Artificial Intelligence and the Water Industry in 2054

António Câmara

CENSE

NOVA School of Sciences and Technology

February 28th, 2024

Artificial Intelligence and the Water Industry in 2054
Humans, Machines and Nature

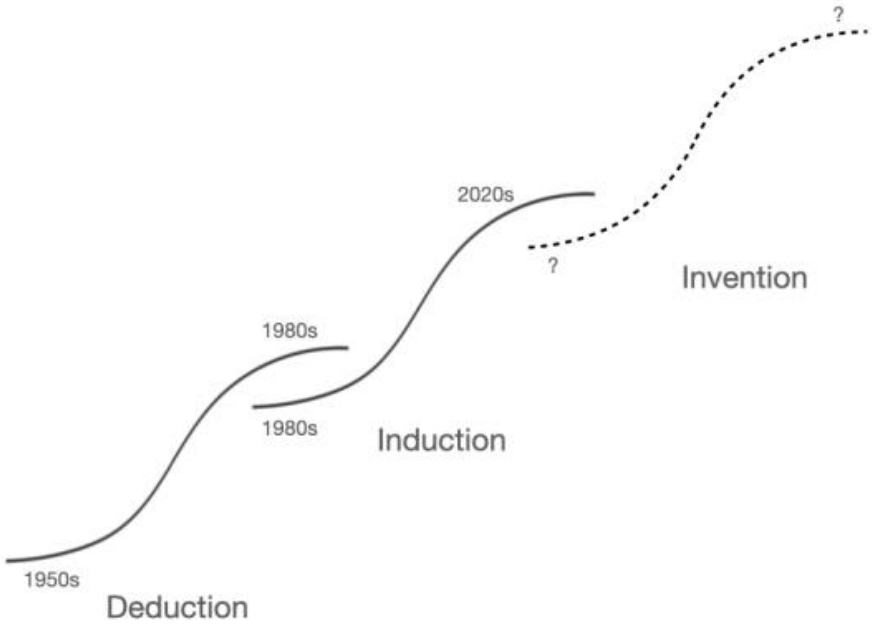
Humans and Industries

Humans and Machines

Humans and Nature

Humans, Machines and the Water Industry in 2050's

From 2024 to 2054



[10 Grand Challenges We Will Face in 2050]

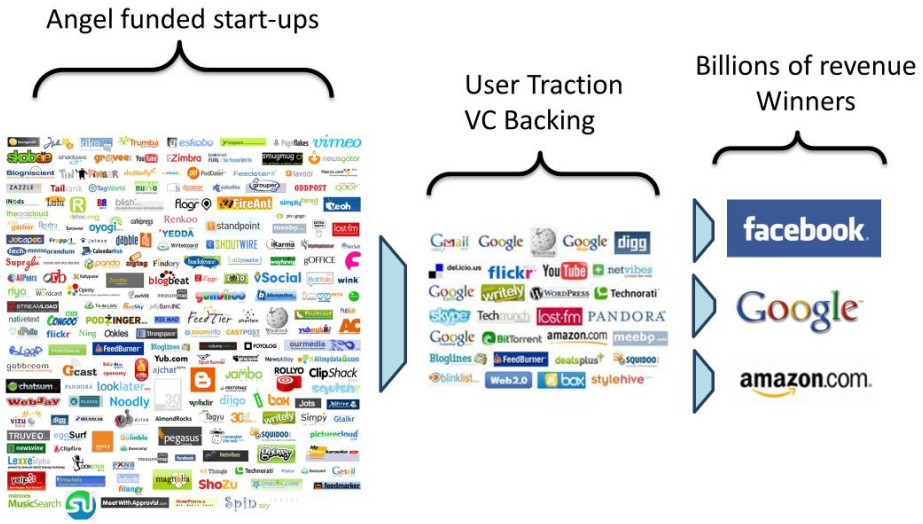
Humans and Industries

A Game and a Game on top of the Game

“We blacks dominate basketball.
Then the whites developed a game on top of our game called NBA”

