

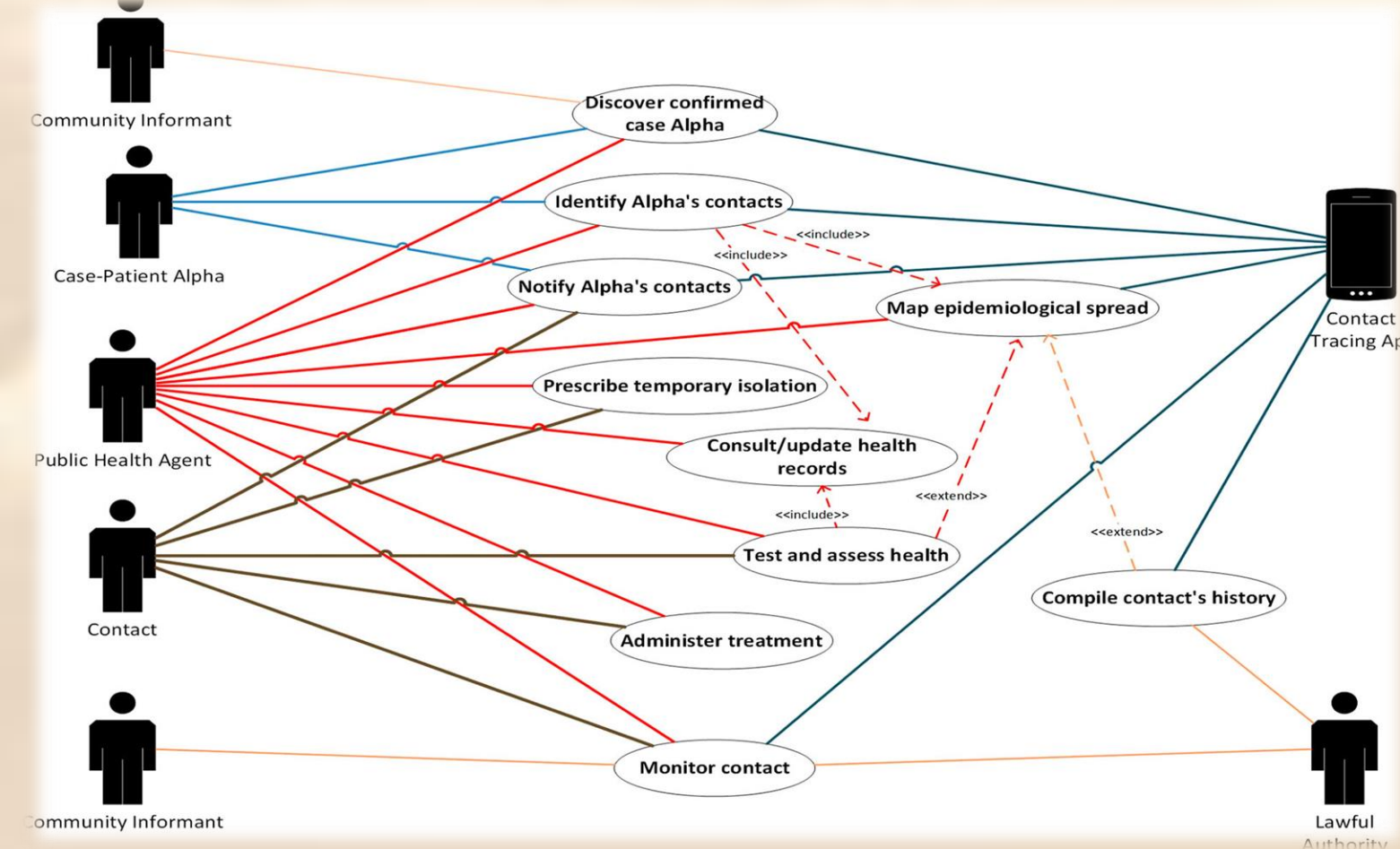


Data privacy in volcanic hazard scenarios

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DIGITAL CONTACT TRACING

- Contact tracing is defined as «the identification and examination of relevant contacts of infectious cases, testing for the presence of infection or disease and, if necessary, provision of appropriate therapy before the occurrence of serious illness» (Glasauer et al., 2020).
- The first known form of contact tracing dates back to a smallpox epidemic that took place in England in the late 18th century (Boylston, 2014).
- The Covid-19 pandemic represents the turning point from conventional contact tracing to digital contact tracing.



Contact tracing as an information system (Source: Spears & Padyab, 2023).

