

IMG 1: Chuttersnap, 2019

PART C: PRESENTATION

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This presentation will explain the inspiration, creation and development of the plant instrument and analyse the execution and its usefulness for artists and potential in the commercial market.

CONTENT

- Inspiration & Influences
- Concept
- Construction
- Commercial Viability
- Demo
- Summary & Conclusion
- References & Bibliography

INSPIRATION & INFLUENCES



IMG 2: Jiroe, 2019

- Commercial music market is saturated
- Lots of competition
- Pitching songs successfully may entail coming up with something new
- According to a study by Columbia Business School, the most successful songs in the Billboard Top 100 Chart over the past 60 years tend to be less similar then their predecessors (Askin and Mauskapf, 2017)

INSPIRATION & INFLUENCES



IMG 2: Jiroe, 2019

- Therefore, there is a demand for techniques that boost creativity
- Limiting oneself is one useful technique (Computer Music, 2018)
- Trying to stay away from the usual workflow can be beneficial
- → Create an instrument that helps creativity

INSPIRATION & INFLUENCES



IMG 3: PM Studio, 2018

- The week before this module Tileyard organised a writing camp for British pop artist "Sigala"
- Researching his sound/style lead to a picture of his studio, including several plants
- "Tropical" music is often visualised with plants



IMG 4 : Thissongslaps, 2015



IMG 5: Playlists.net, 2014

RESEARCHING PLANT INSTRUMENTS



IMG 6: Deline, 2018

- "Singing Tree" by Goldsmith's University of London
- Using a Raspberry Pi and conductive touch it triggers sounds.
- Essentially fit the idea of a plant instrument, however doesn't look real, requires space.

CONCEPT



IMG 7: Deline, 2018

- Be a real plant
- Smaller Size
- Trigger sounds by touching the leaves
- Usable as a midi-controller

HOW WOULD IT BOOST CREATIVITY?

- Touch leaves to trigger sounds would be a new approach

- Player does not know which leaf triggers which sound/not, unlike a midi-piano for example

- Most people are not used to seeing a plant as an instrument

Goal: Create a plant that can trigger sounds and potentially become a new approach to composition

CONSTRUCTION

Component List:

- Calathea Plant
- Bare Conductive Touch Board
- Micro SD Card
- Power Supply
- Copper Tape
- Crocodile Wire
- Carton
- Speaker
- Micro USB Cable
- Mini Jack Cable