The Driving Game

The Silicon Valley Model

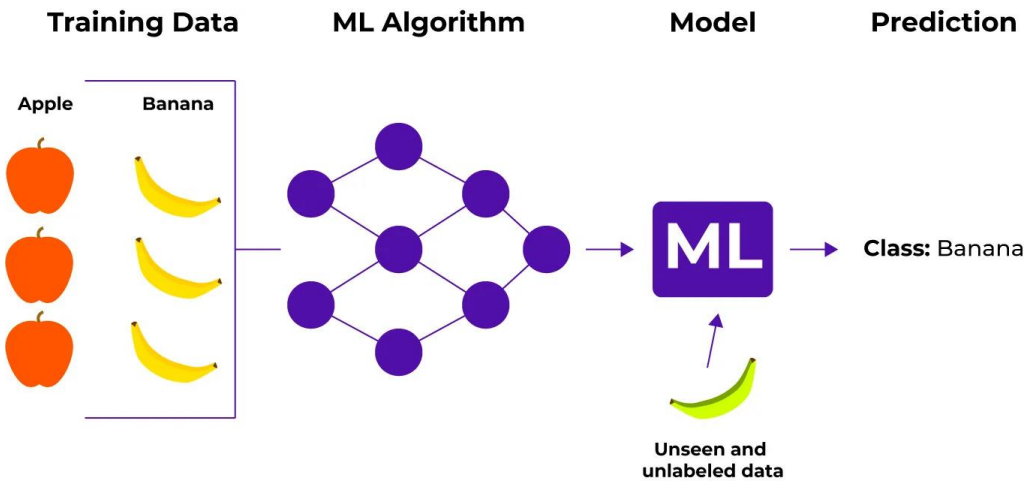


Picture Credits: Ludwig Gatzke

Humans and Machines

AI fundamentals

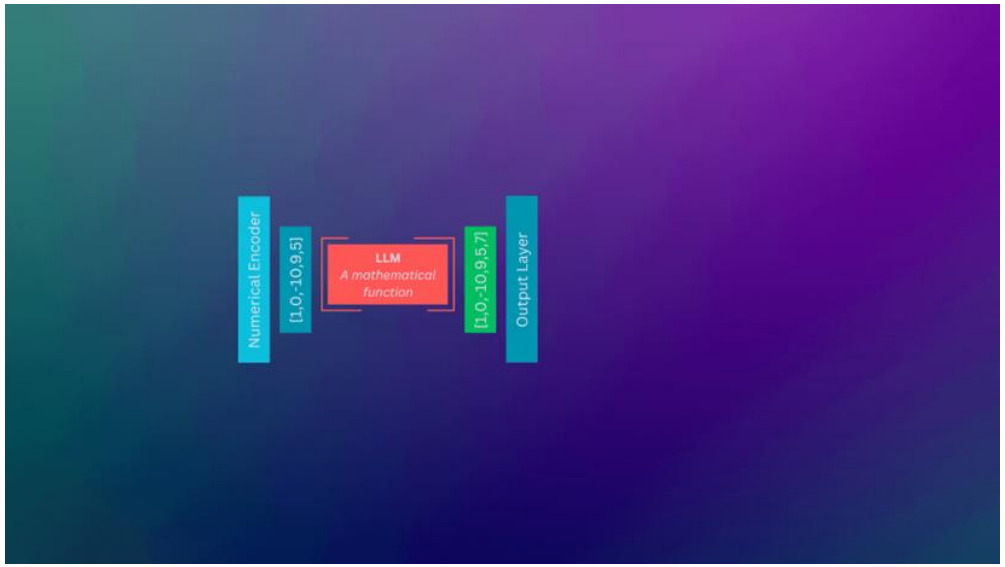
Biological inspired beat symbolic inspired AI- neural networks



[An AI Engineer's Guide to Machine Learning and Generative AI]

