Understanding Events in Multimodal Data

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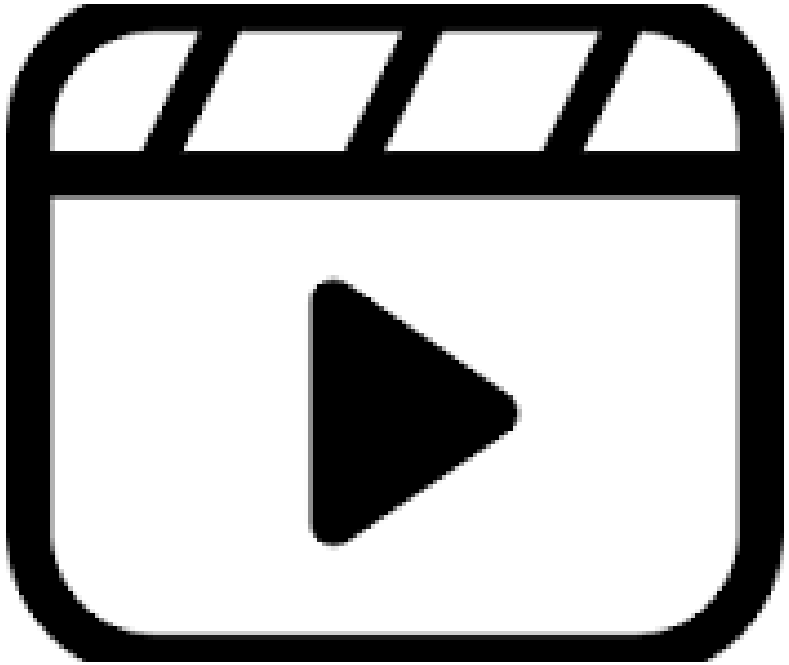
Department of Computer Science

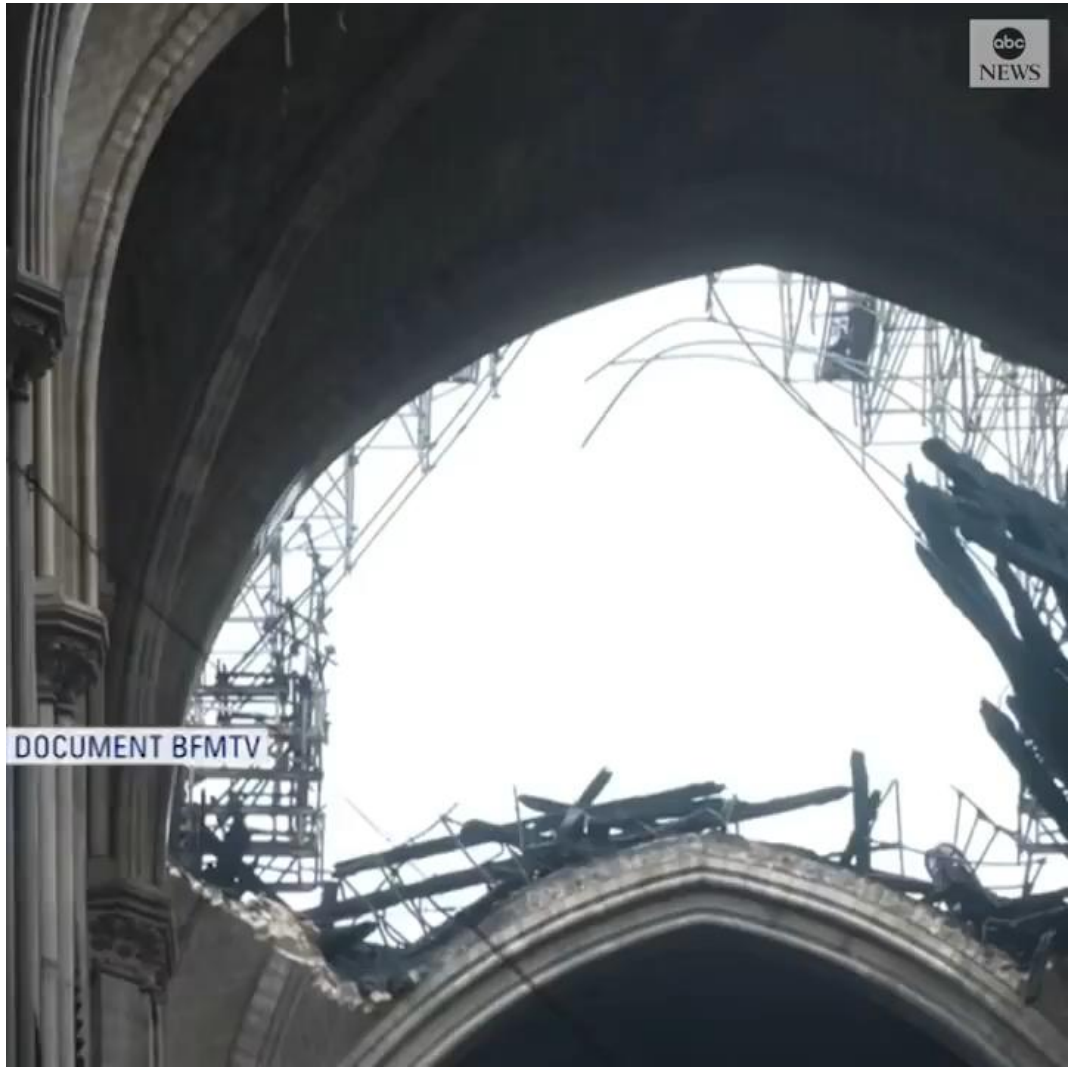
“The Notre-Dame de Paris was severely damaged in a fire”

