Msc. Degree project

S: SMaRC design LoLo,

T: navigation system, high accuracy, low latency, robust

A: past 1 month, reviewed common methods for signal processing of echos, set simulation in matlab, this week run the in air testing, tube, two beacons on each side, one is pinging, another one is receiving, try the detection algorithm on the hardware

R: matlab simulation is done, including all components including adc part, filtering part, downsampling, detection part. About hardware, tricky, thousands of lines of codes, get lost,

Future work: debug, and make system work in air and planning to conduct sea trial in Stockholm sea.

Molly

S: we need to design a new generation of autonomous sailing boat based on Maribot Vane

T: robust, modular, lightweight, two modes(self, active), cheap

A: I am doing control stuff, designed the steering system and manufactured using 3D FDM printing technique. FEA analysis for plastic material. Gears, cogwheels, pushpull wires, bearings, rudder design and manufacturing

R: we conducted two sail trials, the first time the rig was broken because the wind was so strong and carbon fibre was wet, some inherent fractures in manufacturing phase, 2nd time we fixed it by laminating a huge bunch of more carbon fibres on to it to warp it around. The steering systems were working properly at both times. I am so glad.

RV GRUNNES seabed survey

S: another group in archaeological department at NTNU wishes to investigate the cause of MS Helma

T: to conduct a seabed survey with all means, rov with its stereo camera, auv with side scan sonar, surface vessel with multibeam echosounder.

A: prepared all equipment and their working scripts like path planning, model generator, photo mosaic, some postprocessing scripts to illustrate,

R: I collected the side scan sonar data, marked the lat-lon position of the wreck, collected sterocamera data for photogrammetry (3D generation). It was still protected by Norwegian Heritage Agency, then those data were encrypted

SD2709

S: IMR inspection tool for seabed pipeline IMR 120 km long

T: design an AUV, robust, able to inspect the pipeline by all means, tunnel thrusters

A: investigated common corrosion errors, failure modes, reviewed all types of AUVs, choose one of it suitable for inspection, which is based on Eelume flexible-joints snake-body idea, I designed a two-joints three sectioned flexible auv, it can bend itself to a trapezoidal shape, easy detect those shadow zone, all aspects are analysed, structural, hydrodynamic, control, manoeuvring, battery, power system, optimization of the shape hull, speed and weight

R: it is lateral unstable w/o fin, but a fin is introduced, two modes are introduced, one is loitering with its straightline, another one is inspection mode,

SENSOR FUSION

S: eager to learn more in situational awareness field for autonomous marine systems

T: gain some more advanced skills

A: take this nanodegree program to enrich my toolset, in common sensors such as Lidar, Radar, Camera, and their algorithms

R: currently working on Lidar with point clouds, PCL and openCV

PEKING UNI

S: comptetion for robotic dancing

T: achieve the goal of making the robot dancing with human

A: learn deeplearning algorithms like openpose, get used to Raspberry Pi which is built in Yanshee robot, used the magic scripts to convert 2D to 3D skeleton, then map the skeleton to robot

R: robot did perform with human motions, but it can only perform with simple motions in just one plane, like bend your arm up till 90 degrees, but not bow forward, this will induce ambiguity for the motion, that needs to be resolved by using another programming techniques like read programming, integration of different techniques.