Generative AI

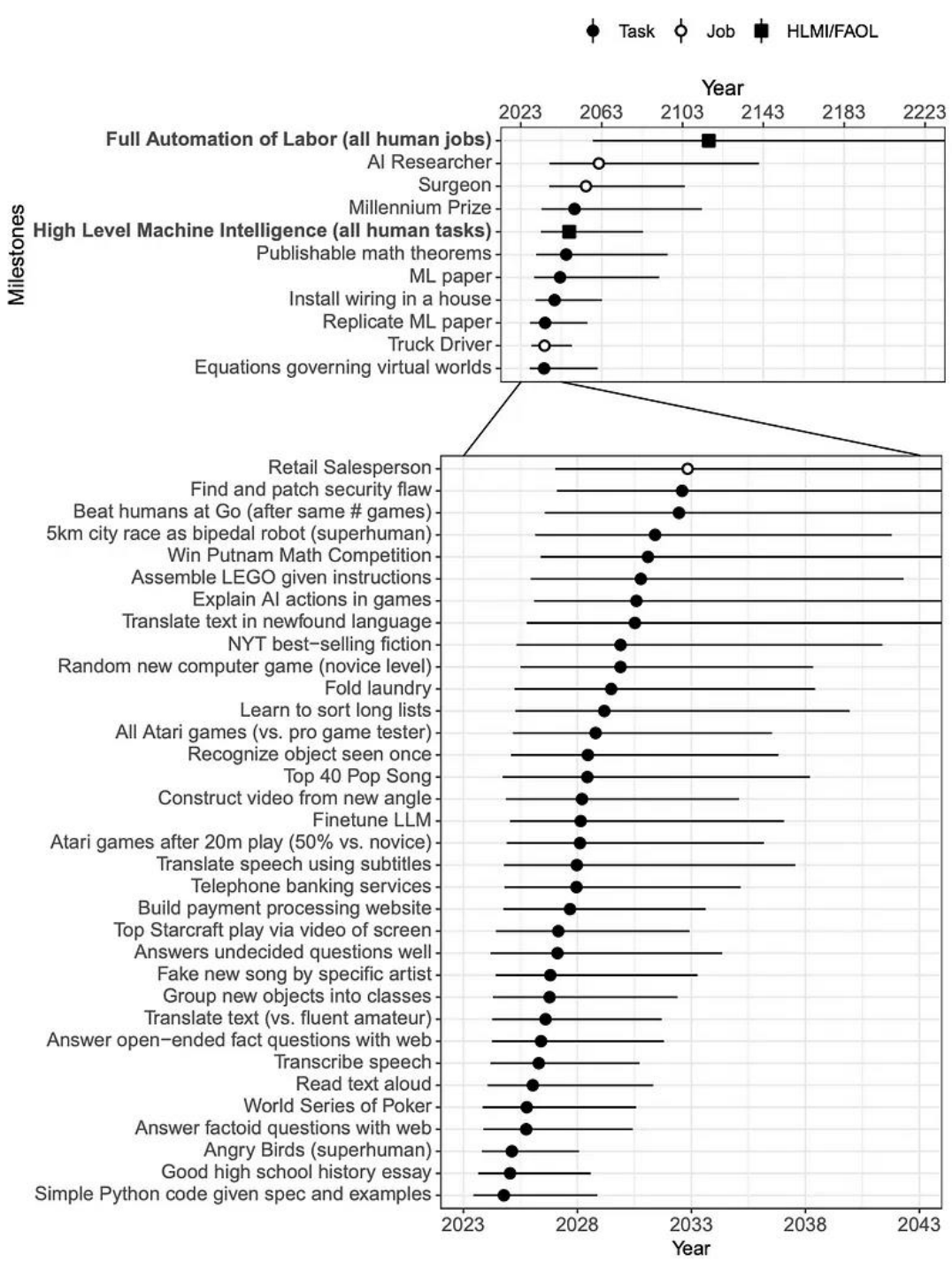
Large Language Models (LLMs) and Large Multimodal Models (LMMs)



Prompt: Drone view of waves crashing against the rugged cliffs along Big Sur's garay point beach. The crashing blue waters create white-tipped waves, while the golden light of the...
more

0:05 / 0:08

This video was created with OpenAI' Sora



High-Level Machine Intelligence- HLMI (2047)

Full Automation of Labor (2116)

Cezary Gesikowski, Redefining Tomorrow: AI Researchers Unveil a Startling Future, February 2024