CROSS-BORDER THREATS TO HEALTH

- The European Union has adopted legislation on serious cross-border threats to health (Regulation 2022/2371/EU).
- In the EU, it is mandatory for member states to communicate contact-tracing findings concerning serious cross-border health threats through an electronic information system known as the Early Warning and Response System (EWRS).
- In cases of severe cross-border health threats to the EU, public authorities have the authority to restrict individual freedoms to a great extent.

PRIVACY VS THREATS TO HEALTH

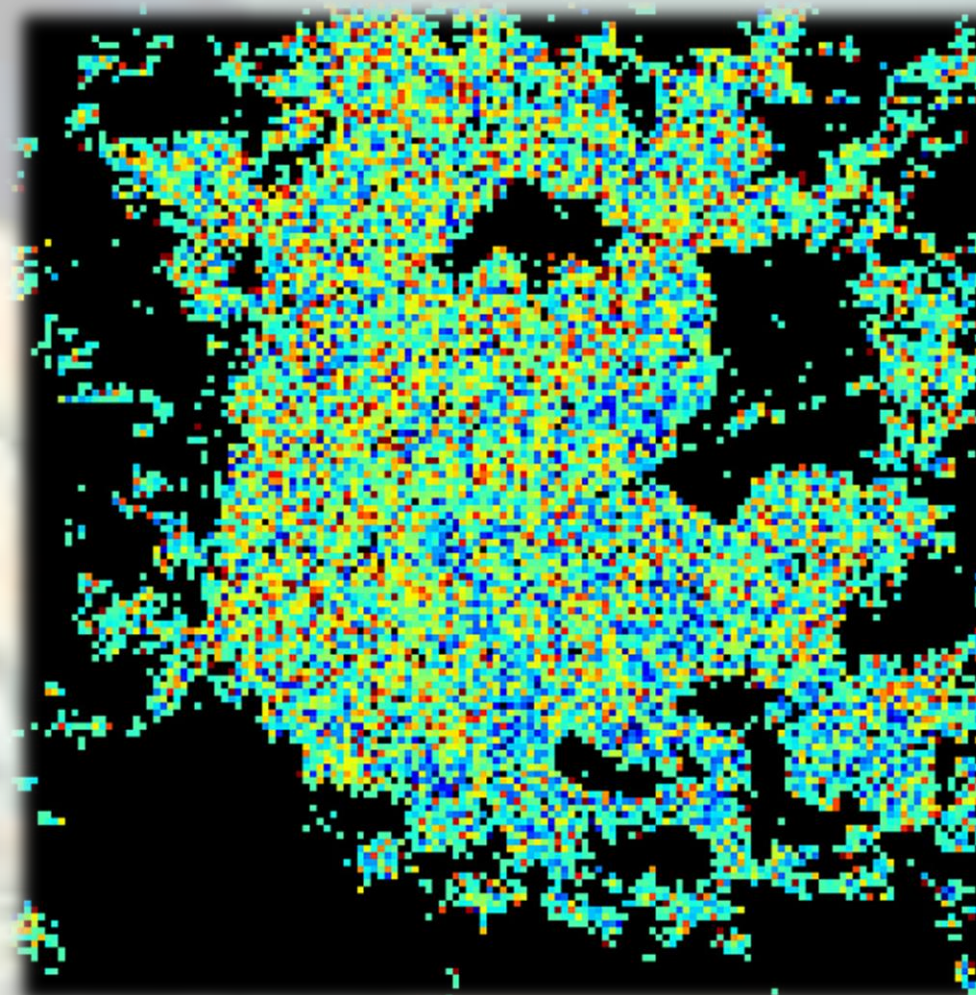
- In the European legal framework, the right to privacy is safeguarded both in the ordinary and in the derivative sources of law.
 1. As of the first, it is enshrined in article 8 of the European Convention on Human Rights and in articles 7 and 8 of the Charter of Fundamental Rights of the European Union.
 2. As of the second, an entire legal regulation on the protection of personal data is contained in the Regulation 2016/679/EU, the so-called General Data Protection Regulation or GDPR, which is considered being the strictest personal data protection regime in the world.
- The right to privacy is not absolute but can be limited when this is in accordance with the law, in the interest of a legitimate aim, necessary and proportional.
- Protection of public health is considered a legitimate aim and therefore legitimizes the limitation of the right to privacy and protection of health data. Furthermore, both the ECHR and the CFREU allow for derogation from fundamental rights in the event of public emergencies “threatening the life of the nation”.
- Even the GDPR allows for the possibility of derogating from the strictest data protection regime for health data in the event of serious cross-border threats to health.

