

PROJECT SCOPE STATEMENT

Project Title: Artibot

Date Prepared: 26.09.18

Product Scope Description:

Develop a self-driving autonomous vehicle which can drive in test environment but not in commercial roads.

Project Deliverables:

Technical

- Image recognition of road lanes
- Self-driving mechanism

Documentation

- Requirement Documentation
- Prototype Results
- Test Results

Project Acceptance Criteria (in scope):

- Recognize road lanes
- Be able to drive between the lanes for 10 seconds or more before it goes out of lane.
- Finish and deliver the Project before May.

Project Exclusions (out scope):

- Battery
- Real life environment (pedestrians and bicycles)
- Speed and acceleration
- Weight
- Vehicle shape.

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Project Constraints:

Project constraints are defined by our budget and team.

- The team consist of five members from different engineering disciplines.
- The budget for our project is 154203.5 NOK
- Limited knowledge regarding AI
- Time

Project Assumptions:

Our team focuses on not developing the car itself but develop the learning algorithm for the self-driving part, which is reinforcement learning. We will use image recognition to detect the lanes and not develop an algorithm for object detection.

<i>Key Stakeholders</i>	
Stakeholders	Description
Employer/The Product Owner; Aurilla A. A.	Direct source of the key requirement
USN	Makes regulation and rules for the development of the project to follow
Artibot	The development team for the project
Investors/sponsors	Provides the financial investment to the project
Suppliers	Provides the equipment and components of the product

Project Artibot

Physical resource:

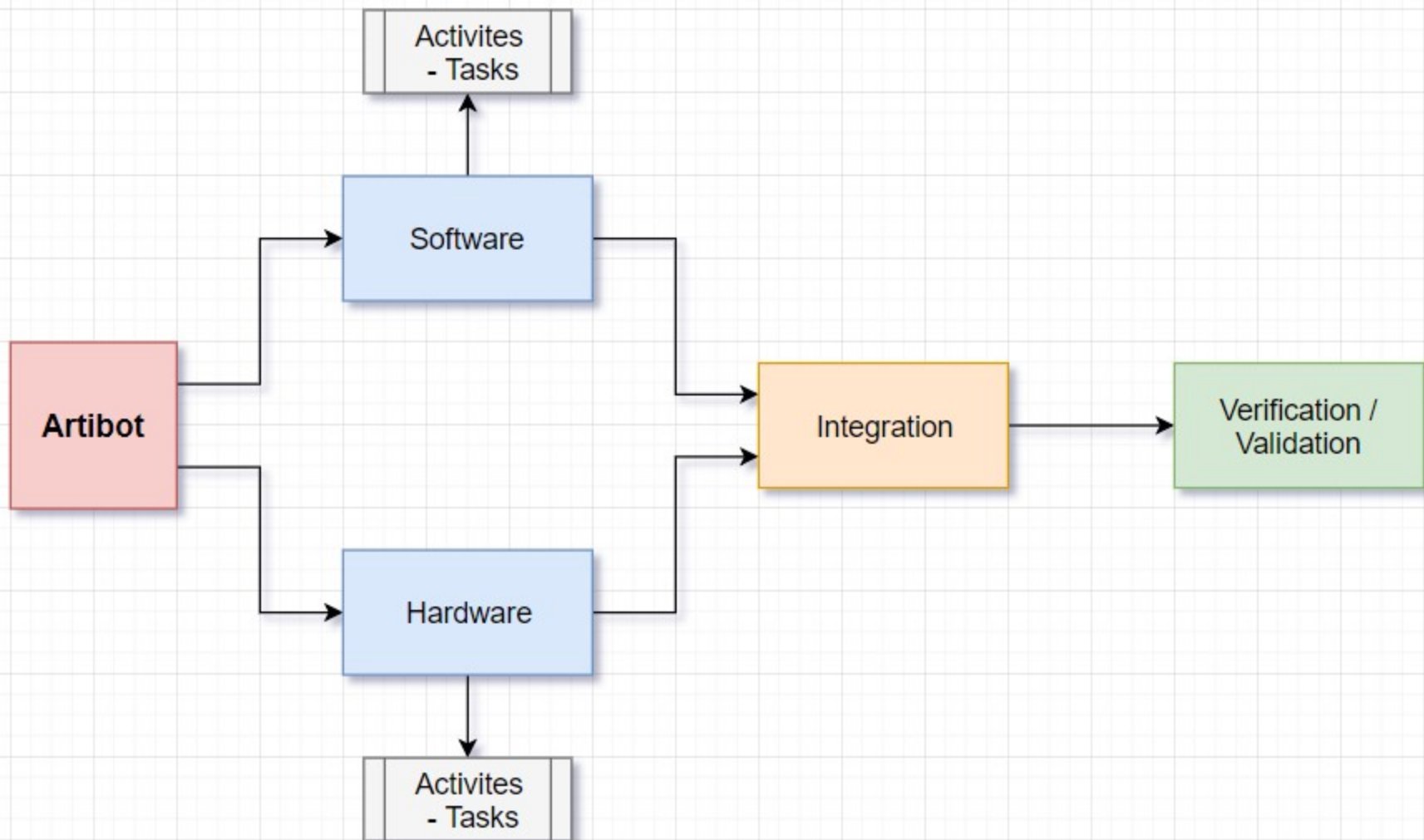
- Lab car prototype.
- Rechargeable Batteries
- Personal PC's
- Jetson TX2
- On board camera
- Sensors
- 2x GTX 1070