Humans and Machines

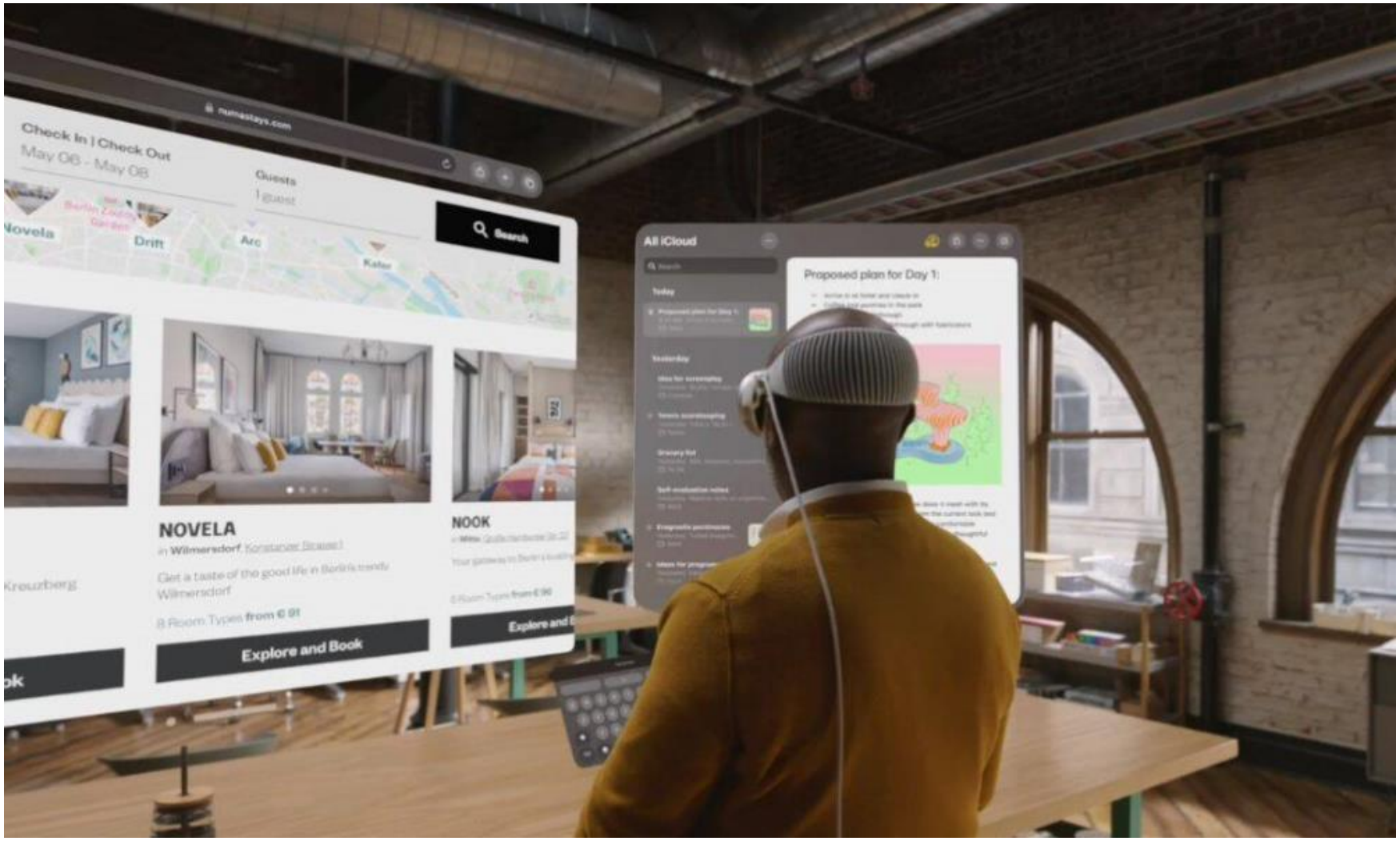
Spatial Computing base knowledge- AI/AR/VR/Robotics

