Bee2Fire Detection

Pedro Vieira
Director at Compta - Smart Devices Division
Assistant Professor at Nova University of Lisbon
46 Years in the Market
Technology is with us!

WE ARE WRITING OUR SUCCESS WITH THE SUCCESS OF OUR COSTUMERS
Wildland fires – A Worldwide Problem

• Every year wildland fires are responsible for the loss of human lives, environment and economic damage

• The mitigation of this problem depends of different players, from governmental agencies, private companies and individuals.
  • Forest management
  • Risk assessment
  • Early detection
  • Decision support tools
  • Field infrastructure
  • Personal trained and equipped
Wildland fires – A Worldwide Problem

• Every year wildland fires are responsible for the loss of human lives, environment and economic damage

• The mitigation of this problem depends of different players, from governmental agencies, private companies and individuals.
  • Forest management
  • Risk assessment
  • Early detection
  • Decision support tools
  • Field infrastructure
  • Personal trained and equipped
01 FIRE DETECTION
- AUTOMATIC
- 365X24
- LOW RATE OF FALSE ALARMS

02 SURVEILLANCE
- INSPECTION
- 360°
- OPTICAL

03 DECISION SUPPORT SYSTEM
- FIRE PROPAGATION
- WIND BEHAVIOR
- FIRE BARRIERS
THREE DETECTION TECHNOLOGIES (PATENTED)

- Optical Spectrometry: detects smoke from fires up to 15km away through comparative analysis of sunlight spectra
- Thermal: detects fires up to 2km away through space-time temperature analysis
- Image: detects fire, up to 15 km, through visual recognition algorithms.
Always Looking for New Solutions

• Through
  • Inhouse research & development
  • Through partnerships with significant players

• IBM Watson contest
  • IBM Weather company for a better risk and fire behaviour assessment
  • IBM Watson Visual Recognition as a tool to integrate deep learning in the wildland fires early detection

Global Champion of IBM Watson Build 2018
FIRE DETECTION AND PREDICTION POWERED BY ARTIFICIAL INTELLIGENCE

the ultimate tool for automatic early detection of forest fires

act before it's too LATE
First 20 minutes are crucial!!!
The Solution

1) **Predicts**: constantly measures the "Fire Danger Level Forecast", powered by IBM Weather Company

2) **Detects**: early Fire Detection powered by IBM Watson AI Visual Recognition.

3) **Recommends**: estimates the fire propagation over the terrain and suggests where and how to act first.
Architecture

IBM Cloud

Virtual Server Instances

CORE PROCESSOR (Windows)

WEB INTERFACE MODULE (Linux)

Images

Classification Results

Weather Forecasts

IBM Watson

Visual Recognition

IBM

The Weather Company

End User
Fire Monitoring
System Access

Service login @ IBM Cloud
A 360 degree circular scan is performed by the camera.

“Fire Probability indication” per scanned image.

“Sequence of last images” to assist operator in decision making.
Operators get an immediate preview of the “FIRE DANGER LEVEL” for the next hours in “Monitoring” screen.

Longer period forecasts and more detailed predictions can be visualized here.
Detection

1) Image with high-potential of a fire situation was detected.

2) An ALARM is triggered with a “siren sound”

3) Operator makes the evaluation and indicates if it’s a “Real Fire” or “False Alarm”
In case of a “real fire situation” = location coordinates are added, operator can add a note and CONFIRM the alarm.

Upon confirmation, the firefighting entities (and others) are notified.
Firefighting Assistance (add-on module)

“Fire Evolution Module” to assist in firefighting measures and action plan.
“Drone Assistant Module” to provide additional data for “decision-making” support
Available “as-a-service”, capable of integrating existing standard HD cameras and consequently reducing costs and time of deployment.

Fast and accurate detection with expected very low rates of false alarms via Watson AI Visual Recognition and with very low dependency of human subjectivity, visual acuity, and fatigue.

Constantly evolves: self-learning capabilities, constantly improving its accuracy as the number of “fire”/”non-fire” situations occur.
Go-to-Market

Target Customers:

1) Municipalities, Counties, Local Government
   • Forest Protection, Civil Protection
   • Natural Parks Protection
   • Wildlife and Ecosystem protection entities

2) Forest Related Industries:
   • Celluloses, Pulp and Paper industry
   • Rubber, Cork, Wood Producers
   • Large Agricultural Plantations
   • Mining Industry

3) Industrial yards with highly inflammable materials:
   • Lumber yards
   • Tyre yards
   • Waste treatment yards and landfills
   • Chemical plants
Thank you

Pedro Vieira – pedro.vieira@compta.pt