“The Notre-Dame de Paris was severely damaged in a fire”



- 15 hour fire
- 4 year reconstruction

“The Notre-Dame de Paris was severely damaged in a fire”



Perspective

Perspective

Event Specifics

Perspective

Event Specifics

Time Frame

“The Notre-Dame de Paris was severely damaged in a fire”

(“induction problem”)

Episode 1

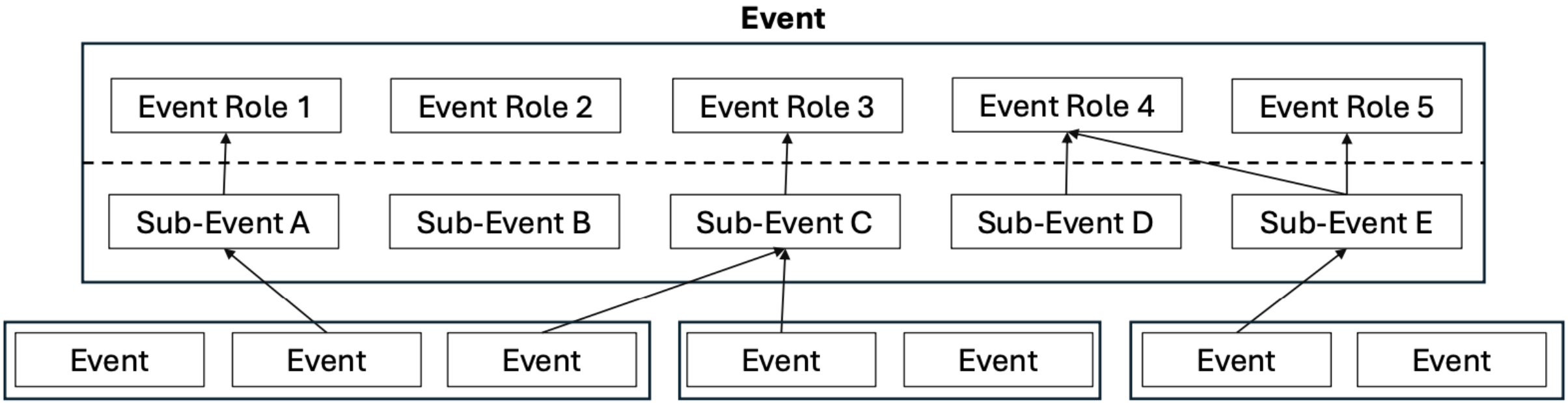
Episode 2

Episode 3

Video A

Video B

Video C



Video A

Video B

Video C

Disasters

Role	Question	Example
What	What emergency/disaster is occurring/has occurred?	Fire, earthquake, hurricane
Where	Where is the emergency/disaster occurring?	Australia, USA, movie theatre
When	When did the emergency/disaster occur?	Morning, last week, 2020
Outcome-Occurred	What was the outcome of the emergency/disaster?	Burned trees, collapsed buildings
Who-Affected	Who was affected by the emergency/disaster?	People huddled together, animals running for cover
Emergency-Response	Who is responding to assist those affected by the emergency/disaster?	Firefighters, doctors,politicians