YVision mathematics

- 3D Rendering: Linear Algebra - Differential Geometry - Geometry (Projective Transformations)
- Physics Simulation: Linear Algebra - Differential Calculus - Integral Calculus - Numerical Analysis (for approximating continuous mathematics)
- Computer Vision: Linear Algebra - Geometry (Homographies, Projective Transformations) - Cellular Automata - Convolutions - Fourier Analysis
- Synthesis and Transform Audio: Fourier Analysis, Synthesis and Transform
- Machine Learning: Statistical Analysis - Artificial Neural Networks - Principal Component Analysis - Regression - Function Approximation
- Evolutionary Computation Core Framework: Lambda Calculus (root of functional programming) - Turing Machines - Theory of Computation

Spatial Computing developments

The YDreams Collection



Disney’s Apple Vision Pro sizzle reel

Humans and Machines

AI and the Water Industry

Water Quality Monitoring and Management

Smart Water Distribution Networks

Predictive Maintenance

Water Conservation and Demand Management

Water Resource Management

Flood Prediction and Management

Water Treatment

[Artificial Intelligence Is Going to Shape the Future of Water]

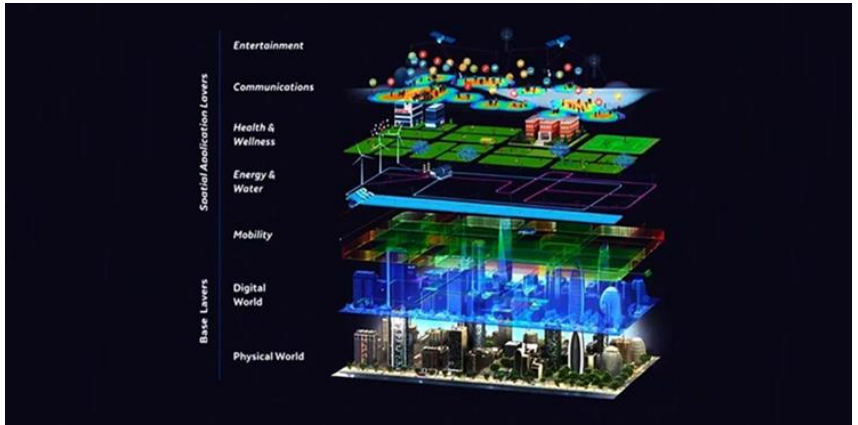
Spatial Computing and the Water Industry

The Data World

The Augmented World

The Digitally Twinned World

The Virtual World



Humans and Nature

The opportunities

Intrinsic markets

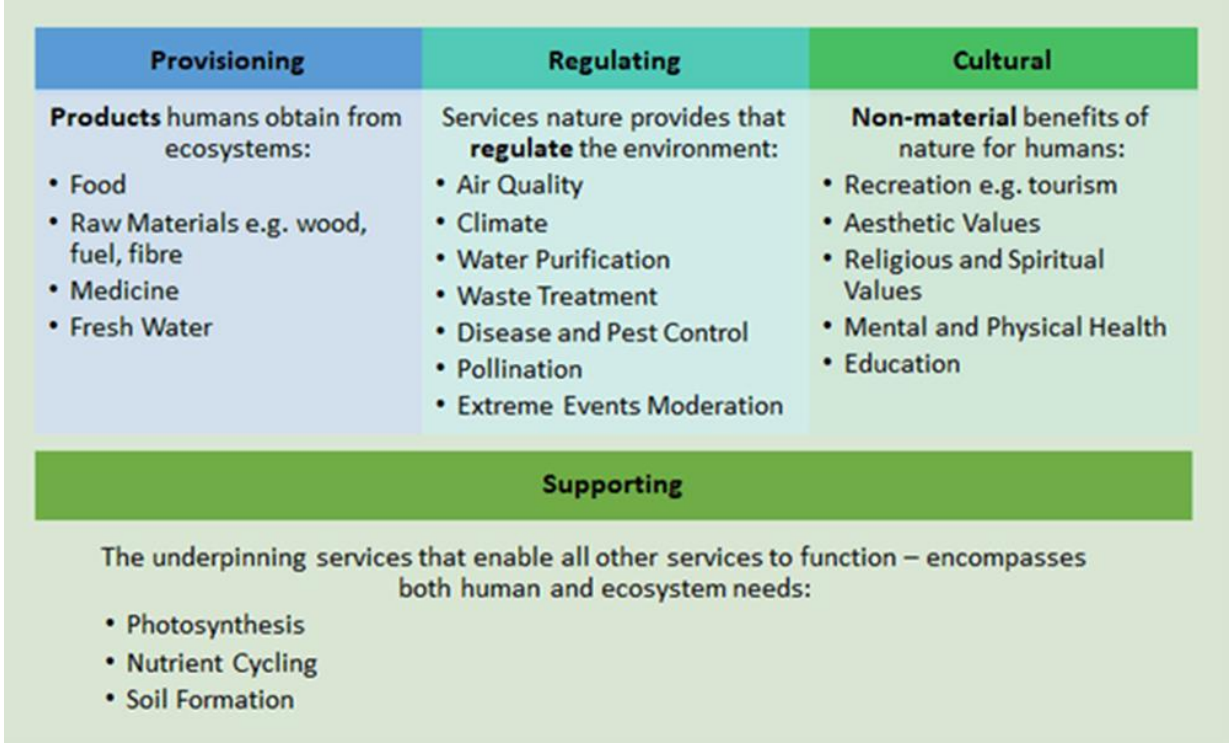
The Real, Data, Augmented and Digitally Twinned Worlds

