

**Visual IoT Network for Environment Protection and Disaster Prevention
[Field Experiment for Smoke/Fire Detection Dataset Development]
Report Form**

I. Organizer:

Name:	Dr. Kanokvate Tungpimolrut
Position:	Principal Researcher, Research Group Director
Institution:	NECTEC, NSTDA

II. Objective:

This field experiment aims to develop an image-based dataset for the training, validation and testing of forest smoke/fire detection models in Chiang Mai, Thailand. The activity is crucial to this project's objective since the model's performance depends upon the quality and quantity of the dataset.

Five experimental areas, as planned, include

- Huai Huk (lat 18.9245582, long 99.094015),
- Pang Sak (lat 18.9026969, long 99.203065),
- Doi Koo 1 (lat 18.8854613, long 99.1708773),
- Doi Koo 2 (lat 18.885279, long 99.1706582), and
- Pa Miang (lat 18.9145094, long 99.2284893), as shown in Figure 1.



Figure 1: Five experimental areas.

The fire spots in all areas are illustrated in the figures below.



Figure 2: Fire spots and positions of the cameramen in Huai Huk.



Figure 3: Fire spots and positions of the cameramen in Pang Sak.

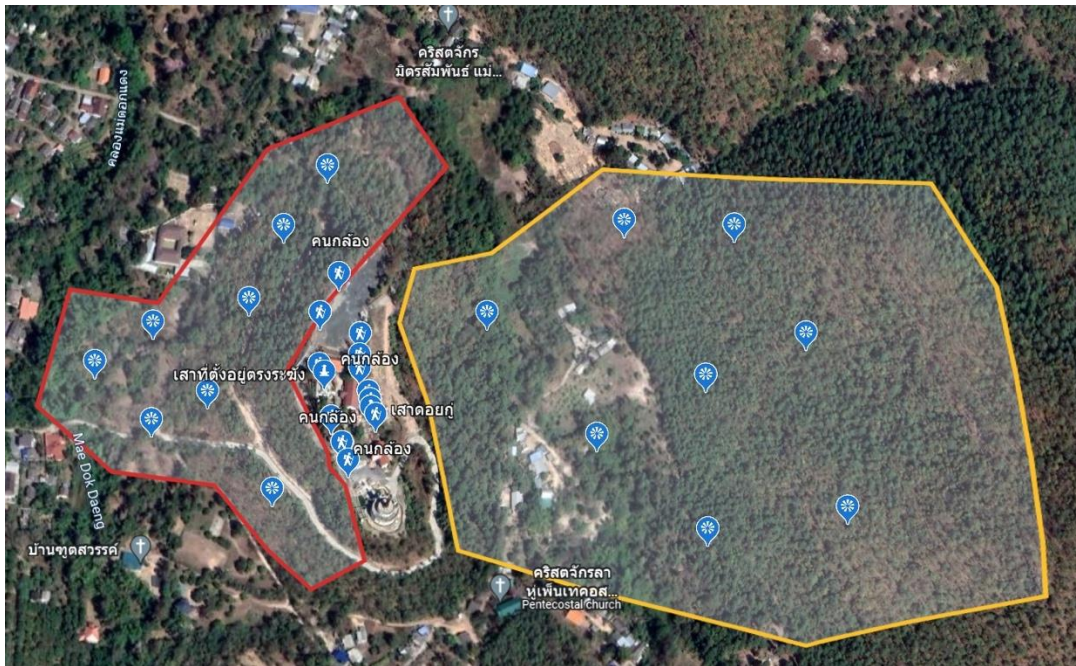


Figure 4: Fire spots and positions of the cameramen in Doi Koo 1 and Doi Koo 2.



Figure 5: Fire spots and positions of the cameramen in Pa Miang.

Note that the shadowed areas are the areas that actual forest fires occurred repeatedly in the past. And the positions marked inside each shadowed area are the positions that

the local government officers will set fire or generate smoke for the experiment. The positions marked outside the shadowed areas are the positions of the experimenters who will take photos.

