proboscis

neighbourhood radio)))

holly clarke   holly@hollyclarke.net   07595 117 029

proboscis   **neighbourhood radio))**

Brief

Research how we might create an online 'radio' station that can pull in location based audio files (or have them submitted) and what technologies that would enable us to build a low-power FM broadcasting station running off the audio feed (podcast) coming from the online radio station.

The research would entail discovering what free or very low cost software / online services might already be available for the radio station aspect; and researching the technical needs to build a low power FM transmitter (software, hardware, legal restriction etc).

Introduction

In this digital age, radio is fast becoming old media. Considering the changes that have happened to broadcasting over the recent years, such as digital and satellite communications, it's important to look at the way we use older technologies and re-evaluate their purposes.

The every expanding digital presence has also heralded the way for new communication ideologies. "A utopian vision of anarcho-communism inspired community media and DIY culture activists...Although the system has expanded far beyond the university, the self-interest of Net users perpetuates this hi-tech gift economy." Open source and hacktivist culture was born out of a global information gift economy, made possible through internet connection. This have given power to the people, creating a social need to make, repurpose and share technology.

This project seeks to repurpose current technologies to make them more socially relevant and to do so through an open source, easy to use model.

Conceptual Reasoning and Project Aims

The aim of the project is to open lines of communication amongst neighbours and form community connections by breaking down social distance and barriers.

New digital media and online culture is now widely accepted as the norm however it is still restricted by on age and price. Analogue radio use spans generations and affluence, making it the perfect medium to bridge these gaps.

Radio also provides an 'opt in' social distance as it can be accessed from inside the home and on user request. This gives the listener a feeling of control as well as personal connection to the content; ideal for building a sense of community. I can be used to break down the social boundaries already formed and allows for a re-interpretation of the neighbourhood zeitgeist.

Radio is a particularly controlled medium and its conventions are rarely challenged. There are many legality issues surrounding radio broadcasting as this is controlled and regulated by the government body Ofcom.

In order to broadcast low-power FM radio at any frequency or Hertz legally, a licence is needed. Two licenses which would be applicable to a low-power community FM radio station would be a Restricted Service Licence and a Community Radio Licence.

Short-term RSLs are typically broadcast on low-power FM or AM can generally last a maximum of 28 consecutive days. They can only be applied for twice in twelve months with four complete months separating the two broadcast periods by the same applicant/group. It costs £200 for application and £400 for the license.

To obtain a Community Radio Licence, applicants must demonstrate that the proposed station will meet the needs of a specified target community, together with required "social gain" objectives set out in the application. Applications can take a year to process and

are only accepted in 5 week windows each year making the process lengthy. The application costs £400 a time and the licence fee is decided on application.

This regulation, although set in place for the 'greater good' leaves no room for interpretation, play and experimentation. It specifically sets out the purpose of radio and builds high barriers, monetarily and legally, for the applicant to overcome. This is a particularly antiquated legal system which hasn't followed the changing purposes and production concepts of communications media. The radio trope is defined by historical institutions of dictatorial broadcasting bodies. This hasn't been challenged to consider new creative concepts of UGC and participation. To challenge it would mean that the system, and broadcast laws, would be deservingly called into question, opening the way for new creative thinking and activity within the medium.

Mediation

Community radio "can enable your community to change itself, to connect with itself, to realise its full potential".

One issue with community radio is the level of involvement required and the barrier that this presents to individuals feeling that they have a voice. "often the only obstacle is the time and effort required for training, education, research and preparation." The process of recording, programming and distributing is committee based and less open to the full range of people in the community.

The aim of the project is to enable as many people as possible to create content and for this to be unmediated. This differs greatly from the current community radio model. Having unmediated content challenges current radio purposes of entertainment and considers it more as a communication method and an artistically expressive medium. Disregarding mediation challenges the formulaic broadcast content and programming

conventions creating a freeform, messy and personalised environment; perfect for inclusion, openness and creativity. Allowing anyone to create content creates a 'from the people up', UGC model of community radio as opposed to the community based current convention. This means the individual will have many fewer restrictions on what they choose to broadcast, giving them an unmediated voice.