Offset markets

The Digitally Twinned World

Derivative markets

The Real and Virtual Worlds



Ecosystem Services: the Fundamentals

Humans, Machines and the Water Industry in 2054

The game

Augmented Reality (AR) for Infrastructure Inspection and Maintenance

Virtual Reality (VR) for Training and Simulation

Digital Twins for Asset Management

Spatial Analytics for Planning and Optimization

Geospatial Visualization for Emergency Response

Smart Water Management Systems

Aquatic Environmental Monitoring

Interactive Public Engagement

The game on top of the game

Intellectual property to water resources related spatial computing software, hardware and data that can be licensed

Intellectual property related to hybrid water resources management Large Multimodal Models

New revenue streams from offset and derivative markets

A World class ecosystem of government, companies and research groups

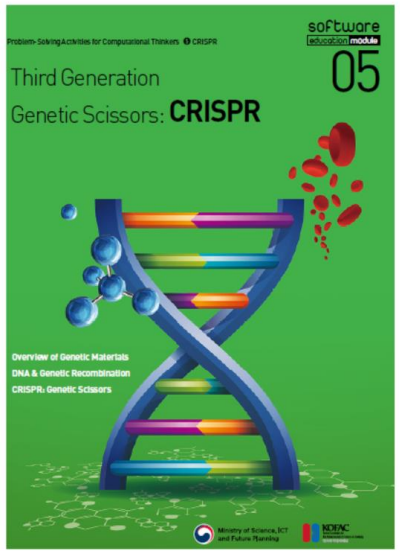
Large Language Models Empowered Agent-based Modeling and Simulation: A Survey and Perspectives

From 2024 to 2054

The knowledge transition

Learning from KOFAC (South Korea) program for 9th year students

1 Artificial Intelligence
2 Driverless vehicles
3 Internet of things
4 Virtual reality
5 CRISPR
6 Space launch vehicles
7 Natural disasters
8 Smart medicine
9 Game engines
10 Sports statistics



Alexander Von Gabain on EU's Innovation Model

Societal Transformation 2018-2037: 100 anticipated radical technologies, 20 regimes, case Finland

