

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.

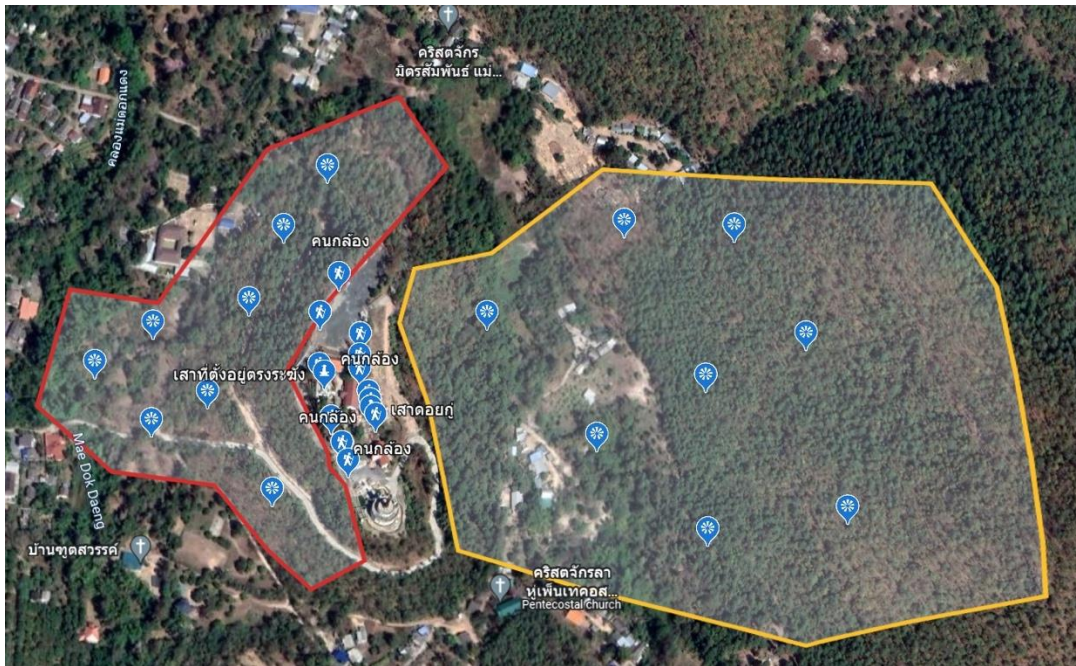


Figure 4: Fire spots and positions of the cameramen in Doi Koo 1 and Doi Koo 2.



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: 6 – 16 June 2023
 Venue: Chiang Mai, Thailand

Program Agenda¹:

6 June 2023	- Travel to Chiang Mai from Bangkok - Meeting and planning with all three subdistrict offices at Nong Yang subdistrict office - Training new CMU students (see Footnote 2) for conducting the experiments
7 – 8 June 2023	- Experiment at Huai Huk (Area 1) - Meeting with the local subdistrict office for summary
9 June 2023	- Experiment at Pa Miang (Area 2) - Meeting with the local subdistrict office for summary
10 – 11 June 2023	Saturday-Sunday break
12 June 2023	- Training new CMU students for conducting the experiments
13 June 2023	- Experiment at Doi Koo 1 and Doi Koo 2 (Area 3 and Area 4) - Meeting with the local subdistrict office for summary
14 June 2023	- Experiment at Pang Sak (Area 5) - Meeting with the subdistrict office for summary
15 June 2023	- Meeting with new students to explain about dataset structure - Meeting with all three subdistrict offices for summary
16 June 2023	- Travel back to Bangkok

IV. Participant List² & Itinerary:

¹ The schedule is revised slightly from the proposal due to the availability of local subdistricts. However, all expected outputs are achieved according to the plan.

² In the proposal, five more members (Jessada's students from SIIT, Thammasat University) from NECTEC would join the experiment. However, they were unavailable; their names are excluded from this report. Since five student members could not join the field experiment, we had to train a group of local university students to work for this purpose. Fortunately, Dr. Kanokvate contacted a professor from Chaing Mai University (CMU) and explained the situation and this project to him. The professor helped us to recruit seven undergrad engineering students to participate in taking photos and setting and preparing all the necessary steps for making the final dataset. Students' names are listed on the participant list from No. 3 to No. 9. And we had to spend a few days on on-the-job training for them.

