STEM Challenge 1

Optimize workspaces and hardware/software needs of employees through automated processes

ALM Services

PROPOSAL REASONING

Under the COVID19 context, medium/large companies and public entities require a solution for managing working spaces and equipments to allow employee coordination regarding full- or part-time and remote working arrangements. They also require a solution for tracking the actual needs of hardware maintenance and software license subscriptions to rationalize the costs of fees

INNOVATIVE ASPECTS TO BE VALUED

- Allow easy cooperation between employees in an intuitive way
- Include mechanisms to detect anomalies or abuses
- Integrate machine learning systems
- Compatibility with customary tools like Microsoft Office 365

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STEM Challenge 2

Elucidate whether inappropriate medication intake and daily activity contribute to the risk of a fall, especially for the elderly

APA Group

PROPOSAL REASONING

Both chronic diseases requiring multiple medications and accelerated lifestyles are becoming increasingly common in our society and may constitute underestimated causes of falls and emergency situations worldwide. This may be particularly critical in the case of the elderly that have limited their mobility and companionship due to the COVID19 situation

INNOVATIVE ASPECTS TO BE VALUED

- Integrate many variables related to patient physical characteristics, psychological profile, health state, medication intake, medication side effects, etc.
- Application of mathematical algorithms
- Minimum 70% reliability in fall detection through non-contact technologies

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STEM Challenge 3

Provide a solution that will benefit people with disabilities towards their inclusion in everyday fun activities (e.g., in sports, museums, recreation, attending events).

Sense Space Informatics

PROPOSAL REASONING

The ideas have to be indicative of a scale that the capacity of the team can materialize. For instance, the challenge does not pursue the creation of a new sports activity for people with disabilities, but a way to include them in experiencing a sports event.

INNOVATIVE ASPECTS TO BE VALUED

- The solutions should be clearly related to technology and/or science that a university should and can provide.
- A methodology, tool, information system, application, hardware system, algorithm, product or service is welcome to undertake the problems that have emerged under our modern way of living
- Feasibility based on the team's capacity and technology level,
- Economic potential and a clear societal and technology impact.
- Ethics, true conception of the idea and expertise.

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2023 EURECA-PRO STEM Innovation Contest

STEM Challenge 4

Bicycle safety & security: a solution to improve safety and security of bike riding through the protection of users and equipment's from unexpected incidents (e.g., crashes, accidents, thefts or misuses)

Sense Space Informatics

PROPOSAL REASONING

The trend of people using their bikes, provides not only a cost-effective solution, but also a healthy and environmentally friendly one. However, one should first ensure the safety and security of riding their bike on a daily basis. Solutions to problems like these can be beneficial from the little child ready to take its first ride, to the person traveling to their work, the casual rider or even the professional athlete.

INNOVATIVE ASPECTS TO BE VALUED

- The solutions should be clearly related to technology and/or science that a university should and can provide.
- A methodology, tool, information system, application, hardware system, algorithm, product or service is welcome to undertake the problems that have emerged under our modern way of living
- Feasibility based on the team's capacity and technology level,
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STEM Challenge 5

Art through technology: an art-related technological solution to help to communicate and approach existing art forms to people

Sense Space Informatics

PROPOSAL REASONING

Technological advances allow artists to explore different ways to express themselves and offer very interesting experiences: augmented reality and virtual reality, touch screens and the internet are increasingly important for the public to interact and enjoy art

INNOVATIVE ASPECTS TO BE VALUED

- The solutions should be clearly related to technology and/or science that a university should and can provide.
- A methodology, tool, information system, application, hardware system, algorithm, product or service is welcome to undertake the problems that have emerged under our modern way of living
- Inspiration and fantasy are highly appreciated under a feasible tool, product or service.

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STEM Challenge 6

Methodologies or tools to improve the digital content quality targeted at children and teenagers in the web and social media

Sense Space Informatics

PROPOSAL REASONING

Nowadays, most people, especially children, spend a vast amount of time to produce and "consume" useless information and fake news on the web and especially on social media. This fact, disorients humans from learning and acquiring knowledge that could aid in the refinement of our society and well-being

INNOVATIVE ASPECTS TO BE VALUED

- The solutions should be clearly related to technology and/or science that a university should and can provide.
- Feasibility based on the team's capacity and technology level,
- Economic potential and a clear societal and technology impact.
- Ethics, true conception of the idea and expertise.

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STEM Challenge 7

Development of a model for the valuation of works of art as an investment good

IMMOQEE

PROPOSAL REASONING

Each step leading us towards the emergence of an appropriate model for valuation of works of art will in fact be a step towards innovation, as such a model does not function in the domestic market at the moment, and yet price reliability is essential for the proper functioning of any market

INNOVATIVE ASPECTS TO BE VALUED

- The model can be developed in terms of the selected target group and area of application (companies, individual investors, galleries/auction houses/banks/brokerage houses, European market)
- Affordability of their use in practice
- Transparency of the developed method
- The form in which it will ultimately be available to the user, e.g. a local or online application, a tool or a descriptive form of a series of practices producing the desired outcome

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STEM Challenge 8

Create a computer platform or system to help people living alone, susceptible to suffer any incident, notifying municipal services or caregivers, so that they can intervene and avoid possible consequences.