AFP

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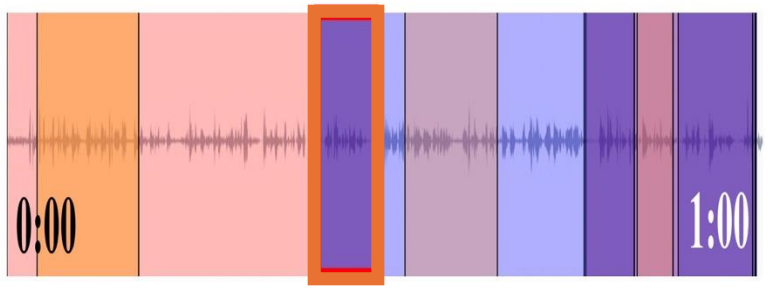
Temporal Information



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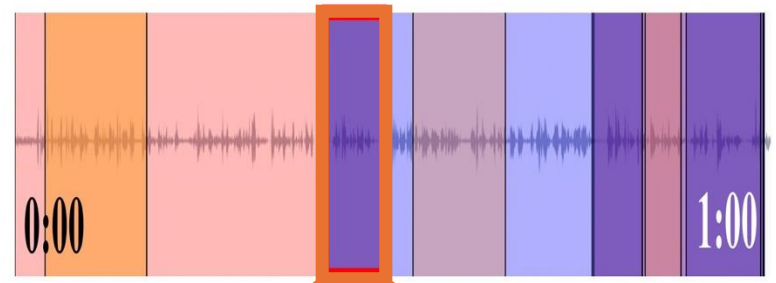
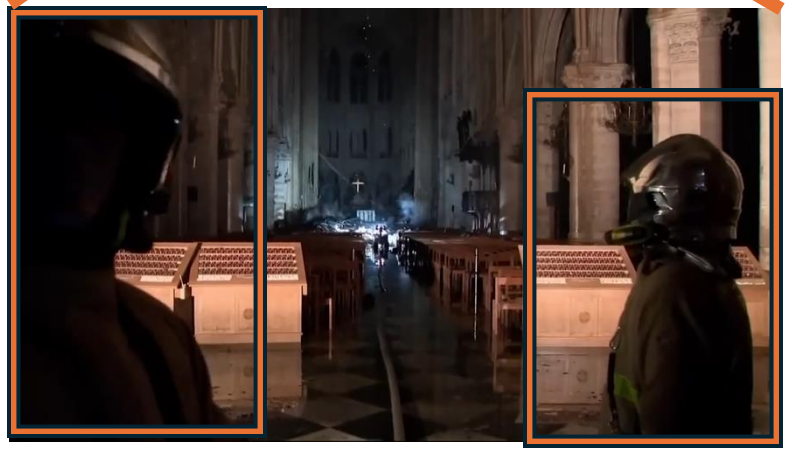
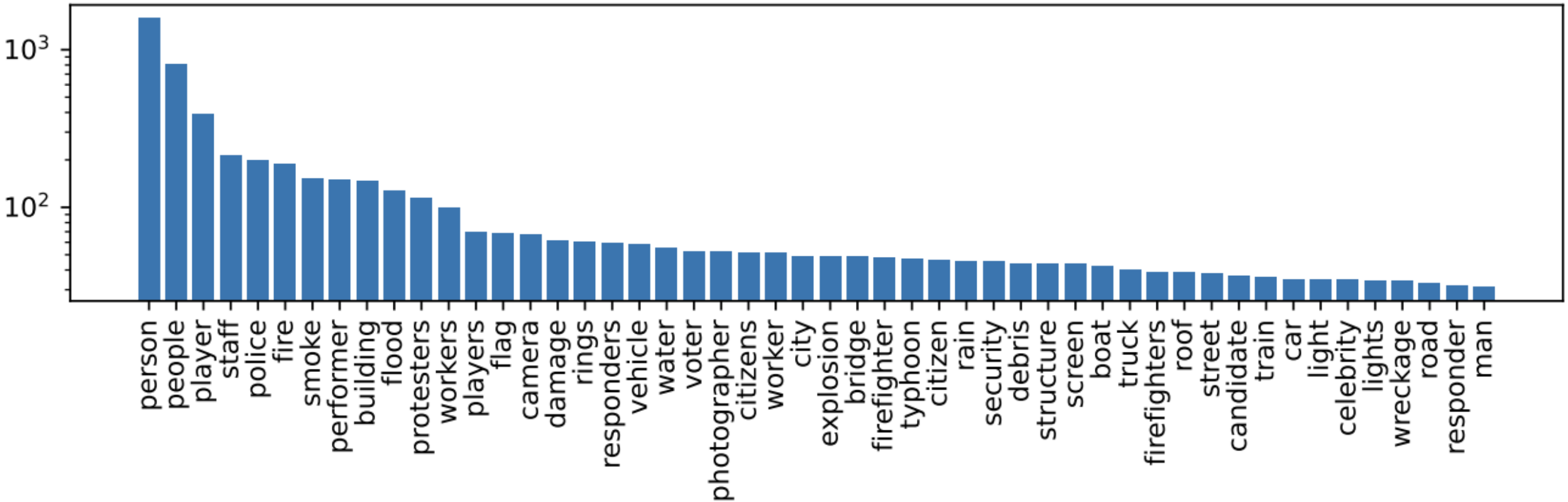