No.	Name	Organization	Itinerary
1	Dr. Kanokvate Tungpimolrut	NECTEC	6/6/2023 (in) 16/6/2023 (out)
2	Dr. Jessada Karnjana	NECTEC	6/6/2023 (in) 16/6/2023 (out)
3	นส. ชิตยาภรณ์ ยาสุมทร	CMU ³	NA
4	นส. ลักษณะภา น้อยไพโรจน์	CMU	NA
5	นาย วาริต คำลี	CMU	NA
6	นาย กิตติธร นำบุญเรือง	CMU	NA
7	นาย ธนกฤต ไชยชนะ	CMU	NA
8	นาย พีรพัฒน์ บุญเดช	CMU	NA
9	นาย นันทิพัฒน์ ด้านจิระมนตรี	CMU	
10	11 officers from the Pa Miang subdistrict office	Local Gov.	NA
11	9 officers from the Nong Yang subdistrict office (Huai Huk area)	Local Gov.	NA
12	11 officers from the Cheing Doi subdistrict office (Doi Koo areas)	Local Gov.	NA

V. Summary of the activities corresponding to the objectives

In total, there are five areas with 29 fire spots, as summarized in the table below. The first column of the table shows areas' names in experimental order. The second column shows approximate locations. The third shows the total number of fire spots for experimental areas. And the last shows the total number of photos taken for the dataset. In total, more than 14,642 photos were taken for constructing the dataset. We expect these photos to be used for a dataset of at least 4,000 photos.

Area	Location	Total number of fire spots	#Photos taken
1. Huai Huk	lat 18.9245582, long 99.094015	8	4,355
2. Pa Maing	lat 18.9145094, long 99.2284893	7	3,977
3. Doi Koo 1	lat 18.8854613, long 99.1708773	5	2,580
4. Doi Koo 2	lat 18.885279, long 99.1706582	4	1,887
5. Pang Sak	lat 18.9026969, long 99.203065	5	1,843
Total number of photos taken in this field experiment			14,642

³ Chiang Mai University

The details for each area are summarized as follows.

Area 1: Huai Huk

There are 8 fire spots, as shown in the table below. The positions of all cameramen are shown in the table below and in Figure 6.

Fire spot 1	18°55'22"N 99°05'22"E
Fire spot 2	18°55'25"N 99°05'30"E
Fire spot 3	18°55'27"N 99°05'29"E
Fire spot 4	18°55'27"N 99°05'24"E
Fire spot 5	18°55'30"N 99°05'24"E
Fire spot 6	18°55'34"N 99°05'30"E
Fire spot 7	18°55'34"N 99°05'22"E
Fire spot 8	18°55'37"N 99°05'32"E

Cameraman 1	18°55'21"N 99°05'26"E
Cameraman 2	18°55'21"N 99°05'27"E
Cameraman 3	18°55'23"N 99°05'31"E
Cameraman 4	18°55'25"N 99°05'34"E , 18°55'25"N 99°05'33"E
Cameraman 5	18°55'29"N 99°05'39"E
Cameraman 6	18°55'20.8"N 99°05'29.9"E