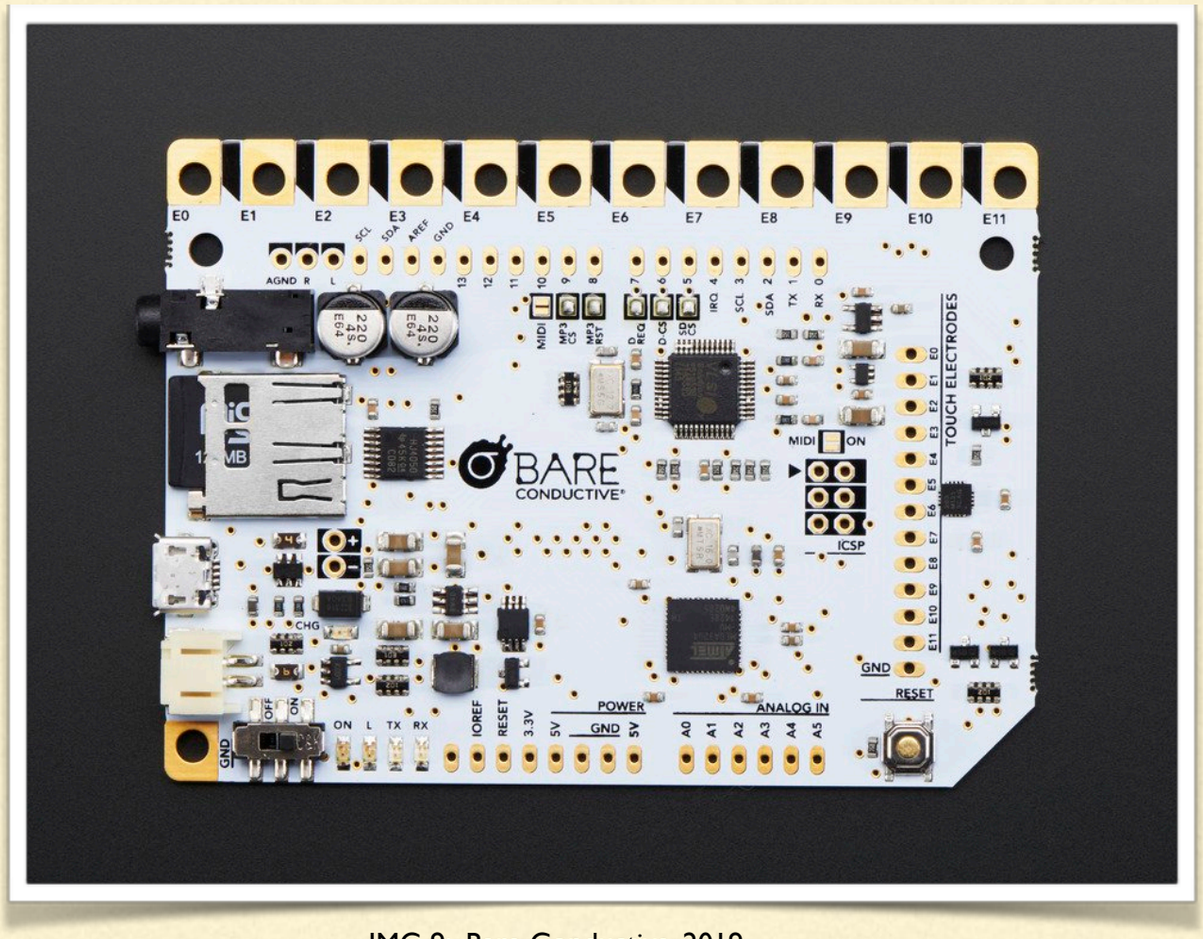
CALATHEA PLANT



IMG 8: Singh, 2019

- Popular indoor plant (Ambius, 2019)
- Large leaves for size
- Indirect sunlight, limited water
- Moderate in size
- Maintainable in a studio

TOUCH BOARD



IMG 9: Bare Conductive, 2019

- Uses capacitive touch to trigger samples
- Has 11 electrodes that can be connected to conductive material (e.g. copper tape, crocodile wire, electric paint etc.)
- Can be reprogrammed with Arduino
- Micro SD card
- Connected to power supply and a speaker

CAPACITIVE TOUCH

- Touch board triggers a sound when the electrodes are touched
- The human body has a natural capacitance, which means it is able to conduct electrical current and store an electrical charge (Aranda, 2016).
- Electrodes of the touch board create an electrostatic field. The introduction of the electrical charge of skin affects the electrostatic field and causes it to redistribute accordingly.
- This is registered by the touch board, which then triggers a sound.

MARK I



IMG 10: Singh, 2019

- Copper tape is very fragile, tears easily
- Connecting it to the board directly caused several problems
- Watering the plant became difficult, risk of damaging touch board
- Difficult to transport
- Crocodile wires had to be introduced

