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Concept of eCall for Transportation of Dangerous Goods

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INTRODUCTION

In all areas, we can observe progress in the use of modern technologies to enhance safety. Transport is no exception. An interesting and current topic is the eCall device, which is designed to connect a vehicle to a Public Safety Answering Point (PSAP) in the event of an accident.

In accidents involving vehicles transporting dangerous goods, there is a risk of these substances leaking into the environment, posing significant threats to both nature and human life. Limiting their impact is critical and requires a timely and effective response. One way to achieve this is by increasing the amount of information that PSAPs receive.

This contribution proposes a simple solution to provide information about the transported dangerous cargo to PSAPs. This approach aims to enhance the preparedness of response units, improve their efficiency, reduce response times, and thereby minimise potential risks associated with accidents involving vehicles transporting dangerous goods.

MATERIALS, METHODS & IMPLEMENTATION

The baseline solution is the current concept of the eCall device. It relies on in-vehicle sensors such as an accelerometer, gyroscope, and GPS. Additionally, an airbag activation sensor can also be used. In the event of a serious traffic accident, as indicated by these in-vehicle sensors, the vehicle is connected via voice to a PSAP, and a Minimum Set of Data (MSD) message is sent simultaneously. eCall can also be activated manually by pressing a button inside the vehicle. The Minimum Set of Data includes: vehicle type, VIN (Vehicle Identification Number), number of occupants, vehicle direction and vehicle location. Currently, no system integrates eCall devices into heavy goods vehicles. In the development of such a system, the type of cargo being transported, especially dangerous cargo, should be considered.

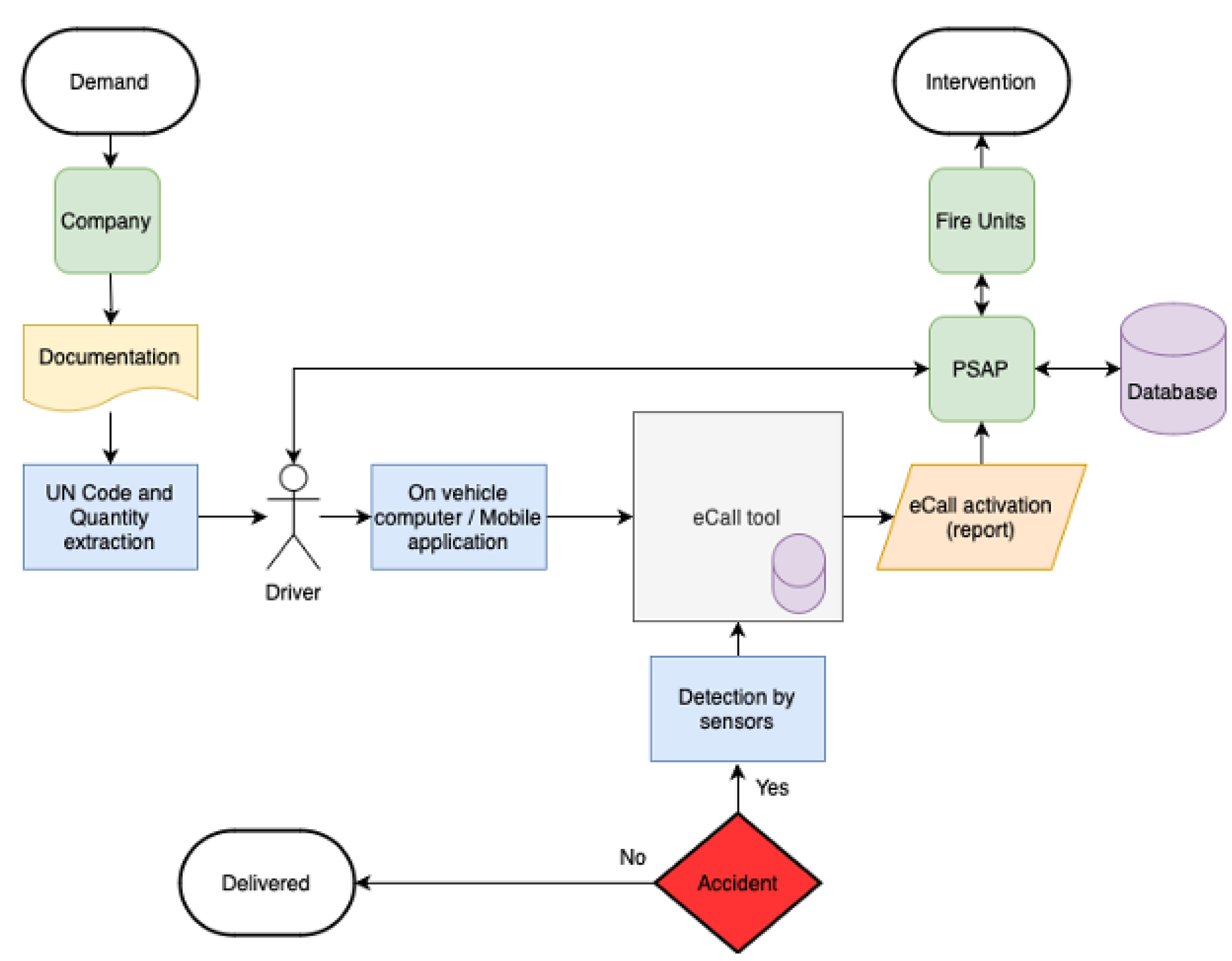
RESULTS

By applying the original eCall principle in combination with an onboard in vehicle computer or an application, we can enhance the input information sent to the PSAP in the event of an accident. We propose two options:

1. Integration of the onboard computer with the eCall system, allowing the upload of the hazardous material's identification number (UN code) and its quantity.
2. Create an application linked to the eCall device via Bluetooth, enabling the input and transmission of information about the hazardous material being transported.

The proposed model ensures that a company provides documentation on transported materials to the driver, who extracts the UN code and quantity, entering them into either an onboard computer or a mobile app. This data is stored in the eCall device, which is linked to accident-detecting sensors. In case of an accident, the eCall system activates, sending a report with the MSD, UN code, and quantity of dangerous goods while initiating a voice call with the PSAP. This allows emergency responders to receive critical information before arriving at the scene. The UI is designed for ease of use, requiring only the UN code and quantity. The PSAP can then retrieve substance details from its database and relay them to responders.

MODEL



CONCLUSION

The solution addressed in this contribution supports current advancements in technology and the Internet of Things concept. Applying eCall into the transportation of dangerous goods offers several benefits that directly impact rescue efforts. The primary advantage is the transmission of accident information directly to the PSAP, along with details about the transported hazardous substance and its quantity. By implementing and extending eCall to HGVs, specifically for dangerous goods, the safety of response units can also be enhanced by reducing the time required to identify the transported hazardous material. By understanding the source of the hazard, appropriate measures can be taken to minimise potential threats, as well as potential future damages.

THE PROPOSED SOLUTION INCREASES THE SITUATIONAL AWARENESS OF RESPONSE TEAMS, AS THEY WILL ALREADY BE INFORMED OF POTENTIAL RISKS EVEN BEFORE ARRIVING AT THE ACCIDENT SITE. THE SOLUTION DESCRIBED IN THIS CONTRIBUTION IS RELATIVELY SIMPLE TO IMPLEMENT, AS IT PRIMARILY INVOLVES THE EXTENSION OF AN EXISTING SYSTEM AND DEVICE AND COULD BE EASILY USED WITHIN EXISTING ENVIRONMENT.

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