

# HOW SOFTWARE AFFECTS AUTONOMOUS DRIVING IN TERMS OF SAFETY

## AUTHORS

Adam Jalyo

## ADVISORS

Dr. Eric Wong

## AFFILIATIONS

Boise State University  
Computer Science Dept.  
University of Texas at Dallas  
Computer Science Dept.

## 1. INTRODUCTION

Due to the rapid technological advancement of autonomous vehicles, ensuring software safety has become a critical concern because autonomous vehicles rely heavily on complex software systems to control their operations. Therefore, any software failure or vulnerability can have severe consequences, including mishaps, accidents, injuries, or even loss of human life.

## 2. OBJECTIVE

Implementing safety-focused software development standards and guidelines based on the analysis of the standard ISO 26262 from the International Organization for Standardization, considering several case studies such as Boeing 737 MAX and Tesla Autopilot Accident. In the end, the expected result is to propose a new solution based on the analysis of the case studies, taking into account the Standardization from ISO 26262.

## 5. CASE STUDY

Boeing 737 Max crash of October 29th, 2018, and another airplane crash on March 10th, 2019, as case studies to see how software safety is essential in autopilot. In a paper by Johnston and Harris, the authors examine how a safety feature intended to enhance safety on the Boeing 737 resulted in the opposite. Why was this the case? According to the paper, the accident was due to the pilots' need for proper training about how the autopilot system and the software operated. Because the main objective of the software was to lower the angle of elevation of the plane during take-off if it ever exceeded safe limits. However, the software would kick in, take over without the pilot's knowledge, and compete with the pilot over the plane's control, because it reached the safe limits implemented as parameters. Therefore, due to the constant oscillation of the plane, the plane lost control. As a result, the pilots cannot control the plane themselves, causing the accident. [4]



## Related Literature

BOING 737 MAX SAGA FOR SOFTWARE ORGINAZATIONS

## 3. METHODOLOGY

Analzying the case studies against the International Standard ISO 26262

## 4. RESULTS/FINDINGS

- it is very critical to offer more comprehensive driver training on autonomous systems that might include things like system limitations alongside some of the potential malfunctions
- Through a proper human-machine interaction design and the implementation of human intention recognition across various software algorithms, it is possible to enhance safety in autonomous systems

STILL IN PROGRESS

## 6. CONCLUSION

The occurrence of the Boeing 737 clearly showcased the importance of different software-related factors like sensor integration, various system limits together with pilot training.

In order to enhance safety by focusing on human interaction in autonomous driving, there is a need to come up with more effective communication strategies to adequately convey the system status, limitations, and even the need for driver attention and intervention