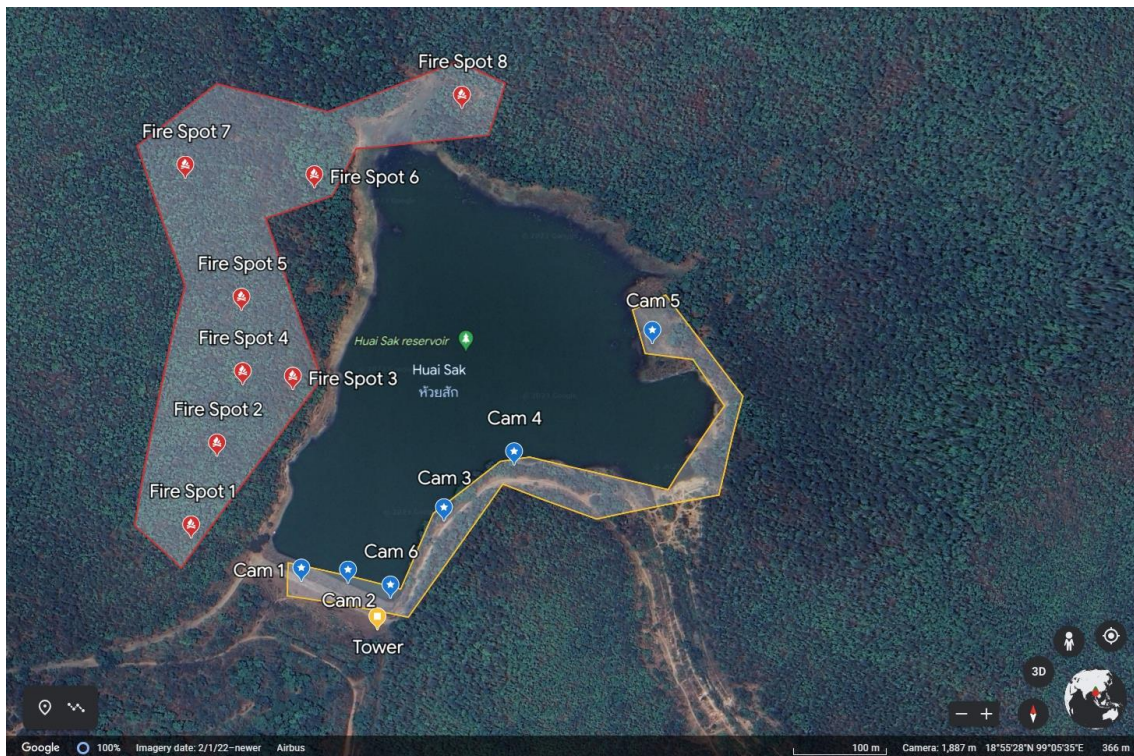


Figure 6: Locations of fire spots and cameramen.



Meeting with the mayor of Nong Yang subdistrict



Meeting with local government offices



Operational staff



Preparation for operation





Figure 7: Meeting and activities at the area 1.

Area 2: Pa Miang

There are 7 fire spots, as shown in the table below. The positions of all cameramen are shown in the table below and in Figure 8.

Fire spot 1	18°54'50"N 99°13'49"E
Fire spot 2	18°54'59"N 99°14'02"E
Fire spot 3	18°54'55"N 99°13'35"E
Fire spot 4	18°54'56"N 99°13'44"E
Fire spot 5	18°54'49"N 99°13'44"E
Fire spot 6	18°54'50"N 99°13'45"E
Fire spot 7	18°54'50"N 99°13'44"E

Cameraman 1	18°54'50"N 99°13'41"E , 18°54'49"N 99°13'42"E
Cameraman 2	18°54'50"N 99°13'42"E , 18°54'55"N 99°13'40"E
Cameraman 3	18°54'51"N 99°13'44"E , 18°54'52"N 99°13'39"E , 18°54'49"N 99°13'41"E , 18°54'50"N 99°13'43"E
Cameraman 4	18°54'52"N 99°13'39"E , 18°54'52"N 99°13'40"E , 18°54'56"N 99°13'51"E , 18°54'50"N 99°13'42"E
Cameraman 5	18°54'51"N 99°13'39"E , 18°54'55"N 99°13'47"E , 18°54'49"N 99°13'42"E
Cameraman 6	18°54'54"N 99°14'01"E , 18°54'55"N 99°13'49"E ,

18°54'49"N 99°13'42"E



Figure 8: Locations of fire spots and cameramen.





Figure 9: Activities at the area 2.

Area 3: Doi Koo 1

There are 5 fire spots, as shown in the table below. The positions of all cameramen are shown in the table below and in Figure 10.