Software resource:

- Anaconda
- Matlab
- Visual studio
- Tensorflow
- Keras
- Sharelatex
- Github
- Ubuntu

Human resource

- Development team
 - Huseyin (SM)
 - Bozhao (Ar)
 - Chrisander
 - Bilgehan
 - Eivind (APO)
- Supervisors
 - Pr. Aurillia
- Consultant:
 - Pr. Dag
 - Pr. Antonio
 - Pr. Tad
 - Pr. Kiran
 - Pr. Bhuvan



RISK MANAGEMENT PLAN

Project Title: Artibot

Date Prepared: 27.09.18

Methods and Approaches:

Risk Analysis

Tools and Techniques:

- Risk Analysis Matrix
- Characteristics: Probability, Severity and Impact.
 - The Impact describes the level of risk and is calculated in the matrix by $\text{Probability} * \text{Severity}$.

Risk Categories:

- Human factors
- Business
- Technology

#	Risk	Description	P	S	I	Mitigation	Action to take
01	Computer crashing	Likelihood of any computer we use crashing	1	5	5	Work on more than a single computer	Computer needs to be repaired immediately, and we need to continue to work on another computer
02	Testing environment	No environment to perform the testing	3	4	12	Apply room as early as possible	Rent a commercial rental room
03	Data loss	If the project documents gets deleted or corrupted	1	5	5	Backup of all documentation in either Google Drive, Local hard drive, etc.	All documentation must be rewritten as fast as possible
04	Absence	Absence of a team member	5	2	10	Make sure that we are not too dependent of a team member	Notify the other team members and divide the tasks
05	Lack of knowledge	Team member lacks technical knowledge to implement a system	4	2	8	Make a plan on which materials we need to learn beforehand	Ask other students/teachers and start learning the insufficient knowledge from the internet
06	Global standard	The car provided by the school might not follow the global standard	3	4	12	Buy components that is following the same certain standard	Buy interface to adapt to the predefined standard
07	Poor requirements	Stakeholder or system requirements might change	3	3	9	Apply Scrum methodology to be agile	Refine the product backlog and add the new requirements
08	Computer compatibility	Software do not support the computer you use	2	3	6	Read the system requirements of the software	Find a new computer that supports the software
09	Budget	The project's cost exceeding the budget given by the investors	4	2	8	Create a good budget plan and make sufficient research of components	Negotiate for a higher budget
10	Group dynamic	Disagreement within the group regarding project and poor working environment	5	4	20	Have a transparent environment and active communication	Scrum master call an additional meeting to resolve issue

Table 1: Lists of risks

P. = Probability, S. = Severity, I. = Impact

Impact	Risk
1 - 3	Minor risk
4 - 7	Low risk
8 - 12	Moderate risk
13 - 18	High risk
19 - 25	Extremely high risk

Table 2: Risk categories

		Probability				
		1	2	3	4	5
Severity	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5

Table 3: Risk matrix

Three point estimates								
		quantity	Optimistic cost	Most likely cost	Pessimistic cost	Weighting equation	Expected cost est.	total estimate
GPU	RTX 2080 ti	4	12000	13500	15000	$(OC + 4*MC+PC)/6$	13500	54000
On board pc	TX2	1	3560	4560	6000	$(OC + 4*MC+PC)/6$	4633.333333	4633.333333
Battery	ZOP Power 14.8V	1	250	350	400	$(OC + 4*MC+PC)/6$	341.6666667	341.6666667
Frame	RC Car Chassis	1	700	1000	2000	$(OC + 4*MC+PC)/6$	1116.666667	1116.666667
Motor	DC Motor	1	350	900	2000	$(OC + 4*MC+PC)/6$	991.6666667	991.6666667
Wheels	Rubber tires	2	250	300	450	$(OC + 4*MC+PC)/6$	316.6666667	633.3333333
software	sharelatex/visual sudio	4	15280	16880	25760	$(OC + 4*MC+PC)/6$	18093.33333	72373.33333
Sum			114480	128930	174340		134090	134090
							Budget	154203.5

Meetings	Backlog Refinement Mid Sprint	Daily Scrum	Task Planning	Retrospective (Sprint review)	Sprint Planning
Documents	GitHub ShareLatex	NA	GitHub	ShareLatex	ShareLatex GitHub

Story cards & Visible wall

<https://github.com/Artibot/Autonomous-Car-CHEBB/projects/1>