Low Frequency - Neighborhood Communication

Community radio can be broadcast up to 5 miles, meaning it encompasses a relatively large population who do not actively behave as a community. This means the programming of the station is no always relevant to the listener. The aims of this project is to focus on a very small (under 100 metres) area so as to make the content produced directly relevant to the listener as it will have been created by their neighbours.

Open Source and Ease of set up

The aim of this project is to create a usable model for recording, programming and broadcasting low-frequency radio; a model which can be applied to any community. This is so communities can have direct ownership; the project acting as a tool to enable them to create their own station. To do this the project need to be as easy as possible to set up, function as a totally standalone project (either as a kit or as a full how to) as well as be as cheap as possible so as not to face the same obstacles as setting up a station according to Ofcom legislation. This means the technology set up needs to have a very low level of affordance and that the software and hardware at every level, from creation of content to broadcast, needs to be open source / freeware.

Similar Artistic Work

Sound Transit

This project is a macro scale version of the neighbourhood radio project, allowing users to explore the global soundscape. Sound Transit is a collection of phonographic works that are hosted online and tagged with a specific location. The user can book their 'flights' between countries and choose the number of stop offs. The software then creative a downloadable mp3 compiled of the phonographic recordings of each stop off. It's a data-rich software created in php which relies on an end user uploading and tagging sounds with a location manually. The software also allows users to listen to RSS feeds of previously made flights. This is done by publishing each new flight as an RSS news story.

This project demonstrates how an RSS feed from geotagged tagged sound is possible through predefined date strings. The user can only select a certain number of locations and the data is not visualised on a map. Also the uploading of the sound cannot be carried out automatically but requires a super user to have control. This works well as a global project as the focus is not on community use so there doesn't need to be an ease of use model worked in to the technology in order for it to be accessible to all members of the community.

GeoGraffiti

GeoGraffiti is more akin to the neighbourhood radio aims; to facilitate community driven intelligence through locative based audio tagged to a specific area. It aims to be fully UGC and community driven. This differences lies in the purpose; to inform and work as a collective intelligence collector. Neighbourhood radio, however, is aimed at building community connections through artistic expression and broadcast.

One interesting factor is that the platform works using a phone to web location tagging system called VoiceMark. It relies on mobile phone technology to generate the geotag and then inputs this into an online platform. This would be a good initial starting point for the neighbourhood radio project as this information is easily traceable with modern phones. However in terms of accessibility this doesn't provide a particularly good solution to bridging age and affluence within the community.

The online platform of GeoGaffiti allows users to log-in and monitor sounds created in their 'hood' by selecting an area and radius. It uses xhtml and maps the audio on embedded google maps. Thsi is a useful tool as google maps are widely used so provide the user with a low afforance when using the platform, a great idea when considering the neighbourhood radio platform ease of use. Having log-ins allows the user to engage with their personal area. These ideas of log-in might be quite useful for neighbourhood radio as the person setting up the radio stream will need to select their area and set their stream to transmit to a certain device.

Although it is not possible for us to use GeoGraffiti as a platform itself, it is a good project to learn from in terms of platform capabilities and community focussed aims.

[AudioTagger](#)

Audiotagger is a very similar platform to Geograffiti, if a little less advanced. The project is similar to SoundTransit in the sense that it aims to document locative based phonography. It also requires a super-user to upload the tagged audio files to the Google-map enabled online portal. It is limited in scope but is easier to navigate than most of the projects researched.

FreeSounds

FreeSounds is a phonographic library which includes a map representation of free audio (not music) files. It relies on users uploading their tracks which already will contain the geotagged information in order to display this on the google map.

Escoitar

A Spanish software very similar to the GeoGraffiti platform, with log-in for posting and uploading from phone capabilities. This is another phonographic software without any way of outputting the sounds in an RSS feed. It does, however, have a very nice interface based in Google maps and using photographs and text to support the audio tracks.