Spatial Information

Template	AR	ZH	EN	KO	RU	Total
Emergency	99	69	121	118	81	487
Election	0	17	23	20	5	65
Political	17	34	60	33	33	177
Demonstration	9	30	31	18	29	117
Social	0	33	58	20	21	132
Sports	0	6	50	0	5	61
Discovery	0	45	71	0	13	129
Total	**125**	**234**	**414**	**208**	**187**	**1168**

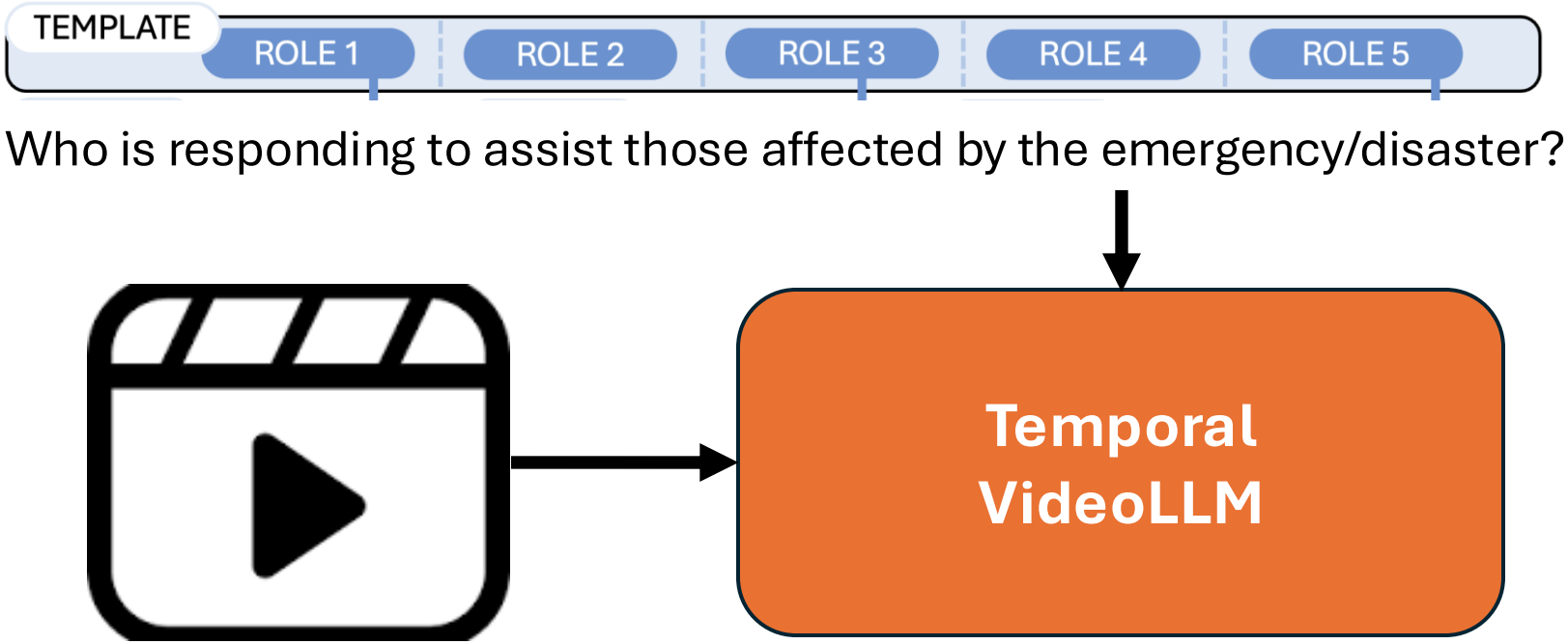

10^3
10^2
person
people
player
staff
police
fire
smoke
performer
building
flood
protesters
workers
players
flag
camera
damage
rings
responders
vehicle
water
voter
photographer
citizens
worker
city
explosion
bridge
firefighter
typhoon
citizen
rain
security
debris
structure
screen
boat
truck
firefighters
roof
street
candidate
train
car
light
celebrity
lights
wreckage
road
responder
man

Temporal Role Localization

Temporal Role Localization

Who is responding to assist those affected by the emergency/disaster?

Temporal Role Localization



Temporal Role Localization

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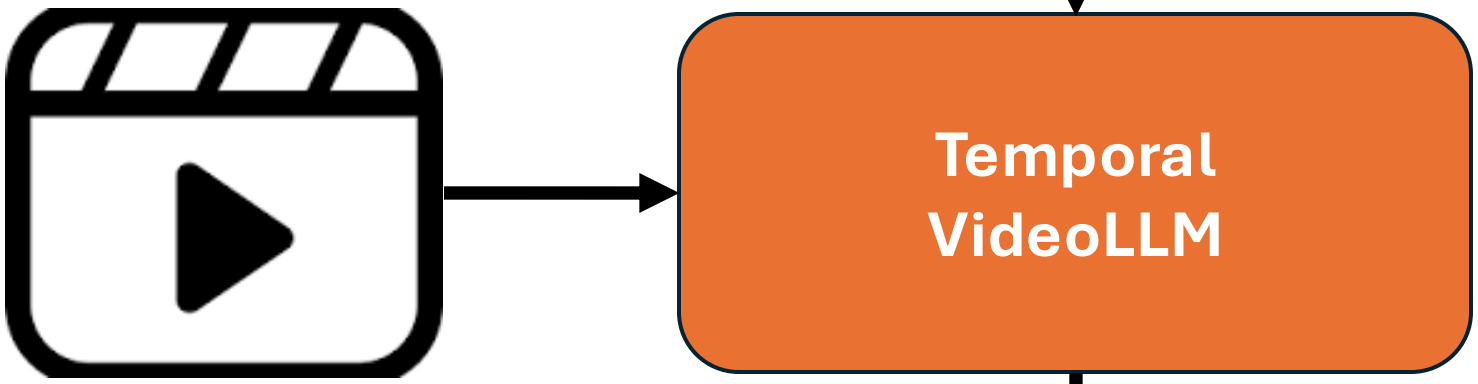

The video shows fire fighters arriving at the scene at [0:15-0:30]

The video shows police blocking streets near the building [1:45-2:00]

Spatial Role Localization

Who is responding to assist those affected by the emergency/disaster?

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“Firefighters [0:15-0:30]”