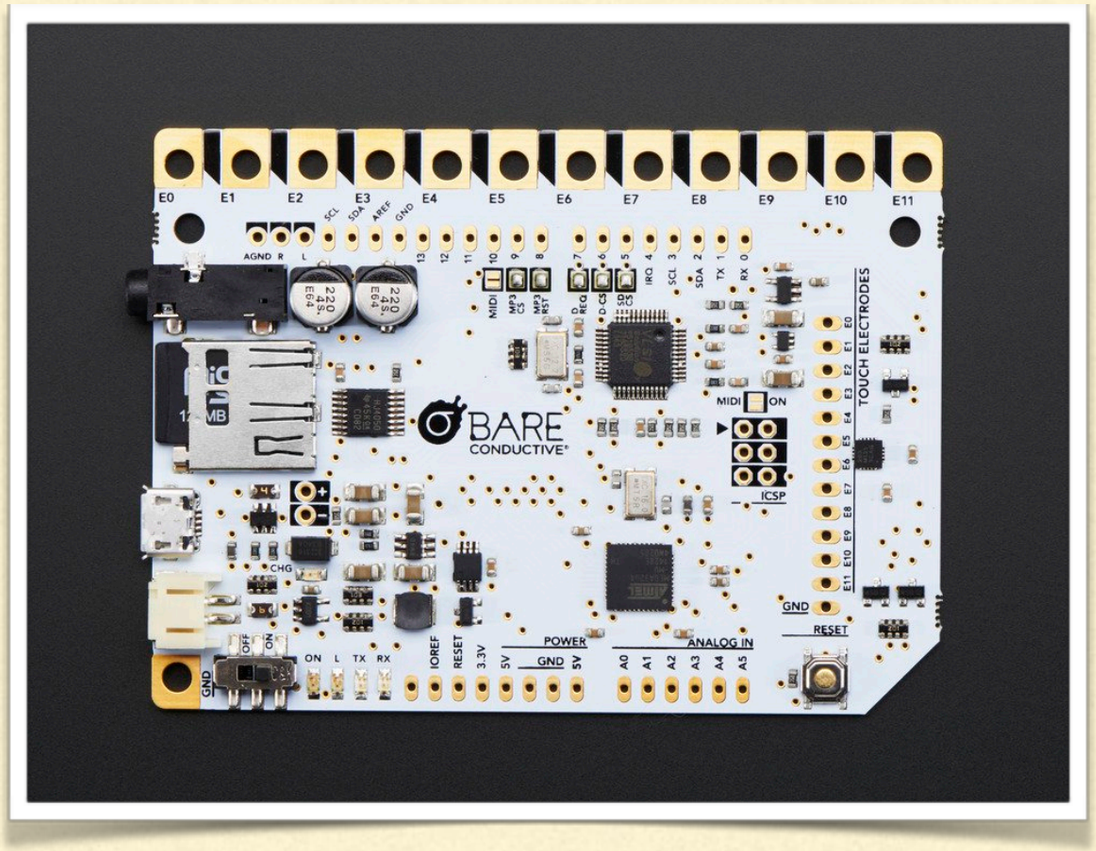
MARK II



IMG 10: Singh, 2019

- Copper tape is attached to the surface of the leaf, follows down the stem and then onto a piece of cardboard
- Crocodile wires can connect/ disconnect easily
- Watering the plant is less risky
- This setup is portable
- However, not enough crocodile clips available

