Group Projects IoT + Bluegrowth

Success stories, goals, objectives of the projects

English

European

GROUP ASSIGNMENTS

Students are organized in groups of three and take over the design, development and evaluation of a pervasive system. The system goal is to address a real-world problem within the context of Blue Growth.

Introductory Study:

- Blue growth and ecosystem services, Luca Mulazzani and Giulio Malorgio, Marine Policy, Volume 85, November 2017, Pages 17-24,
- Smart Ports: Point of View, Deloitte Port Services, 2017.
- Future of the Logistics Industry, PWC, 2016.

Towards this end the students will be involved in a end-user driven design to define their project based on a series of interviews to identify the most important features and understand how to design their system. Each group will be supported by a student from the MSc in Product & Service Design.

The development will be based on the STM NUCLEO-64 F401RE development board allowing the students to try out their ideas and to quickly create prototypes for evaluation. Each project will be demonstrated at the end of the semester along with a detailed presentation of the evaluation of the end-to-end performance.

The group assignment thematic area, expected results and delivery schedule will be presented in detail during the 5th Lecture.

 1st Delivery: Initial Idea Pitch Instructions of 1st Delivery Deadline: 8th April 2021 2nd Delivery: Intermediate Presentation Instructions of 2nd Delivery Deadline: 20th May 2021 Exam: Final Presentation

Instructions of Final Delivery Deadline: Final Exam Data

> EU Login European Commission

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Published reports and infographics

Below you can download a copy of the EU Blue Economy Report for every year of publication. Other documents that can also be downloaded include infographics for every year of publication and a The data and charts below show the economic indicators used for the established sectors in the EU Blue Economy report. The six sectors include: Coastal Tourism, Marine living resources, Marine non-living resources. Port activities. Shipbuilding and repair and Maritime transport. Various filters allow for the customisation of data can in terms of sub-sector, activity, Member State, indicator and time period





IN ED #

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Internet Of Things2021-Delivery 1

ELECTIVE IN INTERNET OF THINGS

(A. A. 2020/2021)

FIRST DELIVERY OF GROUP PROJECT

The first delivery focuses on the main concept and the design aspects of the platform that will be developed during the group project. During the presentation you should focus on the following questions:

- 1. What is the problem and why do you need IoT?
- 2. What are the connected components, the protocols to connect them and the overall IoT architecture?
- 3. What data are collected and by which sensors?
- 4. What kind of collective intelligence do you expect will emerge?
- 5. What are you going to learn and how will you act into the environment by what actuators?
- 6. How are you going to measure the effectiveness of your actions into the environment?
- 7. What are the constraints? How often? Bandwidth? Latency? Energy? Duty Cycle?
- 8. What is the plan and what are the metrics (quantitative, not qualitative) to evaluate the performance

What is the problem and why do you need IoT?

DRUG EFFECTS ON AQUACULTURE AND IT'S REMEDIATION Soumik Banerjee¹, *Dr. Vikram Kumar², Prof. (Dr.) A.N. Pathak³

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ABSTRACT

Aquaching plays an important roke in ployded food preduction. Due to sharper in human detury holds, full communption has not increasing, with more poor de sharper to a strainform of the Aquaching and the Aquach

IoT as a tool to optimise the administrations of drugs:minimum quantity to get acceptable risks

Love the problem before the solution!

Environmental Risks of Marine Aquaculture



What are the connected components, the protocols to connect them and the overall IoT architecture?



What data are collected and by which sensors?

Make Reasonable Assumptions.

Sensors for :

- administration drug quantity
- environmental conditions
- fish health

Actuators for:

• administration drug quantity

Look the for inspiration!





What are you going to learn and how will you act into the environment by what actuators?



What kind of collective intelligence do you expect will emerge?

Collecting data from a number of aquaculture cages we can build a predictive model on the risks of diseases



How are you going to measure the effectiveness of your actions into the environment?

Quality of predictions

Accuracy

Precision

Recall

Reduction in:

- Costs
 - Diseases





What are the constraints? How often? Bandwidth? Latency? Energy? Duty Cycle?

- Underwater vs Terrestrial wireless com
- Every day vs every feed
- Energy Harvesting
- Real time video? Underwater?
- Edge computing
- ..



MORE IN A SPECIFIC LECTURE!

What is the plan and what are the metrics (quantitative, not qualitative) to evaluate the performance

Performance of the technical infrastructure. We are not interested in economic considerations (even if they are appreciated if very focused)

- 1. Define requirements (see previous slide)
- 2. Prove you can meet requirements up to a certain level

HIGH/LOW is not enough

"Our system can run 2 years on batteries providing 2MB of data each day which is sufficient for the purpose of the monitoring activity"





It Works very well because we reduce the battery consumption 50% with respect to the original solution, thus meeting the requirement of op. time > 1.5 years

It Works very well because we reduce the battery consumption 50% with respect to the original solution



It Works, very well because we reduce the battery consumption

It Works very well

It Works

Always support your claims with quantitative evidences! I love sailing





- 46,000 Construction Hours
- >90,000 Design Hours
- 75,000-100,000 CNC Machine Hours
- 17,300 Individual parts
- 140 sensors onboard
- 240 metres of hydraulic pipes onboard
- 50+ Knots estimated top speed (93 KM/H, 57.5 MP/H)
- Weight: 6.450 tonnes
- Crew: 11
- Crew weight: Max 990KG





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W • S E N S E

INTEGRATED CABLELESS SOLUTIONS





Please ... consider the following

- Focus on technology. Other aspects are very welcome if and only if they support your tech choices
- Avoid too much words ... if you can express it in graphs, architectures, diagrams, picture much better. You are engineers not novelists
- Avoid the use of adjectives ... it is better than ... provide quantitative evidences ... it save 50% of the energy with respect to ...
- Mobile phones as sensors/actuators are ok if and only if they are part of a more complex ecosystem of connected embedded systems
- Challenge yourself. Try to do something cool and unique, but remember This is not UI, ML, AI o UX ... this is IoT
- Always motivate your tech choices. Use simulation. We know sometimes it is difficult, but we highly appreciate when is clear why you opted for a specific solution and how you are going to prove it works under reasonable assumptions.