0.1 Introduction

In the third semester our professors assigned us a project where the focus was to be the importance of sensors and actuators with autonomous vehicles being one example. Following this lead the first topic that came to mind was logistics, more precisely forklifts. To investigate the applicability of such devices in the aforementioned field our team members conducted market research starting from two separate perspectives, one being more industrial and the other more social.

0.2 more like a problem formulation???

0.2.1 Forklift related accidents and injuries

Forklift related accidents are a common occurrence, both with solid stationery objects and moving pedestrians. According to data from "article 1" there a around 34,000 injuries from forklifts in the US every year. This results in a great number of lost work days and extra strain and pressure to make up the deficit.

Out of 143 incidents, where the collision happened with a solid object 75 of them are with stationery objects. And 53 of them are collisions between forklifts. Both of these types of incidents are related to human errors, like not paying attention to the surroundings when operating forklifts.

Out of 322 incidents involving pedestrians around 50% of them have been caused by a forklift striking a pedestrian by accident.

The safety of forklifts can be greatly increased with the use for sensors that enable the forklifts to avoid obstacles on their own, even with the human error factored in. This is similar to how safety in cars has been greatly improved in recent years.

0.2.2 Is there a market for self-driving forklifts?

Most companies are always competing to maximize the quality of the product while keeping the cost as low as possible. Many companies choose to outsource manufacturing to countries where, due to the lower average salary, they could further the aforementioned goal. This could achieve lower manufacturing prices but sometimes the quality suffered in turn. After learning this some companies choose to move manufacturing back to their origin. To stay competitive despite the higher costs, automating tasks can be a lucrative investment. For example having warehouses that can work 24 hours a

day can greatly reduce certain costs. All without compromising the quality of the products.

0.2.3 Real-life applications

A research paper from a japanese university revealed that in countries with aging demographics autonomous vehicles such as an autonomous forklift are required to lighten the burden on manpower and manual labor. The authors of this paper detailed an autonomous pallet handling system for forklifts, which is able to handle pallets used for harvesting vegetables with no further human input in an outdoors environment. From a paper about aging populations it is stated that 11% of the world is over 60 years of age and this ratio is expected to rise up to 22% in 2050. From a paper about aging populations it is stated that 11% of the world is over 60 years of age and this ratio is expected to rise up to 22% in 2050.

0.2.4 Conclusion

These four papers clearly indicate that there is indeed a market and an application of highly automated processes regarding logistics and forklifts as well. This is how our group came to the conclusion that an automated forklift would solve a relevant problem all the while fitting in the frame outlined by our professors.