• Need to produce

- **Recording hardware and software to get the audio files online and geo-tagged**
- **Online audio mapping application which draws in the geo-tagged sound files and creates a feed based upon a variable locative area.**
- **FM Transmission Hardware**

    - Connects to internet
    - Reads audio feed
    - Interprets to FM
    - Outputs to FM

Research

Recording hardware and software to get it online and geo-tagged

Audio recording hardware needs to be easy, cheap and widely available. It would be best if this can be re-appropriated from existing and prevalent technology.

A phone-in line which people could call to leave their radio recordings on a [computer answering phone recording system](#) or an application such as [AudioBoo](#) which automatically uploads the content online would give the contributor immediate access to recording by using pre-existing technology. This seems like the most logical way of producing on online sound file.

The main issue is generating the geotags as metadata attached to the audio file when not using a data capable mobile phone software such as Audioboo. This would mean the computer answering phone recording system would need a postcode programming into it and then manually adding the geotag as metadata. This is all fairly easy to do in either Processing or Java as adding the geotag is a simple metadata string but to my knowledge there isn't a pre-existing stand alone program that can produce this.

Interactive audio mapping which produces a feed

There is no pre-existing platform which can map the audio, selects an area and outputs as a feed however the examples of similar project I've research suggest that this is completely possible within programming languages such as Processing and Java. These languages are both open source, visual and can communicate with microcontrollers if needs be. Processing particularly allows for simple data visualisation plug-ins for Google-maps which has been used in many similar projects thanks to it's ease of use and available API.

The functionality would allow the user to log-in to the online platform, select their postcode and then click and drag out the surrounding area on a Google map. The map would visualise all the audio files tagged in the target area and then list the number of files and total play length time. The user could then export the file to a specific URL as an RSS feed and generate a URL ID. This feed would be hosted and updated regularly and downloaded by the broadcasting hardware via the URL ID.
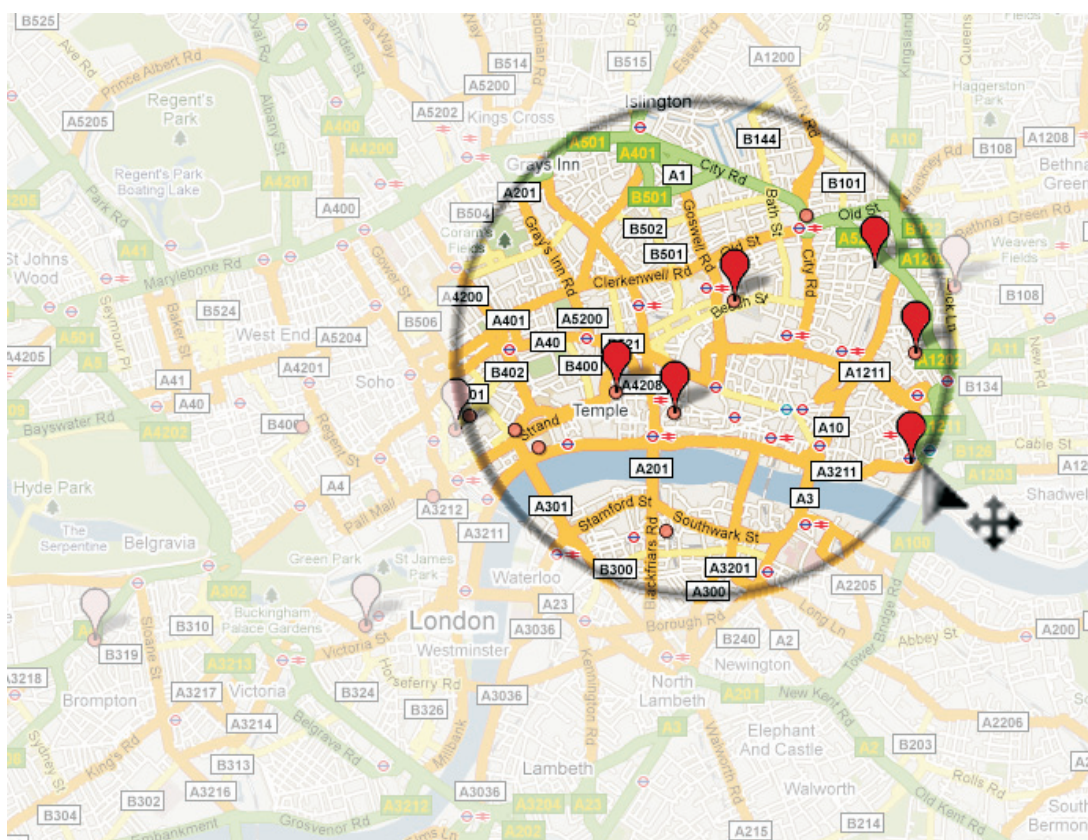
Hardware