Global Virtualizza

PROPOSAL REASONING

Information and Communication Technologies (ICT) have become an essential tool to promote independent living and improve the quality of life of the elderly, who often experience a progressive loss of functions as a result of their age or chronic diseases, which makes it difficult for them to carry out daily tasks, forcing them to depend on third parties.

INNOVATIVE ASPECTS TO BE VALUED

- The system should allow the identification of people at risk, the early detection of possible problems, rapid attention and monitoring of the people and the actions carried out, coordinating the various services responsible.
- To provide geolocation technology

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STEM Challenge 9

No-code application tool helping with the design, allowing to draw, sketch, outline the elements of the user interface to use it in contemporary integrated programming environments (IDEs).

CAPRISOFT S.C.

PROPOSAL REASONING

No-code application development paradigm is getting more and more popular nowadays. The graphical user interface (GUI) is still the main way to provide interaction between the computer or mobile device and human user.

INNOVATIVE ASPECTS TO BE VALUED

- Smart algorithms used to distinguish many standard and complex controls in the GUI design and overall dialogue composition
- Compliance with industry standard UX/UI specifications
- Level of automation during export to GUI designers
- Integration with appropriate programming language.

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STEM Challenge 10

Evaluation of the urban characteristics and the formulation of proposals for the environmental and social upgrade of a central area of Chania city with respects to its social and cultural capital.

Municipality of Chania

PROPOSAL REASONING

Some of its building squares in this area were constructed in the beginning of the 20th century in an organic way, with narrow streets and dense low-quality buildings in order to house refugees. All these characteristics lead to a downgraded area that needs to be re-planned for the provision of better conditions for its residents and visitors.

INNOVATIVE ASPECTS TO BE VALUED

The participants of the project will evaluate the existing conditions and propose strategies and plans for the development of public and green spaces, sustainable mobility networks, conservation and reuse of historic buildings and other facilities to upgrade this urban zone and make it a vibrant place with sustainable characteristics.

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STEM

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STEM Challenge 11

Monitor and facilitate the delivery process of paver asphalt mixes optimising logistics and coordination through real time data

EUROVIA

PROPOSAL REASONING

In road engineering, the logistics of asphalt paving, including order and delivery, is quite often a complicated process in which many people are involved, especially construction site managers, asphalt plant managers and truck drivers

INNOVATIVE ASPECTS TO BE VALUED

- Integrate real time interaction with all users (truck drivers, managers, operators, etc.)
- Automatic refreshing of truck position and data
- Adjustable to different operating systems and devices

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STEM Challenge 12

Design an easy-to-implement solution to recycle laminated/coated products from barrier liners used in paper packaging through existing technologies

SONOCO

PROPOSAL REASONING

While paper recycling is well established, liner material and any other non-pulpable material are being removed from the pulp. The majority of laminated or coated paper packaging is currently not collected or the contraries / reject of the pulping process not recycled. Typically, these materials end up in incineration or potentially in a landfill

INNOVATIVE ASPECTS TO BE VALUED

- Compatibility to a wide range of material compositions in the reject and with relatively high-water content
- Low environmental impact
- Acceptance of/ demand for the output from a technical point of view
- Economically viable
- Easily implementation in low-tech environments

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STEM Challenge 13

Develop an eco-friendly solution for apple harvesting avoiding fruit or tree damage without the use of human force

BAYER

PROPOSAL REASONING

The automation of apple harvesting will enable the improvement of work in many fruit farms, contributing to the optimization of the fruit picking process, and reducing high workload of actual physical work and costs

INNOVATIVE ASPECTS TO BE VALUED

- Easy-to-use device
- Eco-friendly solution
- Ability to remotely supervise the work
- Possibility of remote control of the device
- Application of AI/ machine learning systems

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STEM Challenge 14

Development of a system to automatically detect and recognize LED displayed errors in the production process of LED display boards

ENTE

PROPOSAL REASONING

The production process of LED boards requires automatic assistance in detecting production errors, such as faulty diodes, short circuits on PCBs and driver errors. The system will speed up the quality control

INNOVATIVE ASPECTS TO BE VALUED

- Use of image processing to detect errors
- Automation of the error detection process and software validation

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STEM Challenge 15

Development of a behavioral scoring system, based on users' behavioral data, to improve the availability of financial products for clients

EPEER

PROPOSAL REASONING

Epeer is an innovative platform that uses AI to connect investors and borrowers on a website and mobile application. The development of models based on user's behavioral data, such as interest, location, structure of residence, etc. will improve effectiveness of scoring system and the availability of financial products for people without a credit history