Mobile phone location data for disasters

- Recently, mobile phone data has been utilized in many applications for disaster response and recovery, given its high spatial and temporal granularity, scalability to analyze millions of individuals’ mobility, and increasing availability.
- The studies using mobile phone data for natural hazard response and recovery are categorized into 3 categories of applications (T. Yabe et al, 2022): population displacement and evacuation modeling, longer-term recovery analysis, and inverse inference of damages to the built environment.
- Security has been provided to the public in several countries worldwide by using Wireless Emergency Alerts (WEA) or Cell Broadcasting applications over the past few years. However, the use of applications dedicated to the management of the emergency phase in natural disasters is still developing.

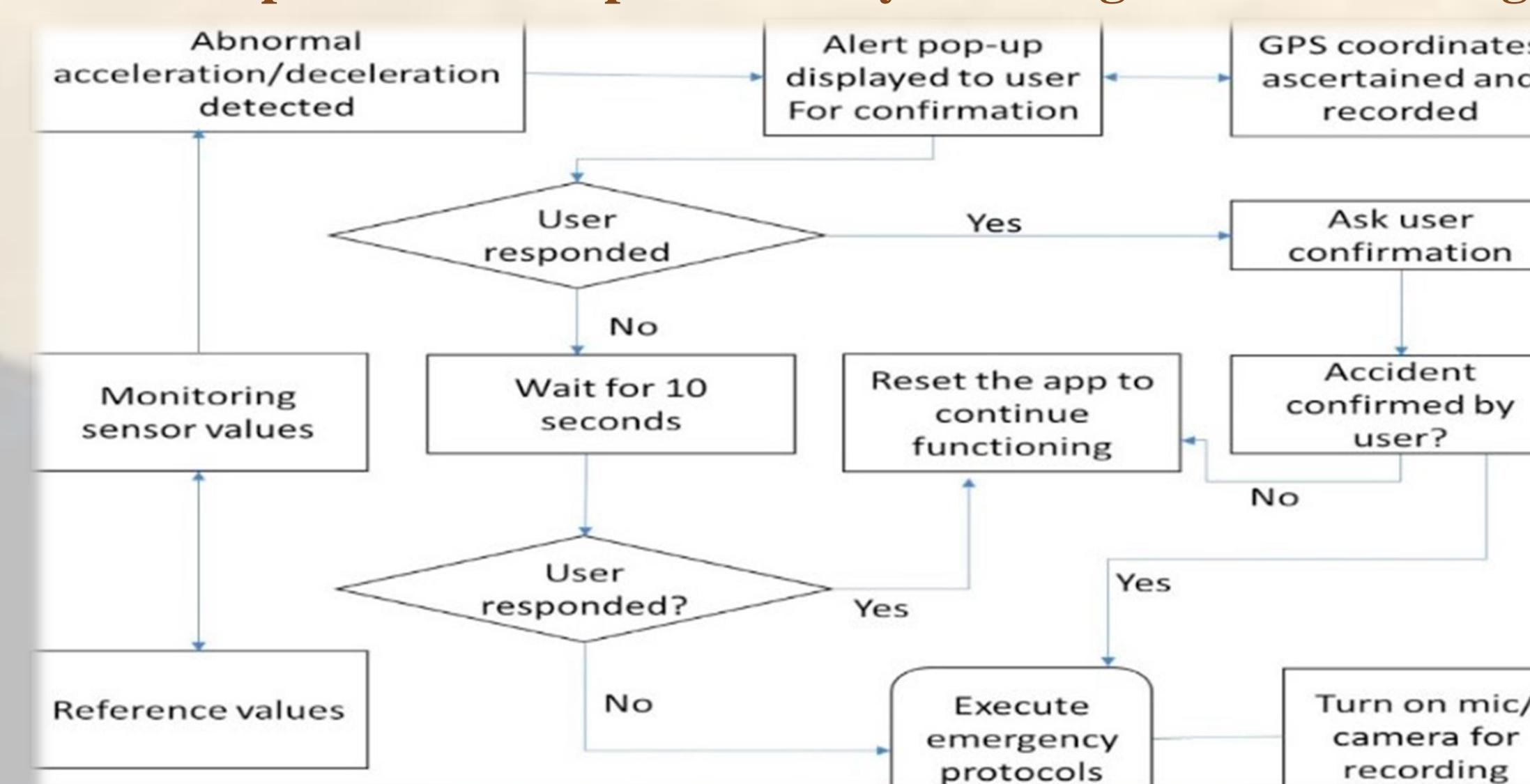
Volcanic hazard scenarios

Determine the dynamics of population displacement and evacuation after disasters to predict post-disaster mobility patterns, and better organize relief operations, including the repositioning of distribution centers.



