PROJECT PLAN
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Effectiveness of Distributed Decision (Crowdsourcing) Wildfire Detection – Hummingbird Watch Evaluation

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BACKGROUND

Crowdsourcing uses modern technology to quickly gather input from large numbers of people to accomplish difficult, time intensive or distributed tasks.

Hummingbird, a British Columbia company, presented their wildfire detection crowdsourcing concept during the Wildfire Canada 2016 conference. Following up a successful live demo with their system, Hummingbird Watch, they also demonstrated their system in January 2017 to Alberta Agriculture and Forestry (AAF) and the BC Wildfire Service. FPInnovations has been asked by both agencies to evaluate the effectiveness of the system as a smoke detection method in an operational environment.

ISSUE/GOAL

How effective is a distributed decision (crowdsourcing) system as a wildfire smoke detection method?

OBJECTIVE

Collect the Hummingbird Watch operational trial data and compare with lookout tower and public reporting detection methods.

METHODS

Locations

Agencies will provide access to infrastructures to allow Hummingbird to connect designated cameras. A coverage area for each camera will be analyzed and then assigned to Hummingbird as a detection responsibility.

Operational Trial

Hummingbird will complete in-house testing with the cameras and then inform FPInnovations when the Hummingbird Watch system is ready for the operational trial.

When a smoke is detected by the Hummingbird Watch system, they will send a detection message to the agency and the researcher.

The smoke message will include the following information:

- Reported by Hummingbird
- Tower name
- Which camera or bearing from the tower
- Additional geo-reference information such as a land mark or distance from the camera
- What is burning
  - o Grass or trees?
- Fire spread information.
  - o Stationary?
  - o Slower or faster than a normal walking speed?
- Smoke colour?
  - o Light grey or dark grey to black?
- Smoke thickness
  - o Light or heavy?

Hummingbird will send the smoke image to the agency and researcher after reporting the smoke.

The agency, the researcher and Hummingbird will keep their own detection logs. These will include information on:

- Smoke image
- Detection time
- Detection message generation time
- Detection message content

A smoke generator may be used to generate simulated smokes if wildfire smokes do not occur during the operational trial.

Any false alarms will be analyzed. Detection messages generated on known or permanent smokes will be considered a positive false alarm. Detection messages generated on non fire phenomenon such as road dust and cloud shadows will be recorded as negative false alarms.

Any missed wildfire smoke will be analyzed by the researcher and Hummingbird.

The researcher will analyze service stability by recording downtime and technical difficulties during the operational trial.

Comparison

FPInnovations will collect any other detection messages generated through other detection methods at the same detection coverage areas by querying agencies' record storage. Hummingbird Watch performance will be measured and compared against both wildfire lookouts and public reporting.

TIMELINE

1. Hummingbird Watch setup and internal testing – June 2017
2. Complete operational trial 2017 – October 2017
3. Intern report – December 2017
4. Complete operational trial 2018 – October 2017
5. Final report – December 2018

PARTICIPATING MEMBERS/COLLABORATORS

Alberta Agriculture and Forestry

BC Wildfire Service

Jasper National Park

Hummingbird