INNOVATIVE ASPECTS TO BE VALUED

- Application of advanced methods of analysis and data normalization to data mart
- Integration of user clustering methods based on the objective function
- Usage of AI for prediction of repayment
- System scalability in relation to a variety of objective functions

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STEM Challenge 16

Development of an electric and magnetic field arm scanner

ROCKWELL AUTOMATION

PROPOSAL REASONING

In order to understand the EMC behaviour and performance of the electronic circuit it is crucial to know which of its components radiates emissions and which are out of concern. This information give to the designer valuable information about parts of the circuit that require investigation in case of circuit EMC debug

INNOVATIVE ASPECTS TO BE VALUED

- Two degrees of freedom
- Communication with a spectrum analyzer
- Data visualization
- Scan area definition procedure
- Users should be able to define scan resolution

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STEM Challenge 17

Development of a sustainable process for the purification of (2S,3S)-2-benzhydryl-3-benzylaminoquinuclidine from other isomers which are created during its synthesis in veterinary and antiemetic drug industries

SYNTAL

PROPOSAL REASONING

Green chemistry focused on the design of products and processes that minimize or eliminate the use and generation of hazardous substances, including reducing consumption of non-renewable resources and technological approaches for preventing pollution. The company Syntal is working under the improvement of technological approaches for synthesis of fine chemicals according to green chemistry rules and with the agreement with economy

INNOVATIVE ASPECTS TO BE VALUED

- New product with high purity (at least 80% of enantiomeric excess)
- Usage of safe reagents
- Increase the sustainability of technology with significant environmental benefits
- Well-defined operating conditions

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STEM Challenge 18

Create a system that manages the legalization (Industrial Safety, Environment and Occupational Risk Prevention), both initial and subsequent, of all types of installations involved in the operation of a building or facility

GLOBAL VIRTUALIZZA

PROPOSAL REASONING

The large amount of legislation that currently affects public entities as private companies (industrial safety, environment, occupational risk prevention, etc.) and its frequent changes, means that they do not have under control their compliance and the documentation that proves it, being outside the law.

INNOVATIVE ASPECTS TO BE VALUED

- The solution should be put into practice through computer applications and technological resources.

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STEM Challenge 19

Design a system, product or plan to reduce and minimize waste material, especially plastic waste, generate at refreshment points to promote more sustainable marathons and races

University of León

PROPOSAL REASONING

While running and trail running is listed on the rise worldwide, races organizers are facing the challenge of organizing greener and more sustainable event, specially when, plastic waste generation is one key environmental problems worldwide.

INNOVATIVE ASPECTS TO BE VALUED

- Economically viable
- Adapted to racers needs
- Adjustable to different operating race conditions and trails

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STEM Challenge 20

Develop a system that is monitoring the maximum sun potential that can be produced in a specific place

ElectroMax

PROPOSAL REASONING

The company carries out economic activity in the field of installation of lighting fixtures using solar energy. Thus, it is very good to know the maximum capacity of solar energy that can be obtained in a certain location.

INNOVATIVE ASPECTS TO BE VALUED

- Building a solar panel that can track the maximum sun light.
- Monitoring and storing information on the amount of energy that can be produced.
- Wi-Fi management.
- Smart phone controlling device.
- Data base management.

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STEM Challenge 21

Develop an easily-to-use system that would allow identifying and reporting to the useer, in real-time, the health status of the poplar trees, based on symptoms observed in the field

Bosques y Ríos

PROPOSAL REASONING

Sustainable production of wood is threatened over the world by the increase in biotic damages, caused by pests and diseases that attack these trees and slow down their growth or, worst case, kill the plant. To detect existing threats, it is necessary to carry out surveillance and monitoring tasks, carried out by specialists in forest health, forest managers, nursery workers, as well as society in general.

INNOVATIVE ASPECTS TO BE VALUED

- Real time identification of the damage based on images
- Multiple potential users such as technicians, owners, forestry agents, students, general public, etc.
- Multidisciplinary approach
- Integrate complementary materials for the acquisition of pest/pathogen detection skills and knowledge
- Citizen Science approach
- Use of deep learning and image processing

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STEM Challenge 22

A drone with suitable sensor technology on board that could monitor the water quality of surface waters so that hazards can be detected in time

Endress + Hauser EH

PROPOSAL REASONING

Due to industrial and environmental influences as well as the advancing climate change, it is becoming increasingly important to determine and monitor the water quality of surface. An advantage compared to a self-contained watercraft would be that a drone could independently cover distances over land to get to another body of water or river branch.

INNOVATIVE ASPECTS TO BE VALUED

- Measure parameters of pH, dissolved oxygen and temperature directly on site, without sampling.
- A timestamp as well as a GPS marker for each measurement is useful.
- Able of water landing and have a minimum flight time of at least 15 minutes per battery set, the distance of the remote control should be at least 200 m. The data should be transmitted directly live to an evaluation unit in a freely convertible format and stored

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