The environmental, social, governance and financial transitions

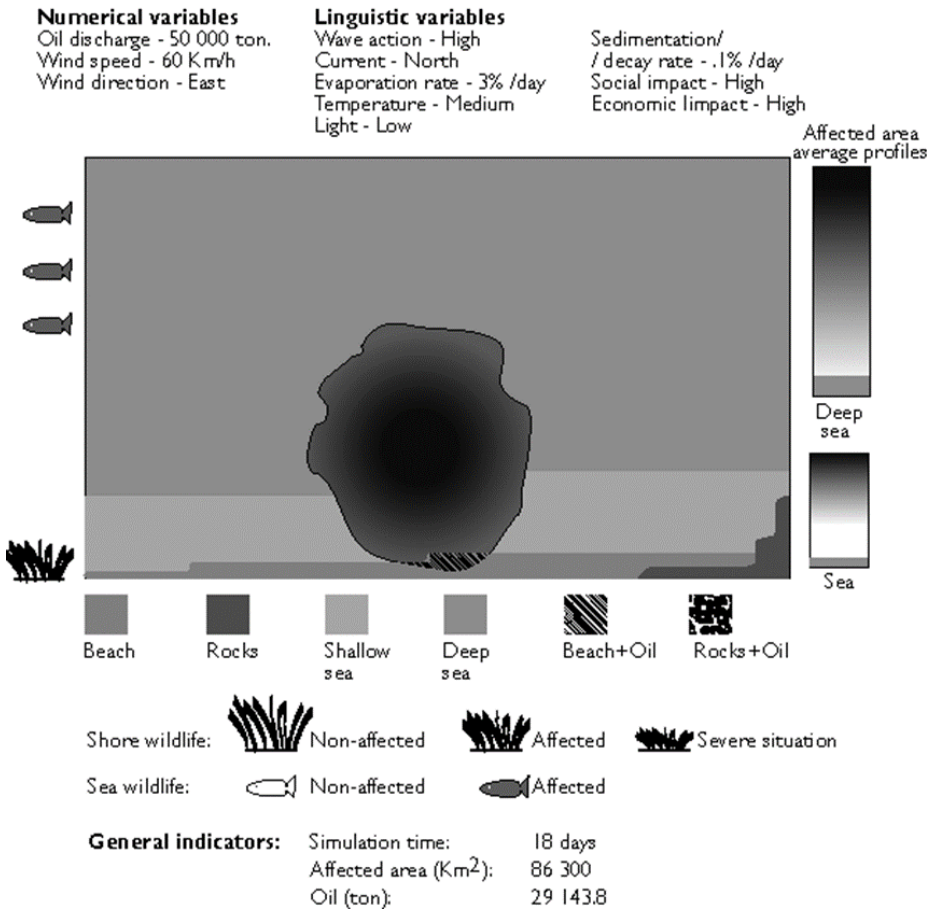
Coordinated Governance of Decentralized Autonomous Organizations (DAOs)

New Generation Communication, Telepresence and Teleoperation Platforms (the new Decision Theaters)

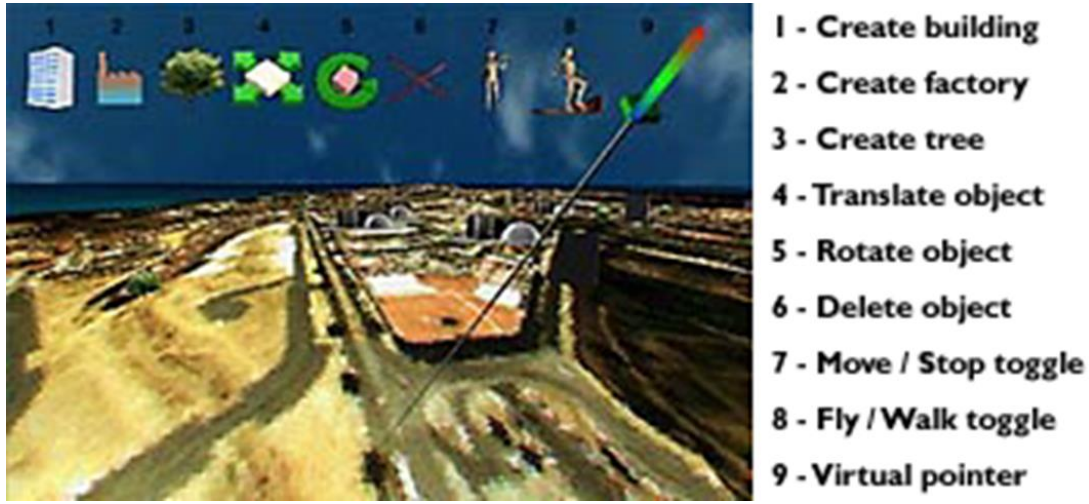
Multi-level Markets: new generation Capital Markets, full blown Nature Markets (water, carbon, bio-diversity)

DAOs, A Canon

1990’s



[Multidimensional Simulation Applied to Water Resources Management]



[Virtual Environments and Water Quality Management]

antonio.camara@fct.unl.pt

The YDreams Collection