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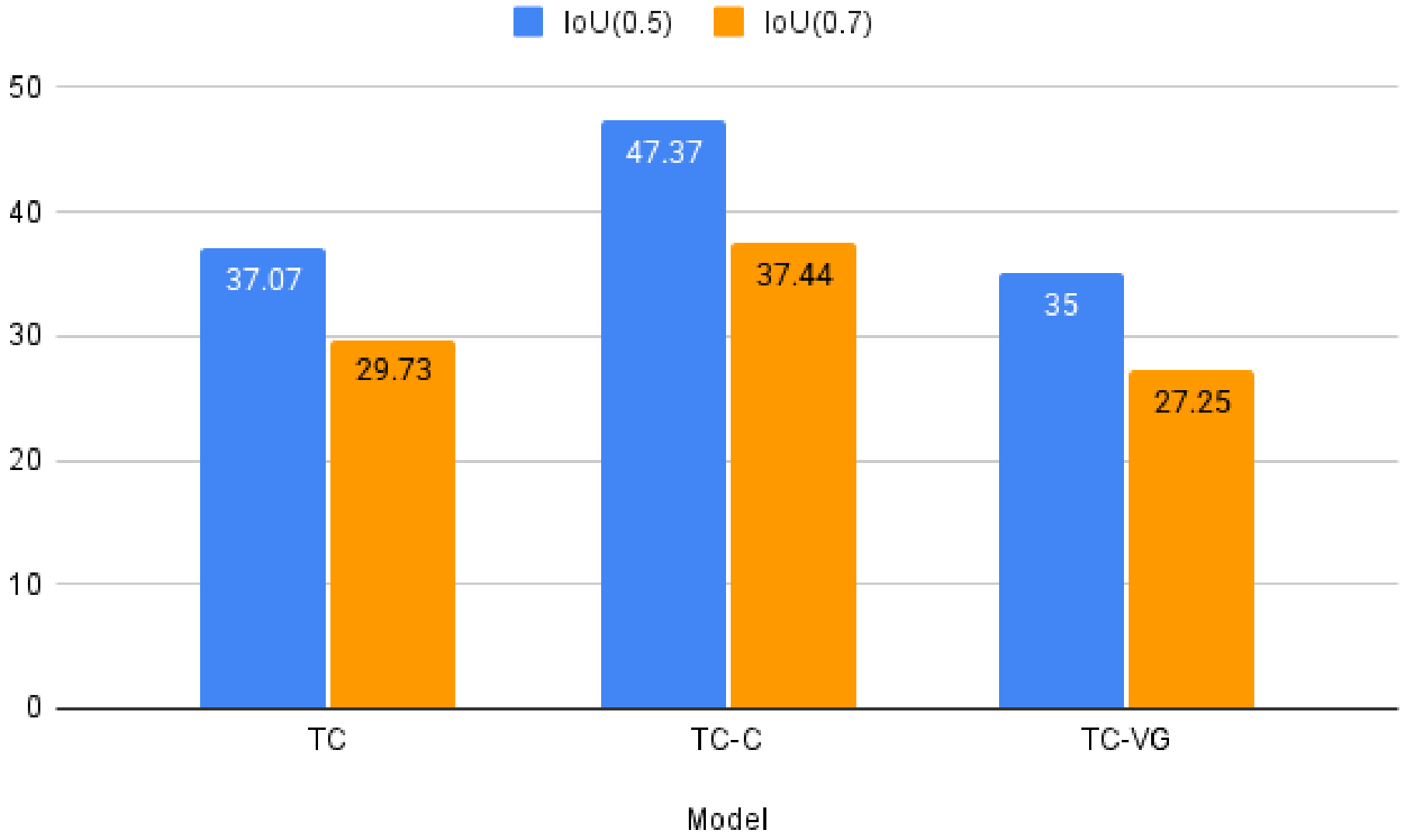