Fire spot 1	18°53'12"N 99°10'13"E
Fire spot 2	18°53'08"N 99°10'09"E
Fire spot 3	18°53'06"N 99°10'11"E
Fire spot 4	18°53'03"N 99°10'12"E
Fire spot 5	18°53'04"N 99°10'11"E

Cameraman 1	18°53'07"N 99°10'12"E , 18°53'06"N 99°10'13"E
Cameraman 2	18°53'07"N 99°10'12"E
Cameraman 3	18°53'07"N 99°10'15"E
Cameraman 4	18°53'07"N 99°10'12"E , 18°53'06"N 99°10'13"E
Cameraman 5	18°53'07"N 99°10'13"E, 18°53'07"N 99°10'13"E, 18°53'06"N 99°10'13"E
Cameraman 6	18°53'07"N 99°10'12"E ,

18°53'06"N 99°10'15"E

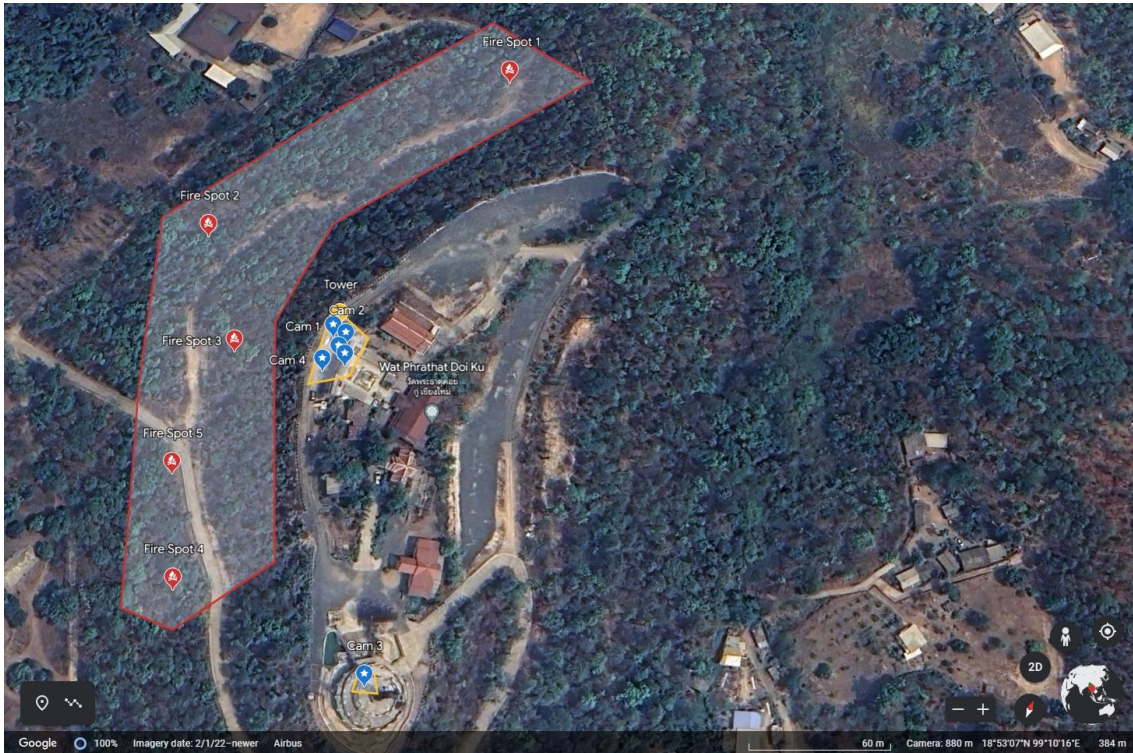


Figure 10: Locations of fire spots and cameramen.





Figure 11: Activities at the area 3.

Area 4: Doi Koo 2

There are 4 fire spots, as shown in the table below. The positions of all cameramen are shown in the table below and in Figure 12.

