Autonomous Robots

Case study and design of autonomous adaptive vehicles



Source: tecnicalia.com

Case Study: DARPA Grand Challenge

DARPA Grand Challenge had the intent of fueling the development of adaptive autonomous vehicle design for the US military. Their goal is to have 33% of all ground forces operate as unmanned autonomous vehicles by the year of 2015.

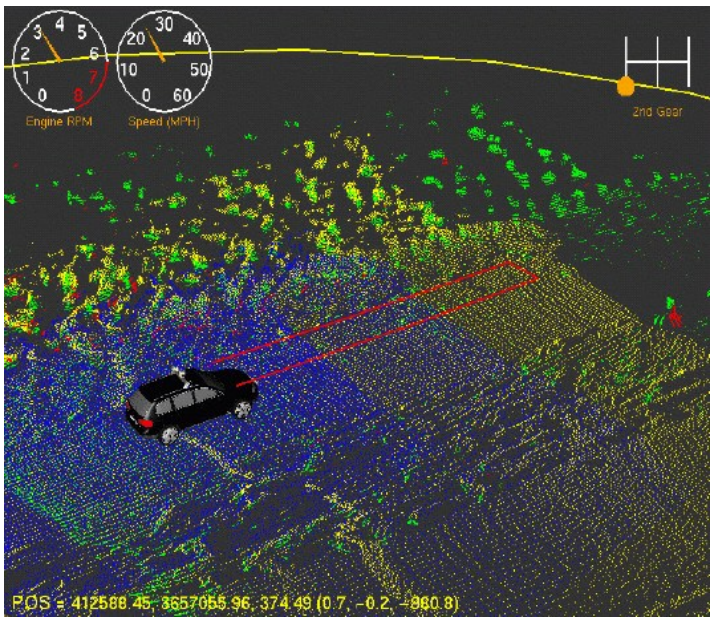
The DGC of 2005 had a total of 195 interested participators. Of the top 23 teams that were granted a place in the final, only 5 passed the goal posts, and only 4 within the allowed 10 hours. Most of these vehicles are apparently not reliable at all, even though many leading scientists did participate and these were backed up by many large companies.

Stanford university won DGC 2005 with the robot called Stanley. We did not find that Stanford used a better development process than other teams, yet they created a robust enough vehicle that completed the track.

The MSc project intend to compare Stanley with a similar vehicle design that has focus on reliability by using well known methods for making the system more reliable by exploiting available sensors and components to the full extent.

Project Goal:

We had an interest in adaptive autonomous systems which can be described as *unmanned machines capable of making their own decisions within some limitations*. We wanted to investigate the state of reliability activities conducted in projects involving autonomous adaptive systems. Such systems are still in the experimental stage, but we wanted to document any methods and findings to achieve reliability for these advanced types of machinery. The result turned out to be that almost no reliability activities are documented even though reliability is identified as an important next step to build commercial available applications.



Source: Stanley technical paper

Project Details:

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The conducted literature study was presented at ESREL 2007, an international conference focusing on *Risk, Reliability and Societal Safety*, held at University of Stavanger summer of 2007.