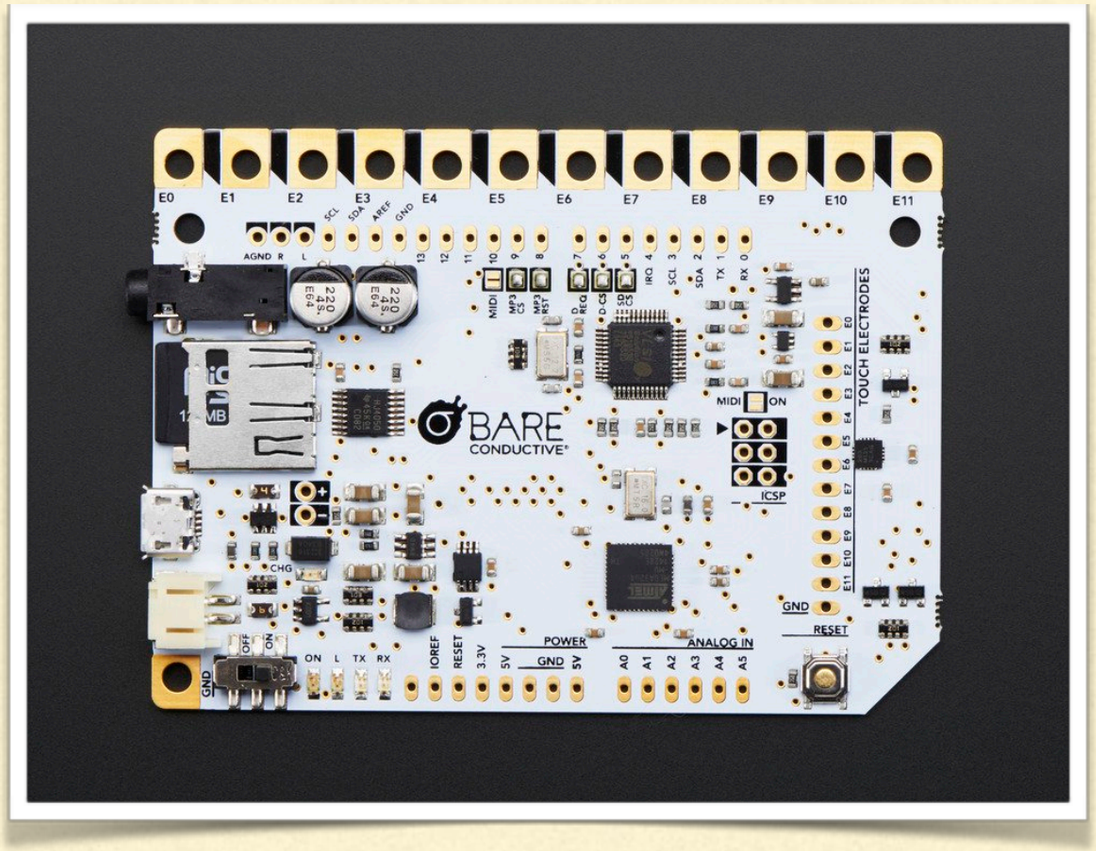
SETTING UP THE TOUCH BOARD



IMG 9: Bare Conductive, 2019

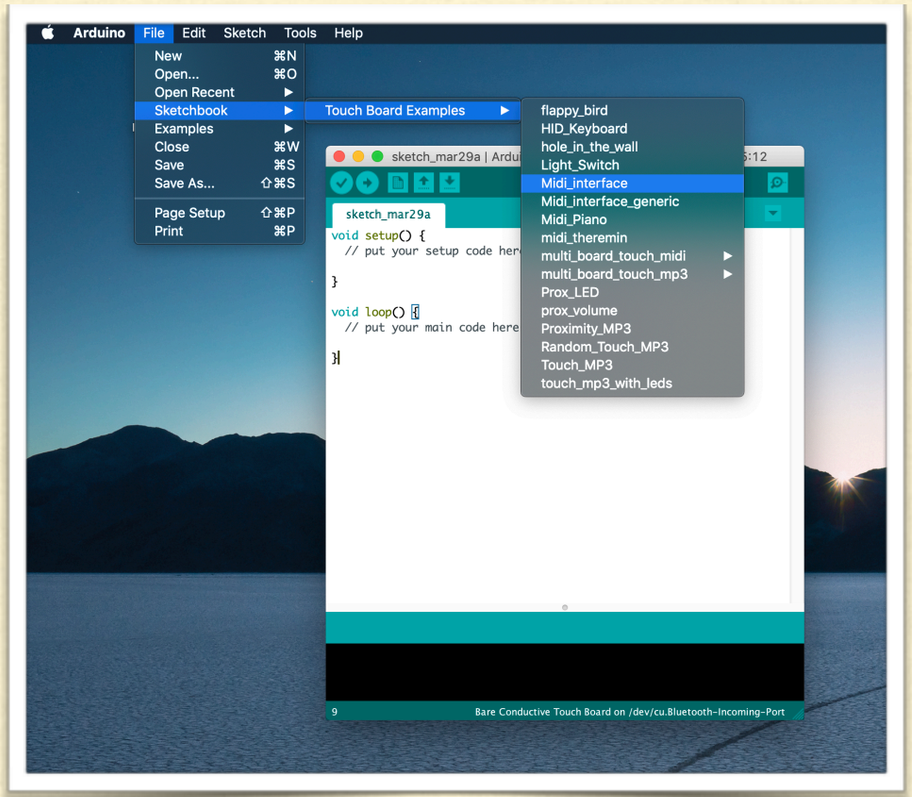
- Comes preloaded with 11 voice samples that explain features
- Works in MP3 playback mode, samples can be easily replaced via the micro SD card
- Slight latency makes drum samples less suitable for playback
- Different instruments were tried
- Going with the ‘Tropical’ theme an mbira was chosen as the final playback instrument
- Scales and chords were considered as well

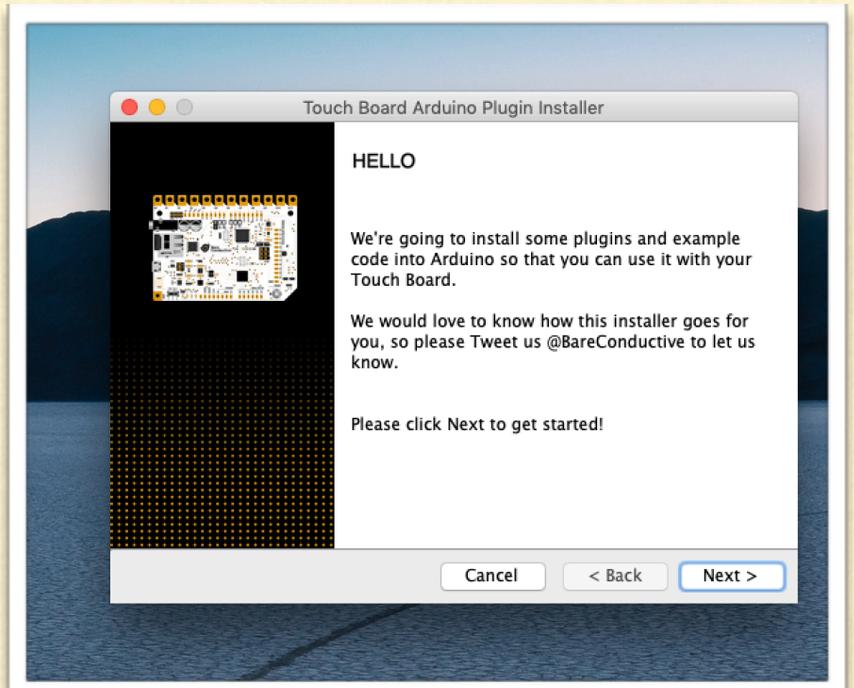
SETTING UP MIDI MODE



IMG 9: Bare Conductive, 2019

- Using Arduino IDE (Integrated Development Environment) software on a computer
- Code "Midi_interface" was uploaded to the board
- File→Sketchbook→Touch Board Examples→Midi interface.
- Connect to a DAW