Fire spot 1	18°53'06"N 99°10'16"E
Fire spot 2	18°53'07"N 99°10'15"E
Fire spot 3	18°53'06"N 99°10'16"E
Fire spot 4	18°53'08"N 99°10'15"E

Cameraman 1	18°53'05"N 99°10'14"E , 18°53'05"N 99°10'15"E
Cameraman 2	18°53'05"N 99°10'15"E
Cameraman 3	18°53'07"N 99°10'15"E
Cameraman 4	18°53'06"N 99°10'15"E , 18°53'05"N 99°10'15"E
Cameraman 5	18°53'05"N 99°10'15"E
Cameraman 6	18°53'05"N 99°10'12"E , 18°53'06"N 99°10'15"E

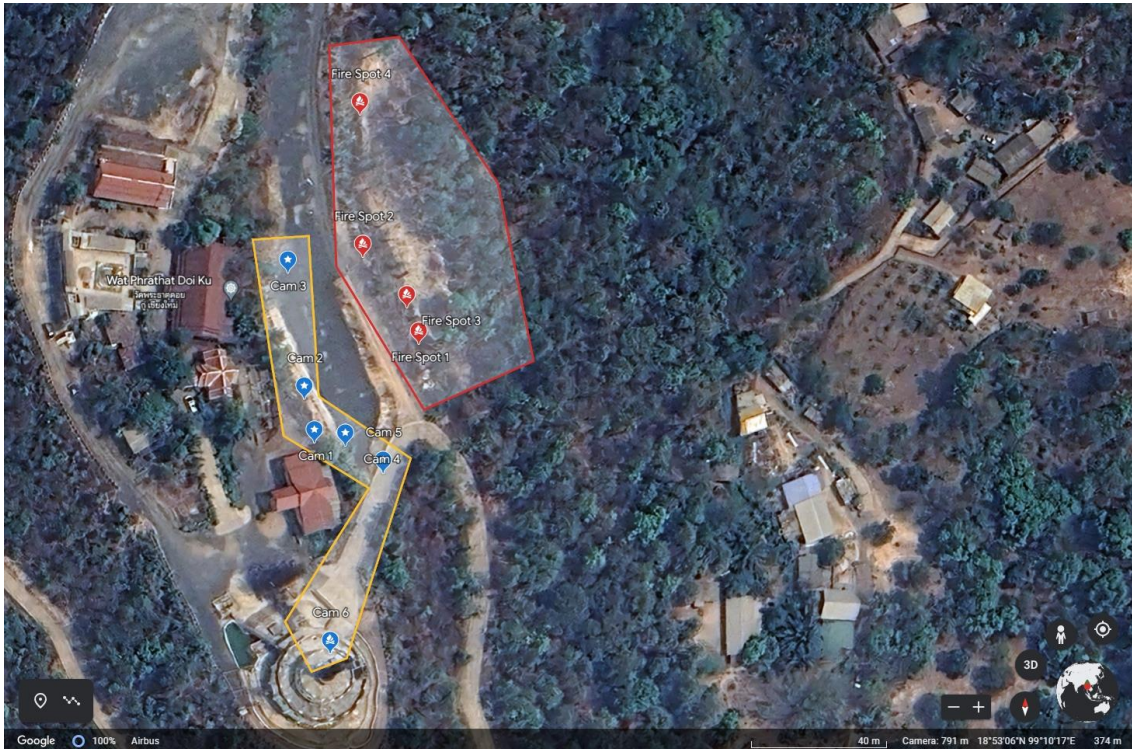


Figure 12: Locations of fire spots and cameramen.





Figure 13: Activities at the area 4.

Area 5: Pang Sak

There are 5 fire spots, as shown in the table below. The positions of all cameramen are shown in the table below and in Figure 14.

Fire spot 1	18°53'59"N 99°11'53"E
Fire spot 2	18°53'58"N 99°11'53"E
Fire spot 3	18°53'58"N 99°11'54"E
Fire spot 4	18°53'57"N 99°11'55"E
Fire spot 5	18°53'58"N 99°11'55"E

Cameraman 1	18°53'58"N 99°11'55"E
Cameraman 2	18°53'58"N 99°11'55"E
Cameraman 3	18°53'58"N 99°11'55"E
Cameraman 4	18°53'06"N 99°10'15"E , 18°53'05"N 99°10'15"E
Cameraman 5	18°53'59"N 99°11'55"E , 18°53'58"N 99°11'54"E , 18°53'58"N 99°11'55"E
Cameraman 6	18°53'58"N 99°11'55"E



Figure 14: Locations of fire spots and cameramen.





Figure 15: Activities at the area 5.

VI. Others

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



Huai Hak Area





Doi Koo Area



Pang Sak Area