III. Schedule:

Date: 1 – 2 February 2023¹

Venue: Chiang Mai, Thailand

Program Agenda:

1 February 2023	Travel to Chiang Mai from Bangkok Meeting and planning with Pa Miang subdistrict office
2 February 2023	Experiment at Pa Miang Meeting with subdistricte office for summary Travel back to Bangkok from Chiang Mai

IV. Participant List² & Itinerary:

No.	Name	Organization	Itinerary
1	Dr. Kanokvate Tungpimolrut	NECTEC	1/2/2023 (in) 2/2/2023 (out)
2	Dr. Jessada Karnjana	NECTEC	1/2/2023 (in) 2/2/2023 (out)
3	Mr. Natthaphol Pornpolkullapat	NECTEC	1/2/2023 (in) 2/2/2023 (out)
4	Mr. Warit Phankrawee	NECTEC	1/2/2023 (in) 2/2/2023 (out)

¹ **[Important Note]** Note that the experiment dates were rescheduled due to the availability of each subdistrict office. Since all of them are not available at the previously proposed timeslot, we have to revise our plan by visiting each location separately. The first place that we visited was Pa Miang (Figure 1 and Figure 5). **However, during our experiment at Pa Miang, we got an instant order from the Chiang Mai government office to temporarily terminate and postpone the experiment. Because the Chiang Mai government office just launched a no-burn policy. And the subdistrict office got such a message after a few hours that the experiment started.** In conclusion, we are allowed by the local government office to continue the experiment again after May. Therefore, this document reports activities and some results from the experiment done at Pa Miang before we got the request to stop it.

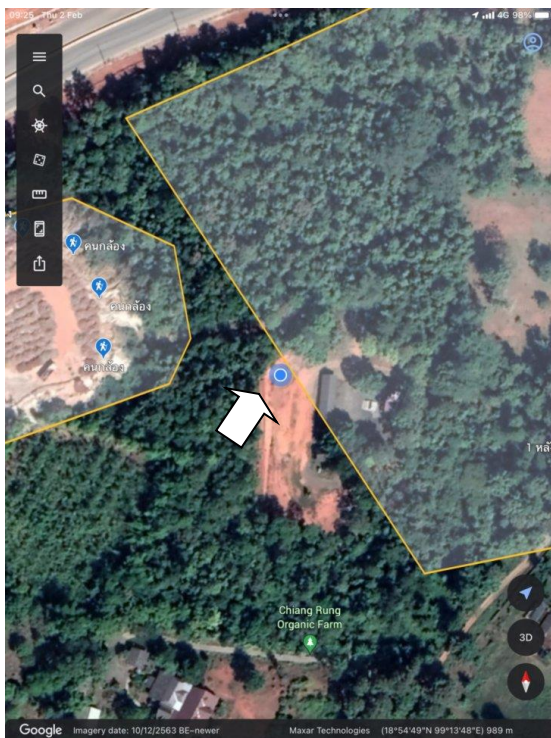
² In the proposal, there are two more members from NECTEC to join the experiment. Since they were not available for the timeslot during the experiment at Pa Miang, they planned to join the experiments in other areas. And for a reason mentioned in Footnote 1, their names are excluded from this report.

5	Mr. Kittikhun Sirinaksomboon	NECTEC	1/2/2023 (in) 2/2/2023 (out)
6	Six officers from Pa Miang subdistric office	Local Gov.	NA
7			
8			
9			
10			

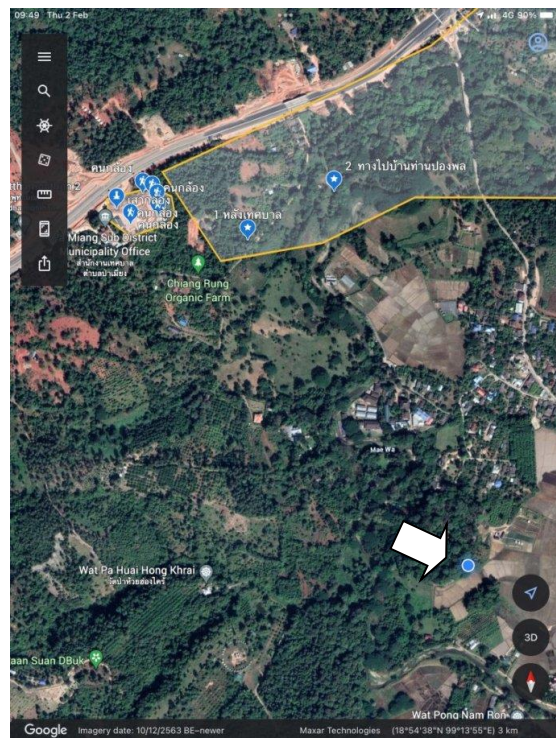
V. Summary of the activities corresponding to the objectives

First, as mentioned in Footnote 1, it is important to re-emphasize that the field experiments cannot be done according to the previously proposed plan. The reason is that, during the experiment at Pa Miang, we got an order from the Chiang Mai government office to temporarily stop what we were doing and postpone the experiment to May (or after May) because of the no-burn policy from February to April. Therefore, we could set fire to only 4 locations in the Pa Miang area, as shown in Figure 6. And their locations are as follows. Some activity photos are shown in Figure 7.

