: Mockup/visualization render of Magnetic DJ made in Blender by the author.

Fig 3: Fig 2: Mockup/visualization render of Magnetic DJ made in Blender by the author.

SKILLS (350-500 words)

Articulate how you have identified, acquired and deployed specialist skills to realise your professional PORTFOLIO project and to advance your practice beyond undergraduate study. Give examples of where these are evident in your PORTFOLIO submission.

- I learnt new skills with coding. Using Grok as an assistant is not a case of replacing the involvement of the user in coding. Grok acts much more like a teacher as it explains what it is doing with the code. Also, the A.I. won't necessarily produce working code without the user having prior knowledge of coding informing the prompt construction. Also Grok (and other A. I's) are much more proficient with popular coding languages such as Python and JavaScript due to the prevalence of material to train the A.I. on. Niche areas such as Max for Live, and to some extent Arduino, suffer from this. Grok was unable to solve problems that arose when interpreting the sensor readings likely due to not having originally been trained with a large base of these kind of problems.
    - I learnt new skills with Python and Arduino (C++) coding such as interfacing Arduino serial USB output to Python as well as use of audio libraries for sound synthesis.
- Also, there was use of the Mixxx playlist functionality to track set revisions, save ideas, and generally organize mixes and approaches. Mixxx retains a history of tracks played which can also be copied to a playlist. See the materials video "*Mixxx Performance Showcase DJ Set Revisioning.mov*".
- I also developed skills in using the Mixxx record mix functionality to keep track of items played with the associated CUE sheet. Mixxx automatically creates a CUE sheet (a file format that's really for CD audio burning operations) when recording a DJ set. Each track is inserted into the sheet with the correct time index for when a track is played, usually starting when the previous track is fully faded out. Mixxx even does this with briefly cut in samples and scratches showing exactly where they are used in the DJ set. See the resulting mix player (Freeman 2025a) that I made of my performance, a kind of "mix map" which I also linked into the Link Stack page (Freeman 2025b) that was distributed with the QR code on the performance poster. Also see "*DJ Freeman - Printed Circuit Beats Mix Map - Full Scroll.mov*" in materials. As I found CUE sheets are not easily editable even though Ocenaudio (Ocenaudio 2025) can open them it can only export in other formats such as JSON. Although I found I could easily integrate that into the Wavesurfer Javascript project which powers the mix map player (Katspaugh 2025).
- I also worked with Mixxx dev team at one point in the project to introduce a function to automatically start Mixxx recording as soon as its opened (Github 2025). This was because I kept forgetting to hit record when practicing (possibly a manifestation of some kind of "red light effect"). This taught me their "pull request" process which includes signing a developer agreement. These skills lend themselves nicely to working on commercial projects beyond undergraduate study. For example, I have a business idea to fork the Mixxx codebase which would be used to create a DJ app that is properly integrated with the Apple macOS system. For example, djay Pro as well as Serato are missing something as fundamental as copying an audio file in Apple Finder and then being able paste it into the DJ app. See the following image.

