The Cacophony Project

Moore's Law for New Zealand's Birds Tim Hunt tim.hunt@wintec.ac.nz



New Zealand's threatened birds

https://www.doc.govt.nz/nature/conservation-status/threatened-birds/

Nationally Critical

Most severely threatened, facing an immediate high risk of extinction:

Antipodean wandering albatross/toroa Australasian bittern/matuku-hūrepo Chatham Island black robin Black stilt/kakī Black-billed gull/tarāpuka Chatham Island oystercatcher/torea tai Chatham Island shag Chatham Island tāiko Gibson's wandering albatross/toroa Grey duck/pārera Haast tokoeka Kākāpō Kermadec white-faced storm petrel New Zealand fairy tern/tara iti

Orange-fronted parakeet/kākāriki karaka Pacific white tern Pitt Island shag Rock wren/pīwauwau Salvin's albatross/toroa Shore plover/tuturuatu South Georgian diving petrel Southern New Zealand dotterel/tūturiwhatu White heron/kōtuku

























https://www.doc.govt.nz/nature/pests-and-threats/animal-pests/

What have we been doing to save the birds?





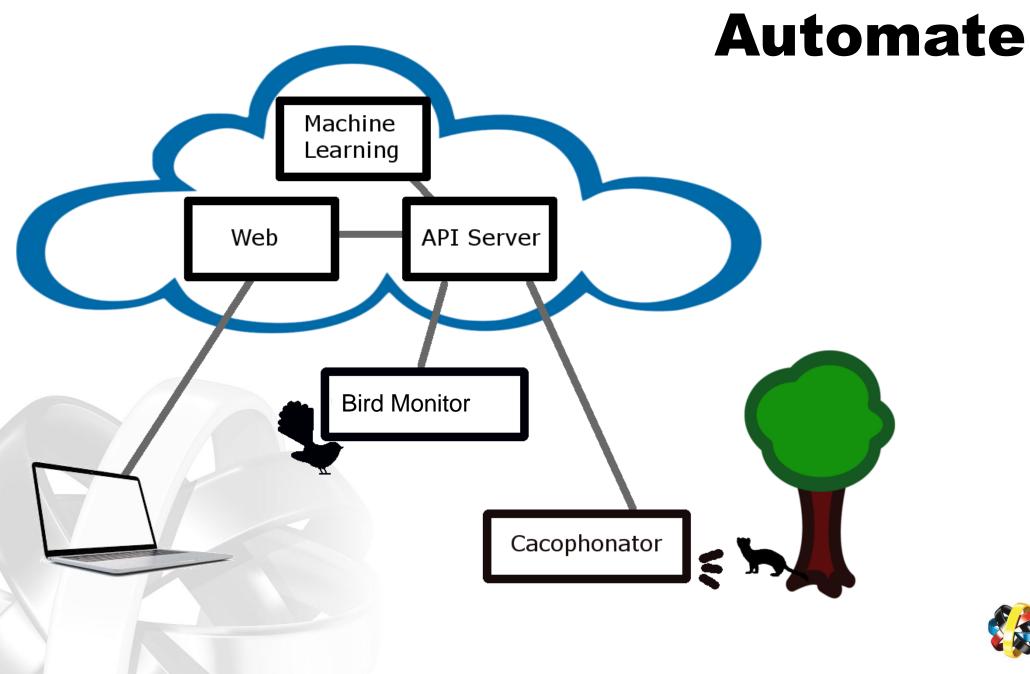
https://www.niwa.co.nz/publications/wa/water-atmosphere-2february-2011/water-safe-after-1080-drop





If you keep doing what you've been doing, you're going to keep getting what you've been getting.







The Cacophonator

The Cacophonator name refers to our rapidly evolving embedded platform. Equipped with a thermal camera, speakers and sensors it is deployed into New Zealand's native bush to automatically lure, identify and eliminate invasive predators. The Cacophonator software is a combination of Go and Python code.

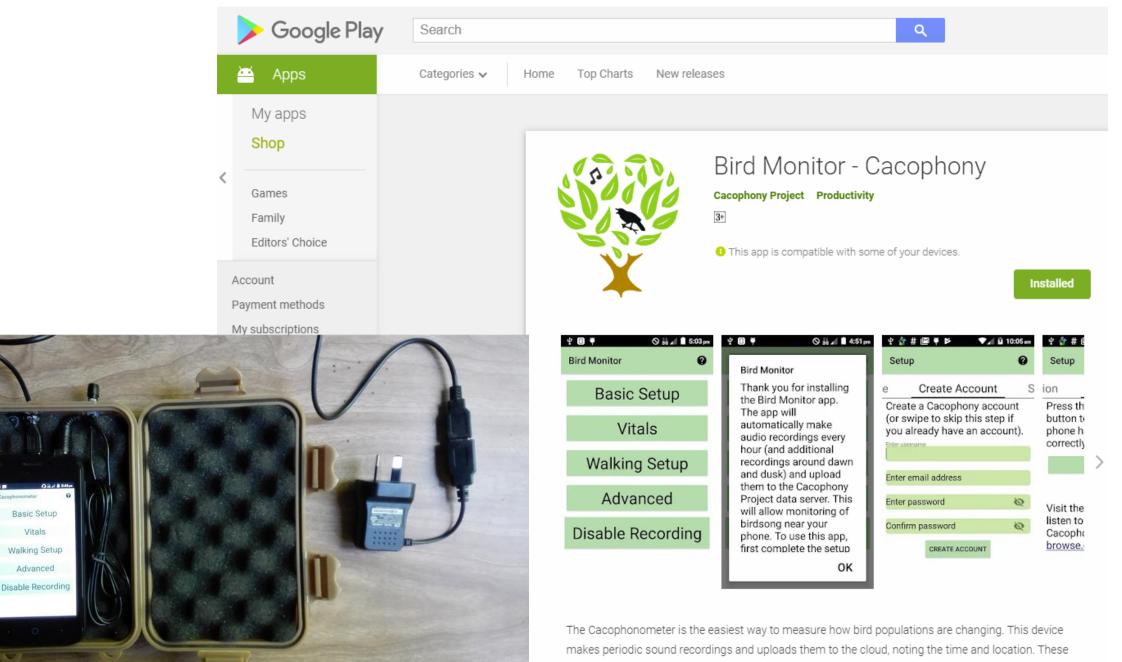
Raspberry Pi 3	
FLIR Lepton 3	
Custom interface hat ATtiny microcontroller 3G modem USB audio adapter Real time clock	
Raspbian	
lepton3 thermal-recorder thermal-uploader	
	FLIR Lepton 3 Custom interface hat ATtiny microcontroller 3G modem USB audio adapter Real time clock Raspbian lepton3 thermal-recorder