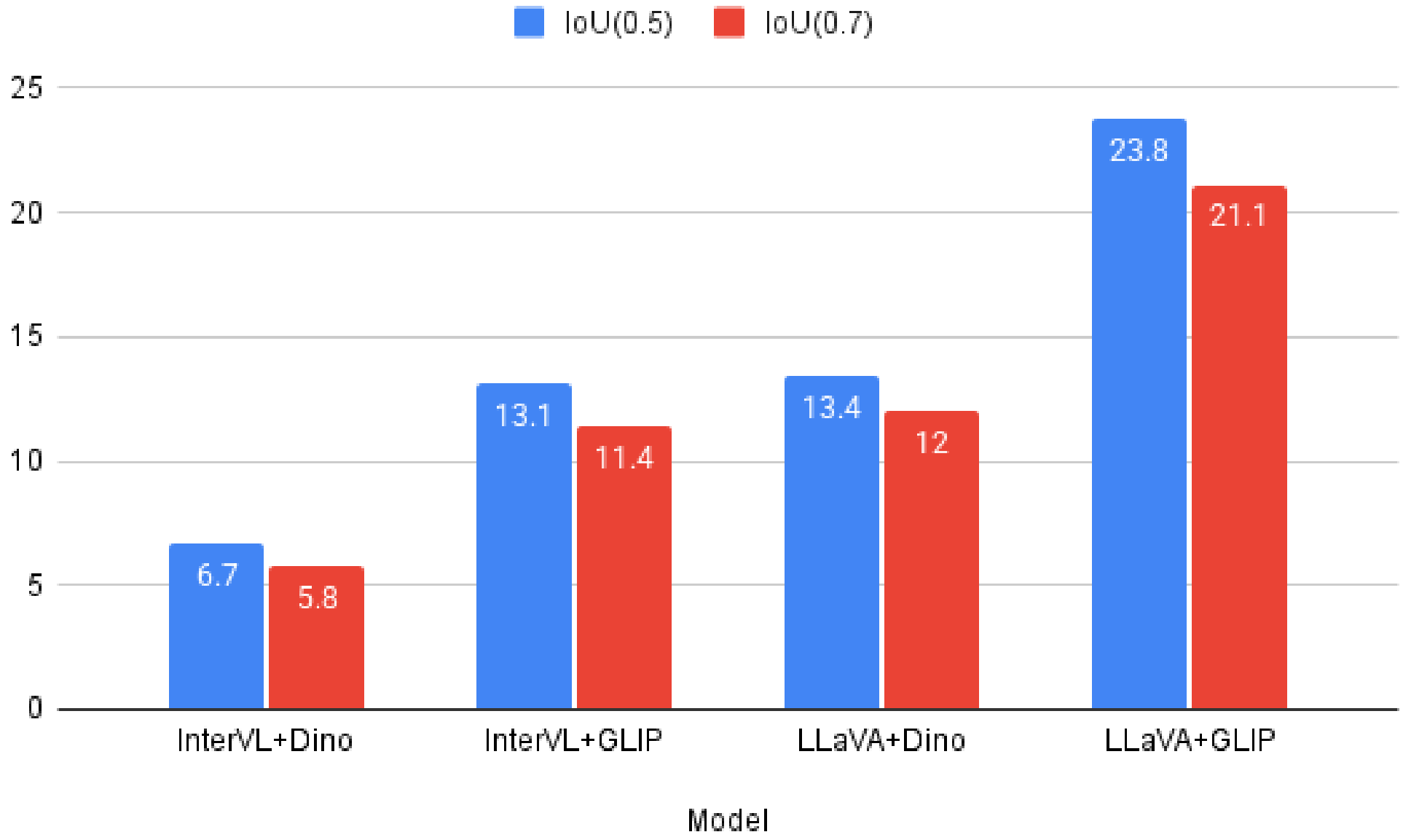
Grounding Model

