UL 3115

Outline of Investigation for Safety of AI-Based Products

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Summary of Topics

This Third issue of the Outline of Investigation for Safety of AI-Based Products, UL 3115, dated June 18, 2026, covers safety evaluation requirements of AI-based products including both AI embedded products and digital AI products.

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Foreword

The landscape of Artificial Intelligence (AI) is evolving with unprecedented speed, introducing AI-based functionalities into a broad spectrum of consumer and industrial products. This evolution is marked by significant milestones such as the advent of Machine Learning (ML), the resurgence of Deep Learning (DL) technologies and emergence of Generative AI (GenAI) and physical AI. These advancements have found applications across various sectors, enhancing wellness, convenience, productivity, efficiency, and innovation. However, if misused or malfunctioning, AI can cause significant harm, both unintentional and intentional. These systems are also vulnerable to malicious attacks that can manipulate their functionality or compromise sensitive data. Additionally, improperly trained AI systems can result in unethical outcomes, particularly impacting specific groups of people. Unsafe AI systems pose risks such as physical harm, financial loss, social disruption, and loss of public trust in AI technologies.

Given the rapid integration of AI technologies, including notable recent advancements like Generative and Large Language Models (LLMs) such as OpenAI's ChatGPT, Meta's Llama, Google’s Gemini and Anthropic's Claude, into everyday products, there arises an urgent need to address the safety and ethical implications of products and services that use AI technologies. The aim of this Outline of Investigation is to specify a set of requirements to evaluate the safety of AI-based products by mitigating the risks associated with their deployment while yielding benefits.

The primary objective of this Outline is to establish a comprehensive framework for evaluating the safety of AI-based products. This framework specifies the necessary requirements and provides guidelines to ensure these products are safe to use and are aligned with the highest standards of AI safety, regulations, and guidelines. The approach in this Outline assesses data handling protocols, performance of machine learning algorithms, adaptive training methodologies, predictive and decision-making processes, and the overall integrity and reliability of AI systems.

Moreover, this Outline recognizes the unique challenges posed by AI products, such as issues of reliability, robustness, transparency, fairness, bias and data privacy, and aims to address these through a systematic evaluation process. This Outline acknowledges the dynamic nature of AI safety standards and regulations, proposing adaptable and forward-thinking procedures to keep pace with technological advancements.

This Outline is designed to serve as a foundational guideline for conducting thorough investigations into the safety of AI-based products, offering a structured methodology for assessing conformity and compliance with evolving standards and regulations. It is aligned with existing and upcoming standards and methodologies defined by recognized standards organizations such as ISO/IEC JTC 1/SC 42 and IEEE-SA and regulatory bodies such as the EU AI Act [EU AI Act 2024] and EU GDPR [EU GDPR 2018] ensuring a holistic and rigorous evaluation process.

This Outline is also intended to bridge the gap between rapid technological advancement and the development of corresponding safety standards, so that AI-based products are not only innovative and efficient but also safe, ethical, and trustworthy. Establishing AI system safety is essential for building public trust and ensuring the responsible adoption of beneficial AI technologies.

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INTRODUCTION

1 Scope

1.1 This Outline specifies the safety requirements and guidelines for AI-based products, including both AI-embedded products and digital AI products.

1.2 This Outline covers two categories of AI-based products:

a) AI-embedded products, where AI functionality is integrated within a physical system and directly influences real-world operation. Examples include autonomous robots, medical devices with AI-driven diagnostics or control logic, and security systems that perform autonomous detection or generate alerts.

b) Digital AI products, which consist solely of AI-based functions. Examples include large language model (LLM)–based personal-assistant applications, customer-service chatbots, and AI-powered service-recommendation applications..

1.3 This Outline encompasses both categories of AI-based products. However, products that include safety functions but do not incorporate AI-based functions are not within the scope of this Outline. The Outline is intended to provide a horizontal set of safety requirements applicable across diverse AI-based products and is intended to be used in conjunction with existing (vertical) end-product safety standards.

1.4 Not all the requirements specified in this document apply to every AI-based product. Depending on the specific AI application or product, only a subset of these requirements may be relevant.

1.5 The scope of this investigation is for AI-based products (equipment, devices, and systems) (but not limited to):

a) Appliances;

b) Autonomous Vehicles;

c) Batteries;

d) Beauty and Personal Care;

e) Components;

f) Consumer Electronics;

g) Consumer Packaged Goods;

h) Furniture;

i) General Merchandise;

j) HVAC/R;

k) Household and Industrial Cleaners;

l) Lighting;

m) Textiles, Apparel and Footwear;

n) Toys and Children's Products;

o) Water and Plumbing;

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p) Wire and Cable;

q) Robotics; and

r) Medical Devices.

1.6 Relevant AI Application Domains selected from ISO/IEC TR 24030:2024 are (but not limited to):

a) Agriculture;

b) Construction;

c) Defense;

d) Digital Marketing;

e) Education;

f) Energy;

g) Fintech;

h) Healthcare;

i) Home/Service Robotics;

j) Information and Communication Technology (ICT);

k) Legal;

l) Logistics;

m) Manufacturing;

n) Mobility;

o) Public Sector;

p) Retail;

q) Security;

r) Transportation; and

s) Work and Life.

1.7 The requirements in this Outline address safety risk associated with using AI-based capabilities and functions of AI-based products. Safety considerations of non-AI based capabilities and functions of the products are not in the scope of this Outline and are to be addressed by the applicable safety standards of those products.

2 Components

2.1 A component of a product covered by this Outline shall:

a) Comply with the requirements for that component as specified in this Outline;

b) Be used in accordance with its rating(s) established for the intended conditions of use; and

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