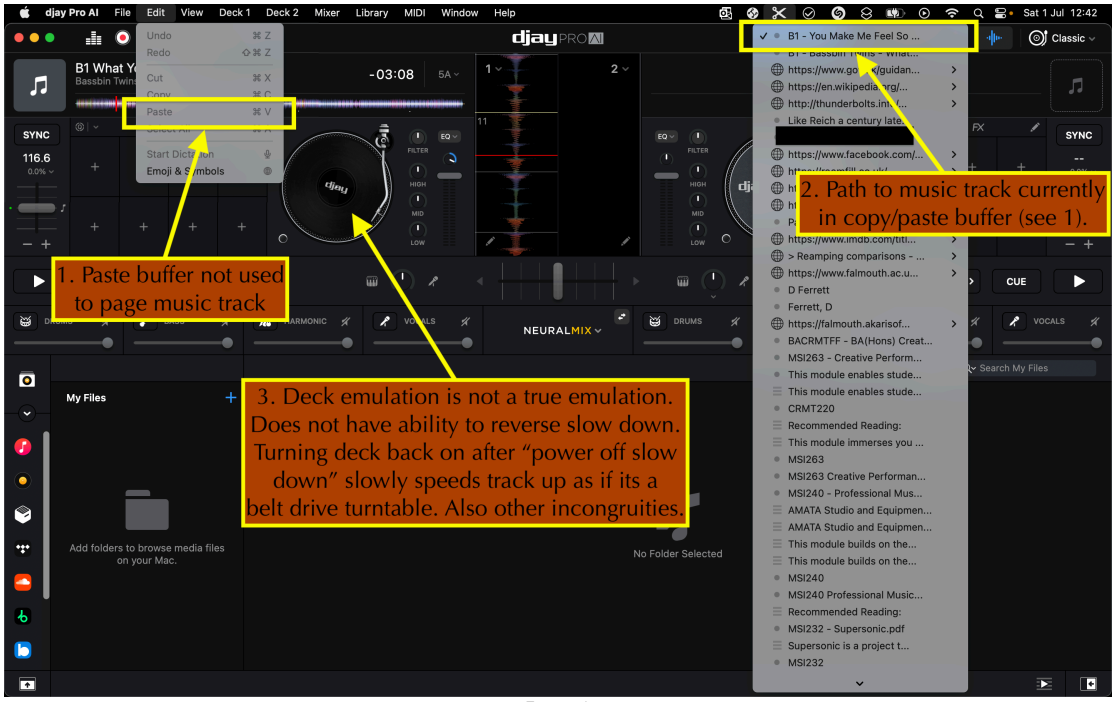

Figure 1

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USE OF EXISTING MATERIALS

Detail the use of any existing and/or adapted materials in your PORTFOLIO submission, providing full references where relevant (e.g. for works sampled).

DJ set (duration 45 minutes, 48 second). To have a better understanding of the mix structure see the included material "*DJ Freeman - Printed Circuit Beats Mix Map - Full Scroll.mov*" which is a video of an online mix map player that I produced (Freeman 2025).

The DJ mix materials consist of the following.

1. "*I can save these people*" sample from Stargate SG-1 Threshold S5E2. (Deluise 2001).
2. The Lady of Rage - Afro Puffs (LP Version). (The Lady Of Rage 1994).
3. DJ Rectangle - Kung-Fu Phrases – Tones [Note: These are the samples scratched and cut into the previous track]. (DJ Rectangle 1998).
4. The Herbaliser - A Mother (For Your Mind). (The Herbaliser 1997).
5. DJ Rectangle - Kung-Fu Phrases II - Break Beats. (DJ Rectangle 1998).
6. DJ Rectangle - Introduction Beat with Wah Wah Wah Whiiishhhhh!!!. (DJ Rectangle 1998).
7. DJ Rectangle - Its Time - Battle Break - Screech! (DJ Rectangle 1998).
8. DJ Rectangle - Kung-Fu Phrases – Tones. (DJ Rectangle 1998).
9. DJ Food - Inosan (Black Devil Mix Pt. 1). (DJ Food 1996).
10. DJ Food - Inosan (Black Devil Mix Pt. 2). (DJ Food 1996).
11. DJ Rectangle - Are You Ready - Baddest DJ - Come Clean Beat. (DJ Rectangle 1998).
12. Redman & Method Man - How High (Dirty). (Redman 1995).
13. Warren G - I Want It All (Album Version).
14. DJ Rectangle - Party People - Whoop There It Is Beat. (DJ Rectangle 1998).
15. DJ Icey - Gotta Get Some. (DJ Icee 1994).
16. DJ Icey - Boom-Bap-Boom. (DJ Icey 1996).
17. Micro & Vicious Vic - Electric (feat. Leslie). (Micro 1996).
18. Dimples D - Sucker (DJ Rawcut Remix). (Dimples 1990). [The remix release is not listed anywhere and was originally obtained from a DJ pool, but does contain samples of the vocals in the cited release].
19. Michael McCann - Adams Safehouse (Deus Ex: Mankind Divided OST Sampler). (Deus 2016).
20. Influx Datum - Expansions (Ease Your Mind) [Unreleased]. (Fabio 2001) [This track was extracted from a recording of the radio show].

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ANY OTHER INFORMATION (max 100 words)
Use this space to include any other information that is deemed pertinent to your PORTFOLIO submission

SECTION 2: COLLABORATION DETAILS

To be completed only by those working collaboratively

2.1 COLLABORATORS
List the name, role and respective Course, if any, for each collaborator involved in the project (e.g. Björk, voice, BA (Hons) Music L6)

2.2 COLLABORATION (350-500 words)
Describe how you have managed a sustained collaborative working process, from creative idea through to project realisation, detailing your unique contribution to the project.

2.3 COLLABORATIVE RIGHTS
Where writing or producing music together, please provide a mutually-agreed publishing rights split in percentage terms for each collaborative element.

– end of MSI340 Portfolio Form –