Automated Image Interpretation of Hazardous Material Transport Incidents

Xiongming Dai,

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1.Project Objectives

- Develop a method of processing and analyzing images captured by the crowdsourcing and first-responders for assessing hazardous material transportation incident scene.
- The outcome of the project will be a component of a smart safety enhancement system that improves the responsiveness and effectiveness of emergency responders and hospitals in dealing with hazardous material transportation incidents.

1.Project Objectives

- **Input: Frames from a video**

Frame 1 → **Time track** → Frame N

1.Project Objectives

- **Output: Image Captioning**

A white car caught fire by the roadside, and many people were standing nearby.

2.Background

- When the hazmat incidents occur, effective emergency response is critical to minimize the impact of the incident.

A car with some toxic liquid pours.

The tanker caught fire.

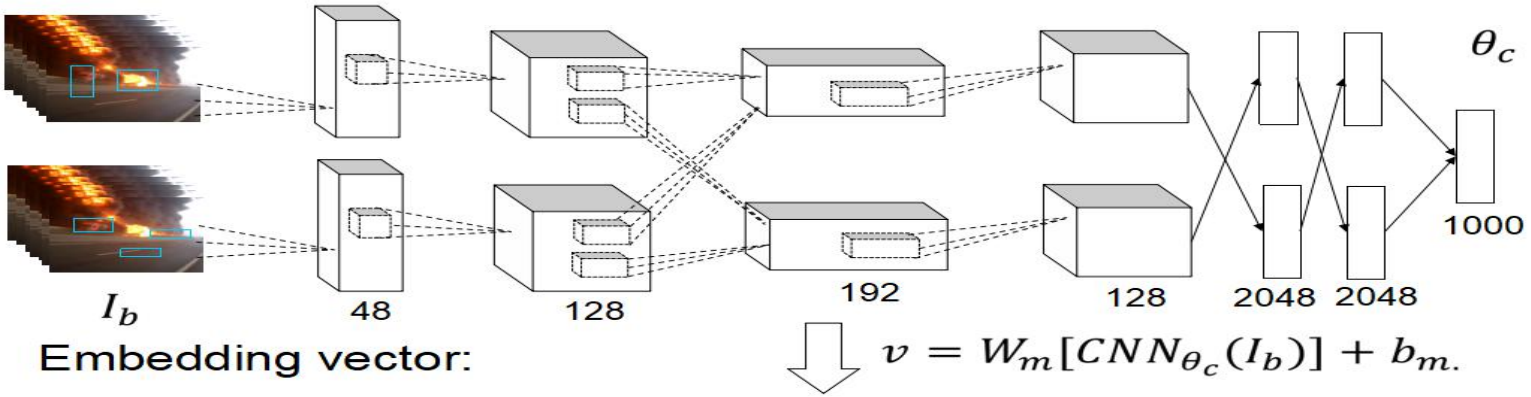
A car with firework exploded.

2.Background and application

- Traditional ways to identify the scene can be time consuming and affected by many subjective factors from first-responders.
- Image captioning can objectively and fastly evaluate and respond to the incident.

3.Methodology

1) Detection(by convolutional neural network)



3.Implementation

1) Detection (by convolutional neural network)

- 19 locations for detecting the objects based on Region- CNN
- The embedding vectors based on the pixels I_b

Inside the bounding box :

$$v = W_m[CNN_{\theta_c}(I_b)] + b_m.$$

Where $CNN_{\theta_c}(I_b)$ takes the image inside a given bounding box and returns the 4096-dimensional activations of the fully connected layer before the classifier, nearly 60 million parameters.

3.Purpose

1) Generate pixels vector representation

We can use neural network to train the parameters of weigths and biases for the superise learning. And then to extract some abstract pixels vector representation for associate objects. That is useful for detection classification and recognization.