The hardware needs to be a hacking/making solution in terms of ease of assemblage, availability of components, low custom programming needed and cost (FM transmitter kits can cost hundreds of pounds and more for good quality audio and frequency controls). It also needs to be programmable using open source code and freeware. One of the most widely used open-source micro-controllers is the Arduino.

- **Connecting to the internet remotely**

To connect an Arduino micro-controller to the internet there are two viable options; an

Arduino Ethernet Shield or an Xport Ethernet module

The Arduino Ethernet Shield extends the functionality of the Arduina Diecimila board

based on the Wiznet W5100 ethernet chip. It can serve as either a server accepting

incoming connections or a client making outgoing ones. The library supports up to four

concurrent connection (incoming or outgoing or a combination).

Xport Ethernet module can be used as a plug-in for the Arduino remote from a PC

which can send and receive data to an external webserver. Examples of these are the

Lantronix Xport, Xport Direct+ and Xport Direct which differ depending on whether they

have in-built web servers and their pin outs. The Xport does not have an inbuilt web

server meaning an external web server would need to be set up. This could provide

flexibility in programming languages used to interpret the RSS data (PHP, SQL or

Java).

- To connect the Xport Ethernet module to Arduino either custom electronics or a

plug-in can be used. I'd recommend an Adafruit ethernet shield for Arduino kit to do this

instead of a custom breadboard as the tutorial is particularly easy to follow .To know

which Ethernet module to use further research into programming would need to be

carried out.

-

- **Reads RSS stream, Interprets to FM**

A similar project, I have drawn upon in this plan, which uses an Arduino variant called

the Bare-Bones Board to produce a low power FM audio broadcast from an ipod

stream can be found here. After research into plug-ins to the Arduino system and other