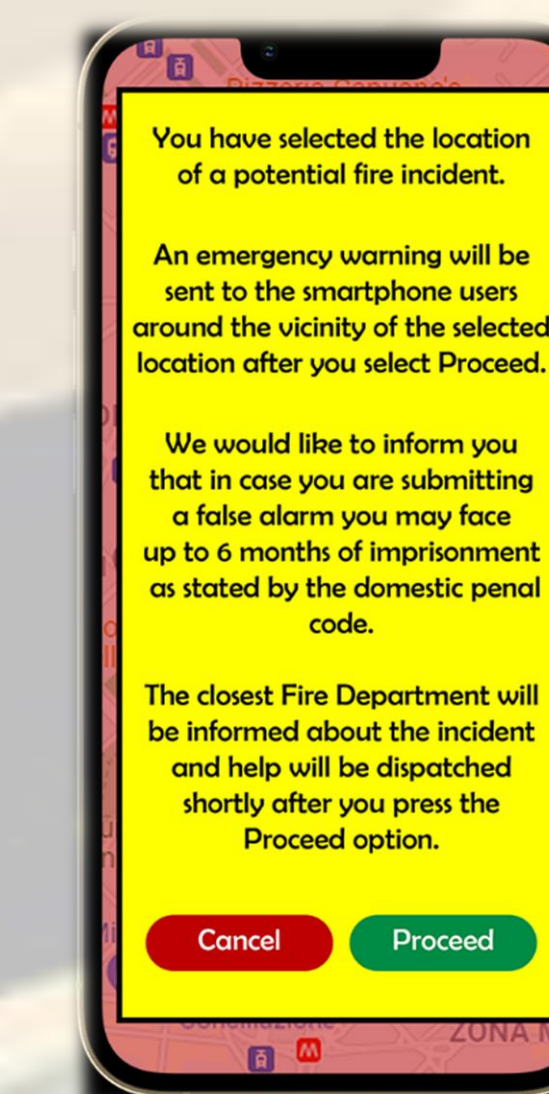
Population displacement after the Puebla Earthquake in Mexico City (Source: Yabe et al., 2021).

Develop a disaster notification system aimed at cautioning the user about natural disasters. This system should be integrated with the disaster portals of the public entity in charge of undertaking the seismic and volcanic surveillance.



Flowchart describing the process flow of the LifeSaver app, aimed at saving lives during accidents and emergencies related to road traffic (Source: Gokul Lal et al., 2020).

Develop a smartphone-based application that supports all the functionalities required to provide assistance to the user, including the possibility of sending emergency warnings.



Warning Screen of Ignis Aiuto app (Source: Bosi, 2021).

Italian case study: “It-alert”

- In Italy, The “Department of Civil Protection” of the “Presidency of Council of Ministers” created the application “IT-Alert”, which operates exclusively for the following civil protection hazards:
 1. Nuclear accident or radiological emergency situation;
 2. Major accident at industrial facilities;
 3. Collapse of a large dam;
 4. Volcanic activity in the areas of the Phlegraean Fields, Vesuvius and the island of Vulcano.
- IT-alert is exclusively used in case of activation of the operational phase of "alarm." The Department of Civil Protection activates this phase in collaboration with the Campania and Sicilian Regions.

- In case of potential imminent eruptive activity in the areas of the Phlegraean Fields, Vesuvius, and the island of Vulcano, these kind of IT-alert messages will be sent:
 - a) “Civil Protection Alert DD/MM/YY at 00:00 – Possible volcanic activity at the Phlegraean Fields/Vesuvius. ONLY FOR THE RED ZONE: START EVACUATING. Keep up to date and follow the instructions of the authorities”;
 - b) “Civil Protection Alert DD/MM/YY at 00:00 – Possible volcanic activity at Vulcano. START EVACUATING: Reach the waiting area provided in the Civil Protection Plan. Keep up to date and follow the instructions of the authorities”.



- No personal data of the message recipient is processed (collected, stored, consulted, etc.).
- IT-alert messages run via the cell-broadcast system.
- This technology allows phone operators to send messages to anyone - without distinction and impersonally - located in the proximity of the affected area covered by specific transmission cells of the cell network in a defined territory.