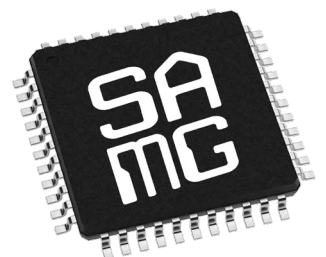


The Bee Project



**South Australian
Microprocessor Group**

To Bee, or Not to Bee

That is definitely the question

The Problem

Bees do not just make honey, they are also an important part of the food chain and pollinate over one third of the world food supply. Bee keepers (apiarists) transport their hives to farming areas to pollinate crops at the correct times of each year. Without that service, those crops would fail.

Unfortunately a parasitic mite has recently arrived in South Australia (about 12 months ago) which is putting some food production at risk and has the potential to destroy the bee keeping industry, if not controlled.

The mite is called the **Varroa Destructor mite**. This mite has been a problem on the Australian east coast and around many areas of the world, for some time. However, because it is a relatively new problem here, local apiarists are struggling to cope.

The Solution

The South Australia Microprocessor Group (SAMG) is a technology group that has teamed up with a Mount Barker commercial bee keeper (about 800 hives) to investigate how modern technology can help. Whilst the mites cannot be currently be eradicated, the situation can be managed.

Most commercial bee keepers spend roughly one day per week dealing with issues around the mite infestation. The aim of the group is to automate the monitoring and treatment of the hives, to reduce the work load and expense. This involves the use of Artificial Intelligence to identify and evaluate the extent of the infestation.

Those results, together with many other parameters that indicate the health of the bee colonies, will be transmitted from the remote locations to an online repository, which the bee keepers can access to determine the next steps.

The Way Forward

The SAMG is donating it's time and considerable expertise to the project free of charge. However, as many of the members are retired, finances are tight and assistance is needed to purchase the components and devices needed to build prototypes for evaluation.

The community stands to benefit in several ways:-

- Increased food security
- A more sustainable bee keeping community
- The possibility of creating two new social enterprises, employing local people
- All research results will be made public and all software made open-source

The apiarist we are working with, is a Mount Barker resident and the project will benefit the local community in numerous ways.

Varroa Destructor Mite



The mite exists in the wild and jumps onto passing bees which transport them back to the hive. There, they reproduce rapidly and feed on the bees. Worse than that, they also embed themselves into the cells where new bee larvae are developing. This reduces the reproductive rate of the bees and introduces a number of diseases to the hive

One aspect of the project is to image the bees as they enter the hive. The images will then be analysed using Artificial Intelligence in order to evaluate the number of mites



This process would replace the current method of evaluation which is a manual process and results in the destruction of about 300 bees each time it is done. If successful, our new method will create a remote and non-destructive way to evaluate the level of infestation. The apiarist needs to know this, so that he can treat the hives when the level reaches a specific threshold.

Currently, the most common treatment is by heating and vaporising oxalic acid crystals which turns the crystals into a vapour. This vapour is then introduced into the hives to kill the mites without harming the bees. The plan is to automate this process so that it can be achieved remotely.

Equipment Requirements

Because the equipment will be used by non-technical personnel, it must have specific requirements ...

Electrical/Electronic Requirements

- Maintenance Free (as far as possible)
- Remotely upgradable
- Remotely maintainable
- Welfare reporting via telemetry
- Solar powered

Physical Requirements

- Water proof
- Sun proof
- Insect Proof
- Farmer Proof
- Cow Proof

Communication Requirements

The equipment will report via radio.
This is essentially line of sight in nature, which means that radio waves do not fly through hills.

Inter-site communications are most likely WiFi or Lora. Lora is preferred as it has lower power requirements and longer range.

External communications will most likely use 4G or satellite. 4G would work in SOME locations, but not all. Satellite comms would work anywhere.

Financial requirements

Whatever we come up with, it needs to be economically viable

General Requirements

- Suitable for purpose
- Easy to operate

Contacts

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