- Area #1 (18°54'49" N 99°13'48" E)
- Area #2 (18°54'38" N 99°13'55" E)
- Area #3 (18°54'46" N 99°14'10" E)
- Area #4 (18°54'06" N 99°13'38" E)



Area #1



Area #2

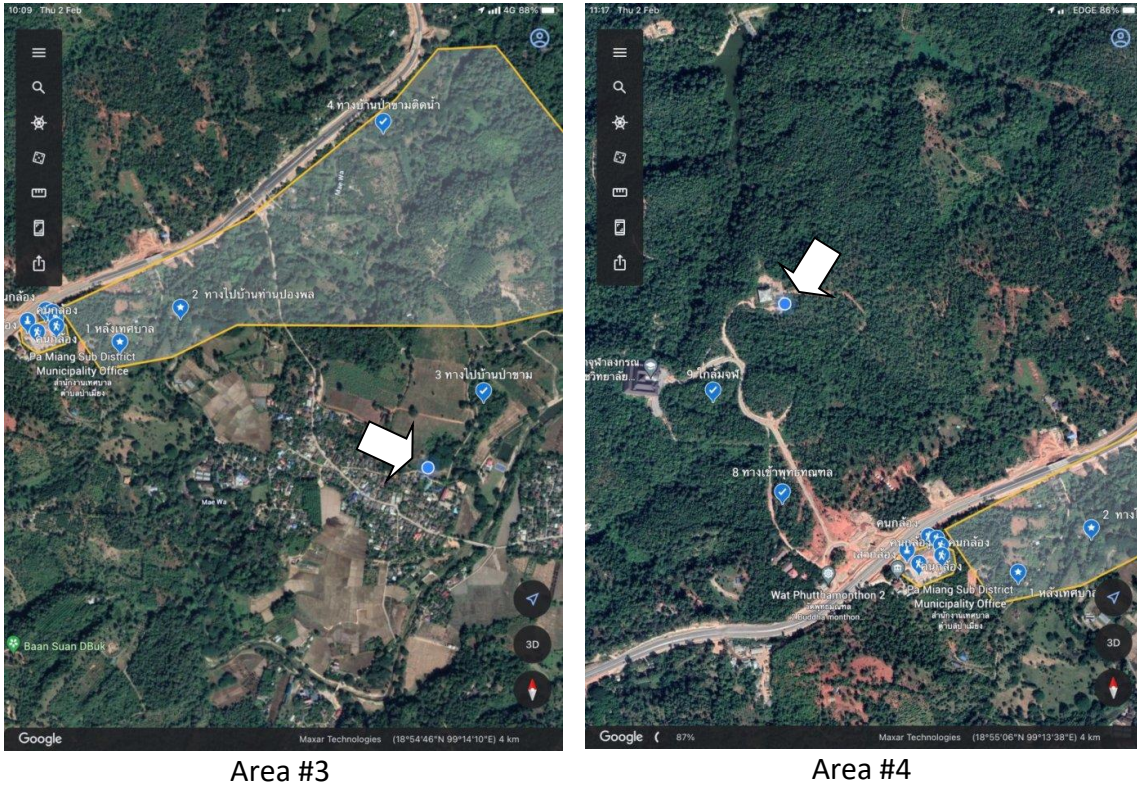


Figure 6: Positions for setting fire in the experiment at Pa Miang.

The procedural activities that were done in Pa Miang are summarized as follows. Firstly, local government officers responsible for setting fire were ready at a planned and designated position (called a fire spot) in a given area, as shown in Figure 6. They made smoke for approximately half an hour for one fire spot. Starting from the time when smoke generation was initialized, four cameramen, including one at the top of the relay station tower at the Pa Miang subdistrict office, were ready to take photos (snapshot and video) from before the appearance of smoke until it died out due to the extinguishment performed by the local government staff. Once the fire was set, the camerapersons took photos from different viewpoints simultaneously. Pictures from different perspectives are critical in model training in the sense that some biases can be reduced. Consequently, the model's performance can be improved. Then, the local government staff moved to the following designated spot and repeated the procedure. Figure 7 shows photos of this operation.





Figure 7: Experimental activities.

VI. Others

Examples of images to be included in the dataset are shown below.