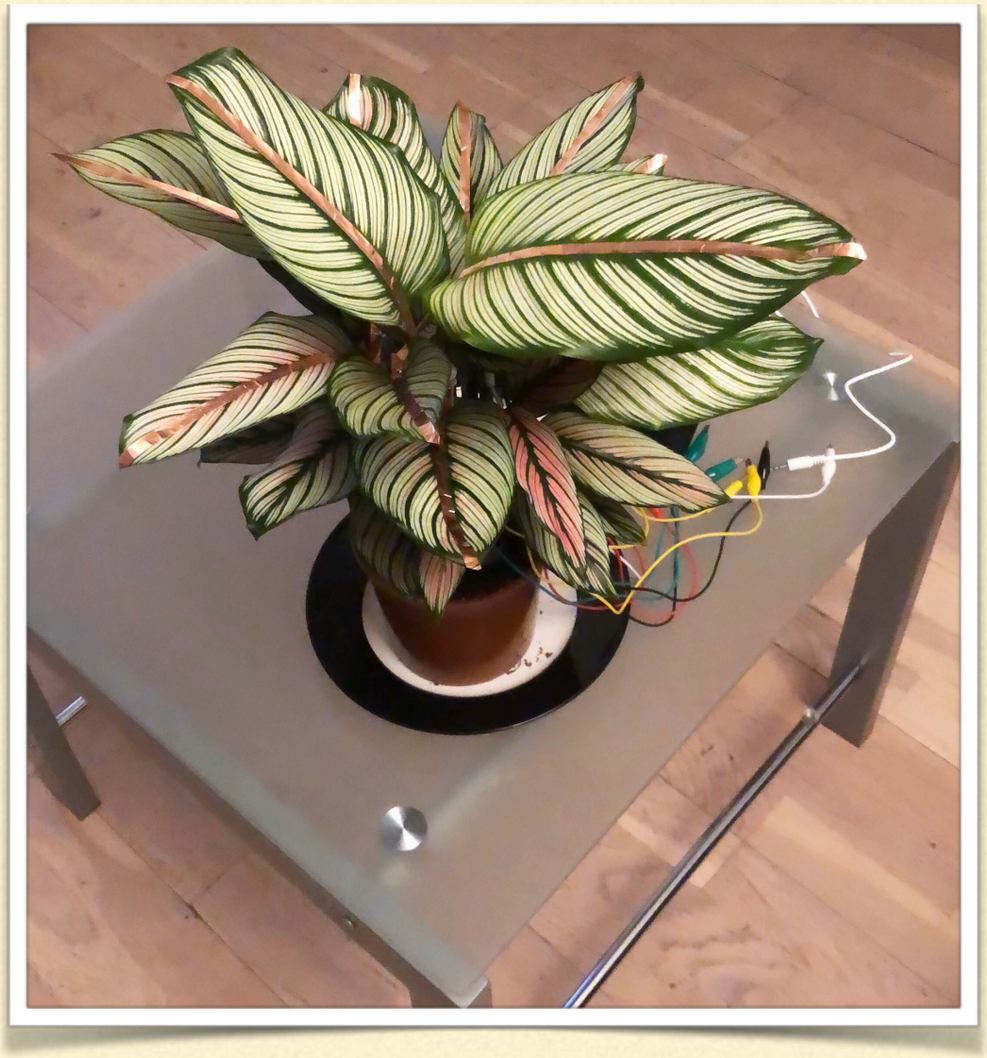

Arduino File Edit Sketch Tools Help
New ⌘N
Open... ⌘O
Open Recent
Sketchbook
Examples
Close ⌘W
Save ⌘S
Save As... ⇧⌘S
Page Setup ⇧⌘P
Print ⌘P
Touch Board Examples
flappy_bird
HID_Keyboard
hole_in_the_wall
Light_Switch
Midi_interface
Midi_interface_generic
Midi_Piano
midi_theremin
multi_board_touch_midi
multi_board_touch_mp3
Prox_LED
prox_volume
Proximity_MP3
Random_Touch_MP3
Touch_MP3
touch_mp3_with_leds
sketch_mar29a
void setup() {
// put your setup code here
}
void loop() {
// put your main code here
}
9
Bare Conductive Touch Board on /dev/cu.Bluetooth-Incoming-Port


Touch Board Arduino Plugin Installer
HELLO
We're going to install some plugins and example code into Arduino so that you can use it with your Touch Board.
We would love to know how this installer goes for you, so please Tweet us @BareConductive to let us know.
Please click Next to get started!
Cancel
< Back
Next >