The internals of a Cacophonator

If you're interested in embedded systems, whether it's getting computationally heavy tasks to run efficiently on small computers, or making embedded systems weatherproof and robust, helping to improve the Cacophonator might be for you.





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recordings will be analysed to detect the volume of birdsong and how it changes over time, giving you an objective measure of the impact of predator control or reforestation.

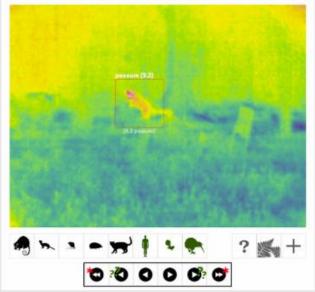
API Server

In many ways, the API server is the heart of the project. It's where all video and audio recordings for the project are stored, processed and then made available for later querying and download. All the components of the project interact with the API server in one way or another.

Platform	Node.js	
Database	PostgreSQL	
Object Store	Minio (S3 compatible)	
Test infrastructure	Implemented in Python	
Source code	cacophony-api	



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Web Application

The Cacophony Project has a full-featured JavaScript web application for querying, tagging and managing uploaded recordings. It interacts exclusively with the Cacophony API server.

If you're into web development or design, we'd love your help to extend and improve our web application.







These autonomous killing machines use machine vision to kill predators and not birds

SORT BY Best selling 🗸





Trap trigger powered by machine vision Not yet available Flexible, multi-catch predator trap Not yet available



How Can You Help?

The Cacophony Project is a mix of technical innovation and conservation. We're designing our own hardware, collecting a huge amount of data, looking for new ways to analyse sound and video, and building software to show the world what we discover. If we get it right, we'll discover the best ways to protect New Zealand birds.

The project is completely open source. This means that anyone can contribute.

If you know the difference between JavaScript and Python, and know that a Raspberry Pi isn't food, you could help improve our software and hardware. The project has many aspects and uses many different technologies. If you're into software development, data science or tinkering with hardware we might have a project that interests you.

Head to our technology page for more.

If bits and bytes aren't your thing, you can still help! As the project progresses we'll need more sites to host devices, people to help with data tagging and people to try out the software we've created. We also love hearing about your ideas for the project and general news about invasive predator eradication in New Zealand. The Cacophony Project is nothing without its community of designers, developers, researchers, supporters, and friends. This is where we recognise people who have given us the benefit of their time and expertise!

The Team

These people have contributed to the project by giving us the benefit of their expertise and time. Nothing happens without their hard work, so many thanks!

- Menno Finlay-Smits Project Manager/lead developer
- Cameron Ryan-Pears Hardware engineering & software development
- Grant Ryan Project initiator/coordinator
- Clare McLennan Software development
- Giampaolo Ferraro Software development
- Tim Hunt (Wintec) Cacophonometer lead
- Matthew Aitchison Machine learning
- Arthur McGregor Software development
- Andy Saunders Software development
- David Blake Software development and field testing
- Simon Matthews Software development
- Ben Biddington Software development
- Huub Nijs System administration
- Sara Coutinho User experience
- Jimmy Kirkus-Lamont Software development & graphic design
- Jessica Lyons Social media (Concentrate Ltd)

- Finn Maunsell audio analysis
- Pete Higgins Mechanical engineer
- Dave Lane Open source design and Drupal CMS integration
- Brent Martin Machine learning (University of Canterbury)
- Elaine Murphy (DOC) Animal behaviour
- Living Springs Field testing and hosting meetings
- Roger McKenzie Hardware advice
- Gray Rathgen Designer
- Kate Haley Supporter
- Paul Campbell Electronics design
- Tim Sjoberg (DOC) Animal behaviour and field testing
- Mark Nikoria (Wintec) Data visualisation
- Michael Busby Website design and development
- Max Johns Content
- Matt Kavermann Digital lures
- Nigel Sharplin and Logan Stephens from Infact Weatherproofing advice
- Donald McKellar Software testing
- Alex James and Michael Plank (University of Canterbury) Modelling and statistics
- Stephen Marsland (Massey University) Bird song analysis
- Shaun Hendy Science supporter

Our Supporters - Thanks



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https://cacophony.org.nz/