

Please read the following text carefully.

Afterwards we will ask you to draw a *Mind Map* around the predefined knotpoint:

"Which risks and benefits come to your mind when considering the use of robots in search and rescue missions?"

Search and rescue robots are a new type of robot designed to search for and rescue people in disaster situations (earthquakes, collapsed buildings, contaminated areas, etc.). Search and rescue robots, such as drones and ground robots, can operate in dangerous and contaminated areas that would otherwise be inaccessible to human rescuers. By performing tasks such as visual inspection of damaged structures, searching for victims, mapping the affected area, clearing debris, providing vital supplies, and autonomously assisting in the rescue of victims, these robots can improve the efficiency of rescue operations.

Since search and rescue robots are still in the development phase, it is important to consider the ethical aspects (= benefits and risks) of search and rescue robots.

Search and rescue robots

Possible benefits of search and rescue robots could include:

- Access to areas that are unreachable or too dangerous for human rescuers
- Reliable performance, especially for tasks that require precision and accuracy
- Autonomous rescue capabilities that allow robots to locate and bring victims to safety

Possible risks of search and rescue robots could include:

- Algorithms guiding the rescue robots could be biased, leading to unfair or discriminatory outcomes, especially regarding where to focus rescue efforts and whom to search for and rescue first
- The level of autonomy of rescue robots in search and rescue operations could raise the question of whether remote control of robot operations in precarious situations is preferable to full autonomy
- Rescue robots could be misused, especially in warfare

The development of search and rescue robots is still in its early stages. You can contribute to the development of ethically safe robots for search and rescue missions. For this purpose, we would like to find out your attitudes and feelings towards rescue robots. To this end, we have predefined the central concepts "search and rescue robots," "benefits," and "risks" at the center of your mind map. From these given concepts, only the emotional evaluation and not the text can be changed.

We ask you to draw your thoughts and feelings regarding the question *"Which risks and benefits come to your mind when considering the use of robots in search and rescue missions?"* in your Mind-Map. For this, you should draw all the benefits and risks that come to mind regarding search and rescue robots around the given concepts "search and rescue robots," "benefits," and "risks."

Please read the following information on soft robots carefully.

Afterwards we will ask you to adjust your *Mind-Map*.

Currently, there is a trend towards using a new type of so-called soft robots for search and rescue missions. Soft robots are a new kind of robot which are designed to mimic the properties of living entities such as animals. Unlike normal robots, which are typically composed of hard materials like metal or hard-plastic, soft robots do not have electronic devices in them and are made of flexible, soft materials like silicone. They often have natural shapes and can bend, twist, and stretch like living organisms, such as snakes or octopi. Designed with inspiration from living entities, these soft robots often look and feel more lifelike than rigid robots.

An example of a soft rescue robot is the 20-meter-long RoBoa from ETH Zurich. This robot is a hybrid construction that combines a soft body with a camera-equipped head mount. Due to its snake-like design, it can move through tight spaces and navigate unstable ruins. RoBoa can identify victims and deliver water and liquid food through a pumping system. Although it could be equipped with artificial intelligence for autonomous navigation, it is currently still remotely controlled.

Soft robots for search and rescue missions

Possible benefits of soft robots for search and rescue missions could include:

- Access to areas that are unreachable or too dangerous for human rescuers
- Delivery of vital supplies (water, food, medicine) until victims are safely rescued
- Reduction of injury risk for victims due to their flexibility and adaptability

Possible risks of soft robots for search and rescue missions could include:

- The soft and adaptable nature of soft robots could potentially lead to damage to the robot in dangerous environments
- Algorithms guiding the soft rescue robots could be biased, leading to unfair or discriminatory outcomes, especially regarding where to focus rescue efforts and whom to search for and rescue first
- Due to their flexibility, soft rescue robots might be less precise in certain tasks that require high accuracy

After reading the information about soft rescue robots, we would now like to ask you to adjust your Mind-Map. You can add new advantages and disadvantages or delete already drawn concepts.