

HBKU Thematic Research Grant 2nd Cycle– Project Highlight

Project Title: Decision-Making in Autonomous Ariel Vehicles during Critical Missions: A Policy Perspective on Ethical AI



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Executive Summary

Can artificial intelligence (AI) understand and respect ethical values in critical missions? Can AI be customized to respect the local population's ethical standards? Can ethics standards be encoded in the AI algorithm?

AI is becoming a major driving force in automation and digital transformation efforts globally. AI helps to solve problems and enables autonomous decisions in different sectors, e.g., unmanned ariel vehicles drone technology and autonomous vehicles. Even though AI is utilized in different industries or sectors, the ethical aspects of AI actions need to be studied with respect to respecting society's values and norms. Ethical AI and machine ethics are becoming a global requirement for enabling AI-based autonomous systems without human operators. As a community, we need to minimize the risk of using AI in autonomous systems through inclusive, fair, and human-centric approaches. Designing human-centric AI for autonomous decision-making in mission critical applications, such as drone rescue operations or challenging autonomous vehicle scenarios, is extremely difficult. Our approach is distinct from previous efforts because we 1) choose autonomous ariel vehicles as an emerging application domain with many interesting critical scenarios and 2) aim to use a human-centric approach to develop the ethical framework to handle the decision-making dilemmas.

Expected Outcome

We have the following expected outcomes:

Policy Framework: Human-centric AI ethics policy framework for autonomous UAVs in critical missions. We focus on privacy and fairness as core ethical dimensions.

Intellectual Property (copyright): Integrated implemented ethical artificial intelligence decision-making model. The ethical agent will consider the missions objectives, UAV constraints, and ethical factors.

Prototype: Simulation environment prototype to validate the integrated UAV autonomous decision-making model and building block to validate more ethical dimensions in the future.

Collaborating HBKU entities:

College of Science and Engineering (CSE) - Dr. Aiman Erbad, Dr. Ala Al-Fuqaha, Dr. Mohammed Abegaz

Qatar Computing Research Institute (QCRI) – Dr. Ghanim Al-Sulaiti

College of Public Policy (CPP) – Dr. Evren Tok

Schematics:

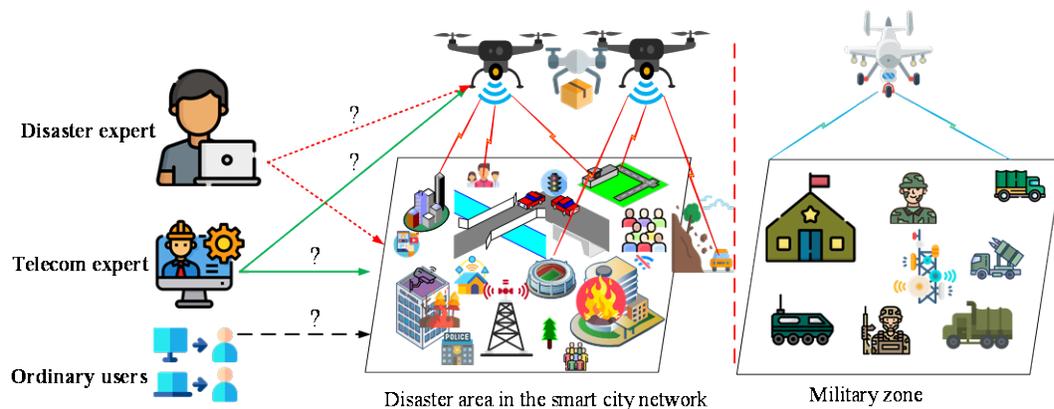


Figure 1: Aerial vehicle-assisted disaster operation

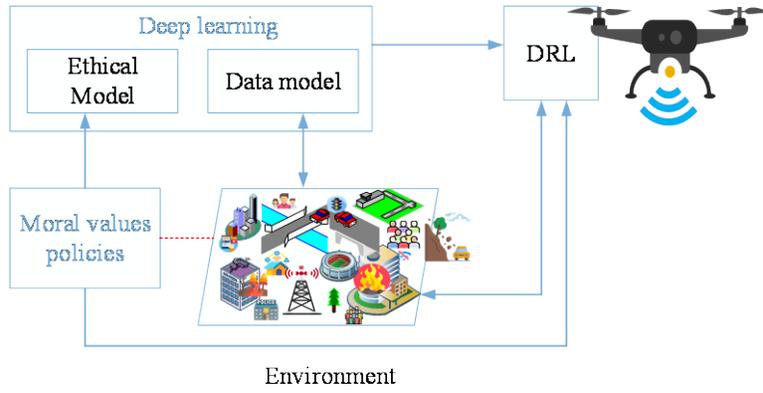


Figure 2: learning framework with ethical model