Arduino File Edit Sketch Tools Help
Plant Synth
Auto Format ⌘T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... ⇧⌘I
Serial Monitor ⇧⌘M
Serial Plotter ⇧⌘L
WiFi101 / WiFiNINA Firmware Updater
Board: "Bare Conductive Touch Board"
Port: "/dev/cu.Bluetooth-Incoming-Port"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Boards Manager...
Arduino AVR Boards
Arduino Yún
Arduino/Genuino Uno
Arduino Duemilanove or Diecimila
Arduino Nano
Arduino/Genuino Mega or Mega 2560
Arduino Mega ADK
Arduino Leonardo
Arduino Leonardo ETH
Arduino/Genuino Micro
Arduino Esplora
Arduino Mini
Arduino Ethernet
Arduino Fio
Arduino BT
LilyPad Arduino USB
LilyPad Arduino
Arduino Pro or Pro Mini
Arduino NG or older
Arduino Robot Control
Arduino Robot Motor
Arduino Gemma
Adafruit Circuit Playground
Arduino Yún Mini
Arduino Industrial 101
Linino One
Arduino Uno WiFi
Bare Conductive Boards
Bare Conductive Touch Board
Bare Conductive Touch Board (USB MIDI, iPad compatible)


Midi_interface | Arduino 1.8.10 Hourly Build 2019/03/27 05:12
Upload Using Programmer
Midi_interface
Compiler_Errors.h
Bare Conductive Touch USB MIDI instrument
Midi_interface.ino - USB MIDI touch instrument
Remember to select Bare Conductive Touch Board (USB MIDI, iPad compa
in the Tools -> Board menu
Bare Conductive code written by Stefan Dzisiewski-Smith and Peter Kr
This work is licensed under a MIT license https://opensource.org/lic
Copyright (c) 2016, Bare Conductive
Permission is hereby granted, free of charge, to any person obtainir
of this software and associated documentation files (the "Software"
in the Software without restriction, including without limitation th
to use, copy, modify, merge, publish, distribute, sublicense, and/or
copies of the Software, and to permit persons to whom the Software i
furnished to do so, subject to the following conditions:
Bare Conductive Touch Board on /dev/cu.Bluetooth-Incoming-Port

SUMMARY OF CONSTRUCTION PROCESS



IMG 11: Singh, 2019

- The plant instrument works
- More crocodile wires needed
- Midi mode and MP3 playback mode do not work at the same time
- Set up is portable

COMMERCIAL VIABILITY

- Can the plant instrument be successful as a commercial product?
- Native Instruments and Avid have a combined annual revenue of over $500 million (Owler, 2019)
- According to study the creative professional market is growing at double the rate of the average job in the UK (Chung, Yang and Cauldwell-French, 2018)
- There seem to be a lucrative market that is also growing
- More information was required → Survey

SURVEY

- Created to find out how much people are willing to spend on tools for music creation and plants
- Assess general interest level for a plant instrument
- Include music professionals and non-music professionals

SURVEY RESULTS

- 54 responses, small number but still shows valuable trends
- 60% of the people who took the survey work in the music industry, the rest does not, giving it some outsider perspective
- In regards to purchasing tools for music (hardware, software, samples etc.) the most common answer was £100-£200
- This number has to be put in context since a large part of the survey is based on students with relatively limited budgets
- Looking at the annual budget for plants, 48% are not willing to spend more than £100
- 37% spend no money at all on plants, leaving only a small amount who are willing to pay £100 or more for them

SURVEY RESULTS

- 52% were “very” to “extremely interested”
- 41% “somewhat interested”
- Only 7% were “not so” to “not at all interested”
- Generally a positive reaction

