Smart Security | The Role of Mathematics | Provisional Timetable

Smart Security | The Role of Mathematics
Challenges and Opportunities
Lisbon October 19, 2018

Provisional Timetable

	Smart Security Challenges and Opportunities ISEL, Lisbon, 19.Oct.2018
09:00 09:30	Opening Session
09:30 10:05	David Rios | AXA-ICMAT Chair, ICMAT, CSIC and Royal Academy of Sciences Aviation Safety Risk Management
10:05 10:30	Edgar Barreira | Lap2Go Technology as a Security service for Sports
10:30 10:45	Coffee break
10:45 11:20	Pietro Gennari | Food and Agriculture Organization of the United Nations (FAO) The role of mathematical/statistical modelling in monitoring food security
11:20 11:45	Tiago Lousada Soares | GALP Energia Machine learning in Cybersecurity
11:45 12:20	Poul Hjorth | DTU - Technical University of Denmark and ECMI Safety in numbers: Smart prediction of crowd dynamics
12:20 12:45	Fred Antunes | Portuguese Blockchain and Cryptocurrencies Association Blockchain challenge for Maths: The new opportunities of Smart-Contracts and Micro-Economy DAO's.
12:45 14:30	Lunch & Networking
14:30 15:05	Rafael Tesoro Carretero | European Commission Maths for digital privacy
15:05 15:30	TBA
15:30 15:45	Coffee break
15:45 16:20	Adérito Araújo | CMUC and ECMI Maths for Crime Prediction
16:20 16:45	Pedro Sousa | DEEC FCT UNL, HOLOS, EPL Explosive Europe: Smart security, bigger walls or other model?
16:45 17:20	Wil Schilders | EU-MATHS-IN Smart Security - Challenges and Opportunities from EU-MATHS-IN Point of View
17:20 17:30	Closing Session

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Aviation Safety Risk Management

David Insua Rios | AXA-ICMAT Chair, ICMAT, CSIC and Royal Academy of Sciences

Despite being key for the global development of aviation, its safety management is pervaded by simplistic methods based on risk matrices. We present an alternative framework to support risk management decisions in aviation safety at state level, taking advantage of big data infrastructures available. After appropriately web scrapping, capturing and filtering data, the framework builds forecasting models for ninety aviation occurrences; forecasting models for their severities (in the ICAO scale 1-5); forecasting models for eight relevant consequences (including deaths, minor and major injuries, delays, maintenance costs, destruction costs, cancellation costs and image costs) and an evaluation model of such consequences, based on a multiattribute utility function. We then use such information to monitor aviation safety, screen occurrences and properly allocate safety resources with an optimization model. The framework has been fully implemented in R! and we shall discuss its application in supporting the development of the aviation safety management system for Spain.

(Joint work in collaboration with AESA Agencia Estatal para la Seguridad Aerea)

Technology as a Security service for Sports

Edgar Barreira | Lap2Go

Take new challenges, take the best picture for Instagram, take fun from the endurance - these are key arguments for the new amateur sport participants in road races, trail running, MTB races or another extreme events. But, who cares about each participant? How technology and mathematics ensures protection for the participants and for the race directors?

The role of mathematical/statistical modelling in monitoring food security

Pietro Gennari | Chief Statistician, Food and Agriculture Organization of the United Nations (FAO)

Food security is a complex, multidimensional concept which has to do with food availability, food accessibility, food use and the stability of all these conditions. Many indicators have been proposed to measure its key dimensions. However, often these indicators are not, or cannot be, directly measured (through survey instruments or

otherwise) either because to collect the appropriate data would be too expensive or because it is recognized that the objective is to measure a latent variable. For these reasons, modelling plays a very important role in food security monitoring. In the paper, the main modelling solutions proposed to address a number of measurement problems of the key indicators of Food availability and Food access are presented.

(Joint work with Carlo Cafiero)

Machine learning in Cybersecurity

Tiago Lousada Soares | GALP Energia

The field of cybersecurity has seen in recent years an increased focus on machine learning and artificial intelligence-based solutions. This presentation will focus on how the application of machine learning models augments traditional detection methods, with practical applications of these models in the field of cybersecurity.