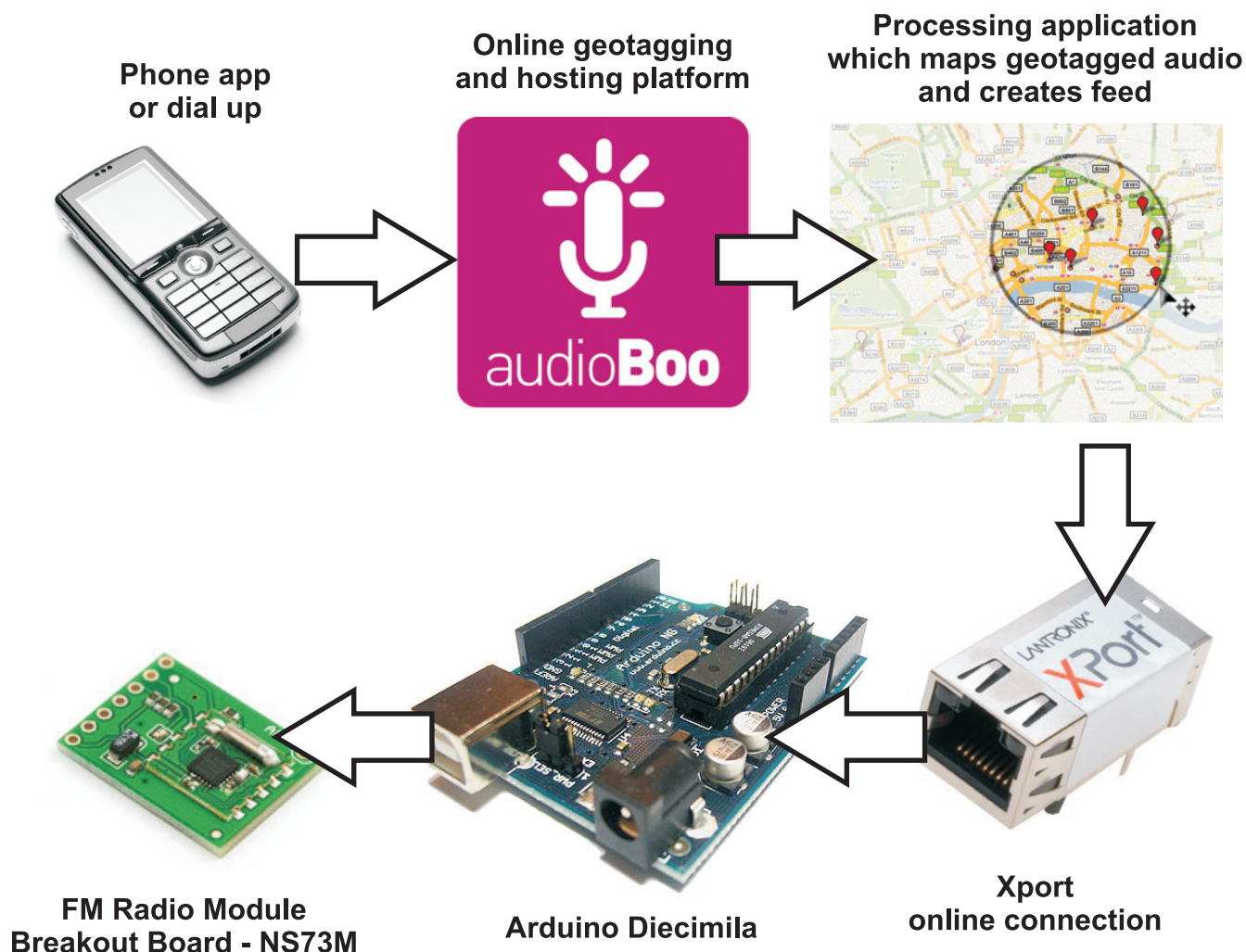comparable micro-controllers then the Arduino Diecimila definitely seems to be the

most suited to the job. This again will need custom programming but examples of similar

sketches can be found here, here and here.

Outputs to FM

FM Radio Module Breakout Board - NS73M is used in conjunction with a Arduino Diecimila

successfully in this project outlined on the Arduino Forums. Mike Yancey also uses this

transmitter in his ipod transmittion project.

Proposed Solution

**Phone app
or dial up**

**Online geotagging
and hosting platform**

**Processing application
which maps geotagged audio
and creates feed**

**FM Radio Module
Breakout Board - NS73M**

Arduino Diecimila

**Xport
online connection**

Conclusion

The aim of this project was to research viable existing technologies to use to create a prototype for a podcast/FM radio broadcast based on location tagged audio. Unfortunately there isn't one pre-existing platform that would be suitable however this report shows that there are many similar projects which can be drawn upon in the creation of a custom programming project in Processing. I have also detailed and linked to examples of code and online resources which I believe will help build the custom prototype.

The next stages of the project would be to work alongside a programmer and work on the software and hardware for the prototype based on the suggestions I have made. I estimate this being a fairly in-depth process as the project is fairly complex in terms of the many functions it needs to perform.

The exciting part of the project will be creating a model for a hackable/makable technology which is at the forefront of the DIY digital culture and challenges pre-existing relationships we have with radio as a medium. On top of this, the project would help to empower a community and hopefully challenge and bridge our social communications.