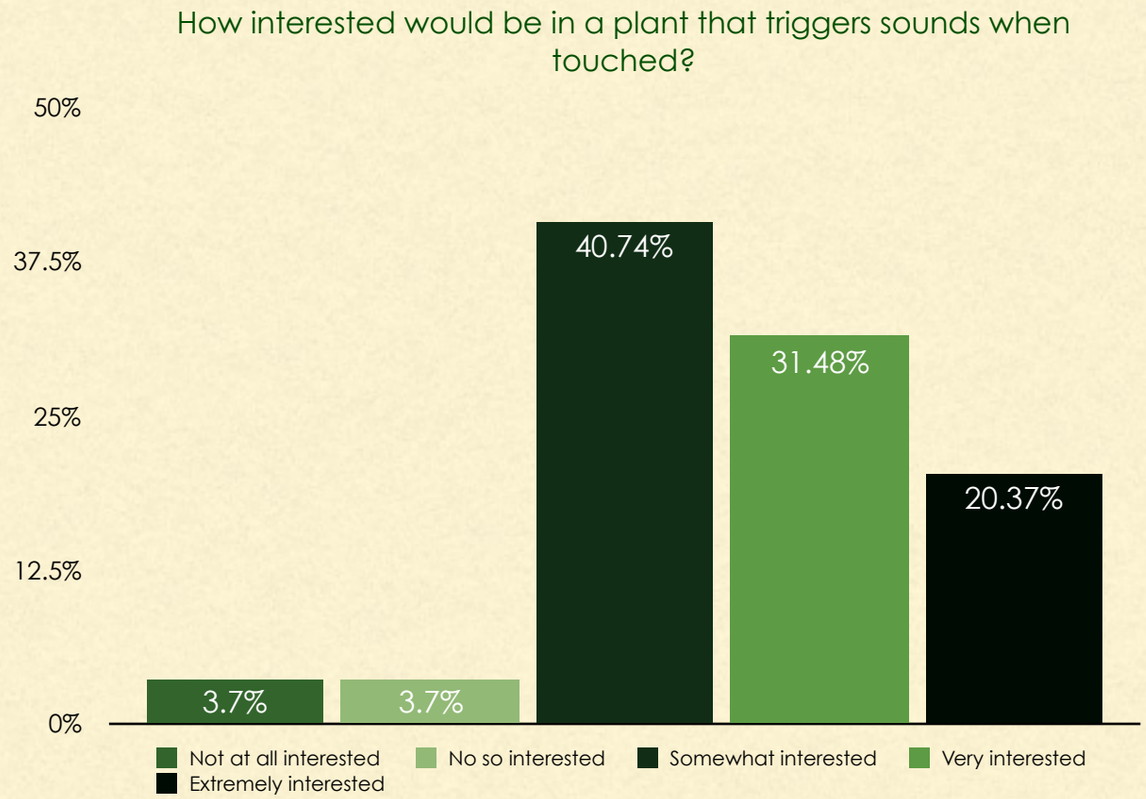


Fig.1: Plant Instrument Survey, 2019

SURVEY RESULTS

- 59% are willing to spend over £50
- Whereas 22% would spend £100 or more
- Interestingly, only 18% would not spend any money at all since 40% of participants do not work in the music industry this is a positive result

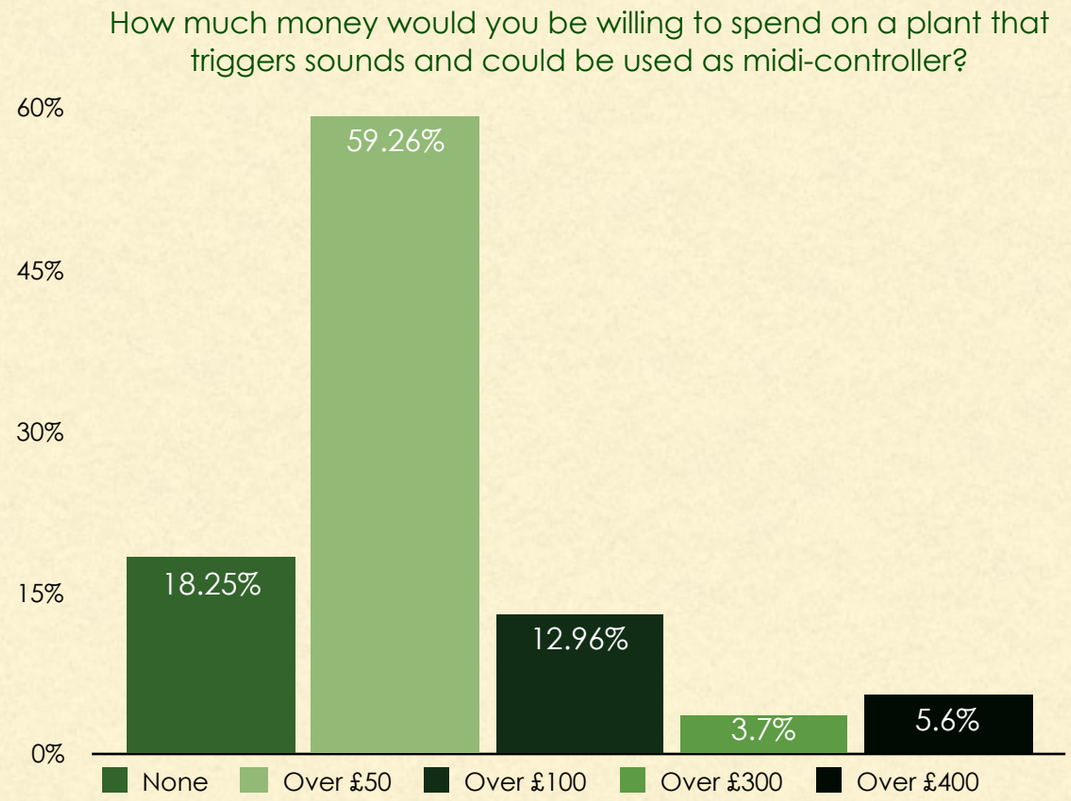


Fig.2: Plant Instrument Survey, 2019

ANALYSIS

- Despite a very limited survey there are still interesting points
- Only 7% being “not so” to “not at all interested”
- 81% are willing to pay at least £50 or more for it
- Generally a positive reaction