Safety in numbers: Smart prediction of crowd dynamics

Poul Hjorth | DTU - Technical University of Denmark and ECMI Executive Director

Predicting and managing pedestrian crowds, both for safety and for efficiency of transport, presents a challenge in modern cities. I will discuss a relatively new approach, involving a mix of experiments, heuristics, computation, and mathematics to the modelling of such complex systems, and provide some examples.

Blockchain challenge for Maths: The new opportunities of Smart-Contracts and Micro-Economy DAO's.

Fred Antunes | President of the Portuguese Blockchain and Cryptocurrencies Association

In 2017 a new word came up in all the Fintech society because of its disrupt essence: Blockchain. Blockchain itself is a new world for discovering. Smart-Contracts will be the new era of registering code and algorithms and hundreds of projects are being created

everyday using them. The need of each project has its own economy took us to the Decentralized Autonomous Organization concept where the basic economic concepts like inflation, interest rates, scarcity, etc, must be customized and adapted for each project. In this presentation we should go beyond the present and have an overview of the future and technological innovation and what will be the mandatory role of Maths and Mathematic professionals and how their contribute is absolutely indispensable.

Maths for digital privacy.

Rafael Tesoro Carretero | European Commission

Nowadays, privacy in the cyberspace is a relevant domain quite intertwined with cyber security. For example: it has been already raised that we might be very close to the point where an external system can understand your feelings better than you. We discuss some examples on how mathematics provides tools and methods which are arguably practical cornerstones for digital privacy.

Maths for crime prediction

Adérito Araújo | CMUC and ECMI President

It is undeniable that an unfortunate aspect of modern life, technologically and economically more developed, is the presence of crime distributed in major urban areas. This does not only affect countries like Portugal or the European continent but is experienced in all countries around the world. Is possible to perceive that although crime has a ubiquitous character, this does not seem to be uniformly distributed both spatially and temporally.
In criminology, mathematical models can be very useful tools in the fight against crime. In fact, criminal activities have evolved in tandem with changes in technology. Crime has become more sophisticated, organised and transnational. With the changing nature of crime, the traditional approaches to tackle it are quickly becoming obsolete and there is a growing need for a new way of thinking to face that challenge head on. In this lecture we present an overview as well as some results regarding the problem of house burglary prevention.

TBA

TBA | TBA

TBA

Explosive Europe: Smart security, bigger walls or other model?

Pedro Sousa | DEEC FCT UNL, HOLOS, EPL

The Humanist and Decent Europe (the Europe of values) will perish to the void of human development. In its periphery, in Africa and Middle East, population increases and diminishes the distributed wealth. Internally, a consumer society prevails discarding the elders, overprotecting or ignoring the youngest. This exhausted model compromises the postwar peace, which is taken for granted.
Europe of Utopia does not defend itself with security or walls, but with education, integration and a new development model.
We know it, but we do not understand it. We do not act!
Meanwhile, all those who say - this has always been the case and never ever so many all over the world lived so well - are right!

Smart Security - Challenges and Opportunities from EU-MATHS-IN Point of View

Wil Schilders | President of EU-MATHS-IN

Smart security is one of the areas where mathematics plays an essential role. Our defence relies on advanced engineering and technology underpinned by sophisticated mathematical modelling, whilst our national security as well as the security of our financial system has long depended on sophisticated mathematics and remains a major employer of very high-calibre mathematicians. Many other challenges in industry and society are also becoming increasingly more complex, and the only way to master this complexity is the use of sound mathematical techniques. Therefore, strong incentives should be put in place for cross-disciplinary work between the mathematical sciences and other disciplines. New mathematical understanding does not come out of the ether. It requires investment in the pure mathematics that underlies all the rest, in the applications working with partners and other disciplines, in the people, particularly the young who will take it forward, and in understanding of mathematics from the top CEOs and ministers to those in the more technical areas who will do the 'hard graft.' EU-MATHS-IN has been founded to exactly achieve these objectives. In the presentation, some examples of how we approach this will be given.

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