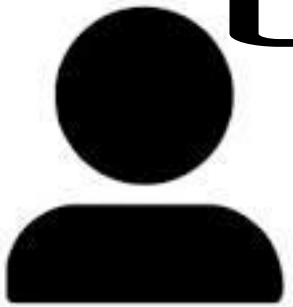
Temporal Localization



Spatial Localization

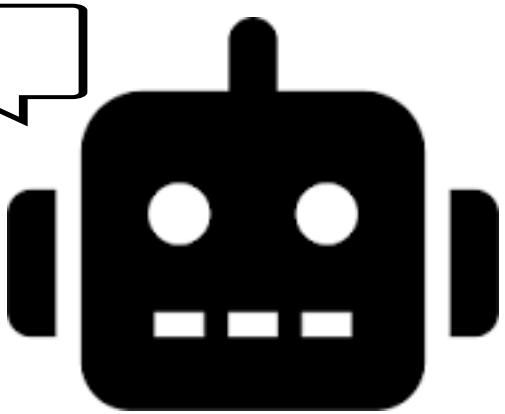


Applications: Grounded Article Generation

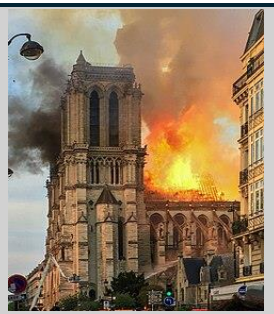


Can you tell me about the Notre-Dame Fire?

Sure!



On 15 April 2019, a structural fire broke out in the roof space of Notre-Dame de Paris, a medieval Catholic cathedral in Paris, France.

The fire destroyed the cathedral's wooden spire (flèche) and most of the wooden roof and severely damaged the cathedral's upper walls.

By September 2021, donors had contributed over €840 million to the rebuilding effort.[9] The cathedral reopened on 7 December 2024 after three years of reconstruction.[10][11]