ANALYSIS & PRODUCTION COST

PRODUCT	COST (INCLUDING SHIPPING)
Calathea Plant	£8
Touch Board (SD Card, Power Supply Included)	£62.02
Copper Tape (20m)	£6.99
Crocodile Wire (10 pieces)	£4.99
Carton (5cm²)	£1
Speaker (Micro USB Cable, Mini Jack Cable Included)	£6.80
TOTAL	**£89.80**

ANALYSIS & PRODUCTION COST

- Not accounting for labour, the cost of the instrument is currently at approximately £85 (copper tape lasts for several instruments)

- Adding a net profit margin of 10%-20% (e.g PepsiCo, Inc. 10% or Apple Inc. 22%), The product would retail between £93.5 to £102 (Statistsa, 2014).

- Adding marketing and labour costs would make it even more expensive

- Looking at the survey, it would probably be too expensive (despite the survey being based on students and young professionals with limited budgets)

PRODUCTION COST

- Realistically, the cost of production could potentially be cut down by using cheaper materials, buying material in bulk and bringing production in house (Long, 2017)

- The main cost is the touch board, using a raspberry pi and capacity touch sensors could be cheaper

- To be profitable as product it would probably have to be made by an established company like Bare Conductive (similar to electric paint kit)

IMPROVEMENTS

- To be commercially viable the product's design, features and benefits have to be assessed to discover which improvements need to be made to hypothetically market this product

- Current version works well but looks like a DIY-project

- A major improvement would be incorporating the board, speaker and power supply in the pot of the plant

- Have wires of the same colour (green or copper), potentially develop a special wire

- Would require serious levels of development, engineering and investment

MARKETING & IMPROVEMENTS

- Additional feature could be to sense proximity similar to a theremin.
- The instrument being a plant has positive aspects that could be useful for marketing
- The instrument being based on a plant is an unique selling point
- Plants clean the air, make the workplace more attractive and according to studies even boost creativity and reduce stress (Chignell, 2018)
- On the other hand, having to take care of a plant could be a dealbreaker for some people.
- Hypothetically running customer service for the plant instrument could be costly

DEMO

SUMMARY & CONCLUSION

- The goal of the assignment was achieved
- The instrument works well and can help creativity
- The modes are mutually exclusive
- The instrument seems to be perceived well by people in and outside of the music industry
- It is probably too difficult to release as a product into a saturated market.
- However it could potentially do well as part of an art installation and DIY-project as there appears to be interest for it
- It is simple to make and people who really want this could easily build it themselves
- In conclusion, in is an interesting DIY-project to create and use and certainly at least somewhat interesting to most people.

Thank you for your attention!

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IMAGES & FIGURES

IMG 1: Chuttersnap. (2019). Palm trees. [online] Available at: https://unsplash.com/photos/u-vmeJcJ-Z4 [Accessed 28 Mar. 2019]

IMG 2: Jireo. (2018). Two black audio mixers. [online] Available at: https://unsplash.com/photos/qAahMC9xLmA [Accessed 28 Mar. 2019]

IMG 3: Jireo. (2018). Two black audio mixers. [online] Available at: https://unsplash.com/photos/qAahMC9xLmA [Accessed 28 Mar. 2019]

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IMG 7: Deline, M. (2018). Singing Tree. [online] Mdphysicalcomputing.tumblr.com. Available at: https://mdphysicalcomputing.tumblr.com/page/3 [Accessed 28 Mar. 2019]

IMG 8: Singh, B. (2019). Calathea. Shot on iPhone X

IMG 9: Bare Conductive. (2019). Touch Board - Bare Conductive. [online] Available at: https://www.bareconductive.com/shop/touch-board/ [Accessed 28 Mar. 2019].

IMG 10: Singh, B. (2019). Calathea. Shot on iPhone X

IMG 11: Singh, B. (2019). Calathea. Shot on iPhone X

FIG 1 & 2: Singh, B. (2019). Plant Survey. [online] Available at: https://www.surveymonkey.com/results/SM-QRD3M87NV/ [Accessed 28 Mar. 2019].