Autonomous Vehicle:

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1. **INTRODUCTION**
   1. **Purpose**

This software design document describes the architecture and system design of a choreography analysis and timing system and the precise implementation and details required to satisfy the requirements as specified in the Software Requirements Document (SRD). It is assumed that the reader read the SRD, since this document also defines the implementation details of the design behavior given the requirements within it.

* 1. **Scope :**

The project is designed to give a develop a solution for navigation in autonomous vehicles (in a simulator or a real car), with an emphasis on the reliability of the autonomous software.

The project include feature the use of innovative hardware components, implements navigation, and mapping algorithms (for example - SLAM algorithm), an interface with sensors.

In this project we will not focus on the hardware of the robot or the type of tasks it will be able to perform. but the main effort will be directed to programming the system to be installed in the "robot brain".

* 1. **Overview**

The design description defined in this document serves multiple purposes:

* To describe the functional structure, data and algorithms to be implemented.
* To identify required system resources.
* To be used to assess the impact of requirement changes.
* To be used to verify compliance with requirements.

1. **System Overview**

Our world is becoming more and more autonomous on a variety of topics.

Our solution - data analysis, mapping and modeling of spaces using sensors, is a significant tool in the development of autonomous vehicles and will go to great lengths to promote the idea of autonomous vehicles.

1. **System Architecture** 
   1. **Architectural Design**

• Real-time image recognition algorithms, using Python libraries (using the Real Sense built-in camera)

• Analyze the Bag files coming from the camera.

• Mapping and modeling the space.

• Work with the AirSim simulation program, to test our code with different scenarios.

1. **Data Design**
   1. **Data Description**

Our information is dynamic and the idea comes from the sensor cameras in real time.

Our sensors have the ability to give an image even with depth (Z axis).

The information that comes to us from these sensors as Bag files we transfer to the algorithms and thus I analyze and map the space.

1. **Component Design**

In this section, we take a closer look at what each component does in a more systematic way. If you gave a functional description in section 3.2, provide a summary of your algorithm for each function listed in 3.2 in procedural description language (PDL) or pseudocode. If you gave an OO description, summarize each object member function for all the objects listed in 3.2 in PDL or pseudocode. Describe any local data when necessary.

1. **Human Interface Design**
   1. **Overview of User Interface**

Describe the functionality of the system from the user’s perspective. Explain how the user will be able to use your system to complete all the expected features and the feedback information that will be displayed for the user.

**6.2 Screen Images**

Display screenshots showing the interface from the user’s perspective. These can be hand­ drawn or you can use an automated drawing tool. Just make them as accurate as possible. (Graph paper works well.)

* 1. **Screen Objects and Actions**

A discussion of screen objects and actions associated with those objects.