



ITAKA: general information

ITAKA

Intelligent Technologies for
Advanced Knowledge
Acquisition

This is a group with the Catalan label of “grup consolidat”

We are 9 doctors and 15 PhD students

Research Lines:

1. Data analysis and decision support. Dr. Aïda Valls
2. Semantic text analysis and explainability. Dr. Antonio Moreno
3. Computer vision and robotics. Dr. Domènec Puig

Website: <https://deim.urv.cat/~itaka>



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EUSFLAT



EUROPEAN SOCIETY
FOR FUZZY LOGIC
AND TECHNOLOGY

EW
G

MCDA
MULTIPLE CRITERIA
DECISION AIDING



xartecsalut



XARXA
RDI·IA

TECNATOX

- **Research Interests:**

- Data & Image Analysis
- Computer Vision
- Pattern Recognition
- Machine Learning
- Artificial Intelligence
- Autonomous perception and navigation
- Scene understanding
- Vision-based robotic systems

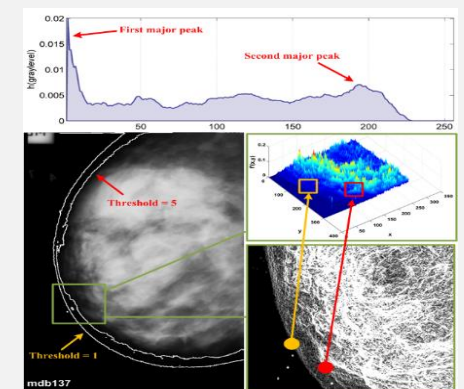
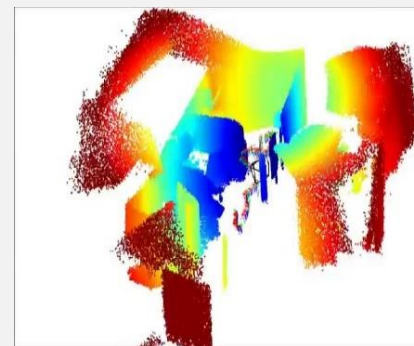
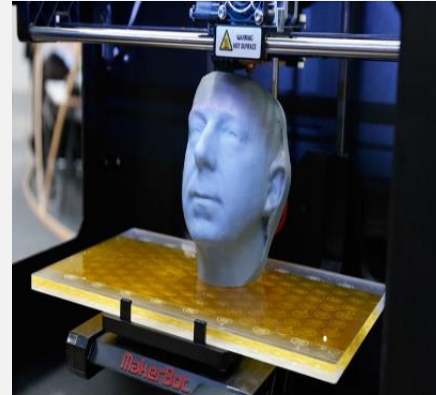
- **Applications:**

- Healthcare
- Smart City
- Industry

- **Spin-off :**



- UP2Smart is a technological based spin-off company born at URV within the Intelligent Robotics and Computer Vision lab of ITAKA group

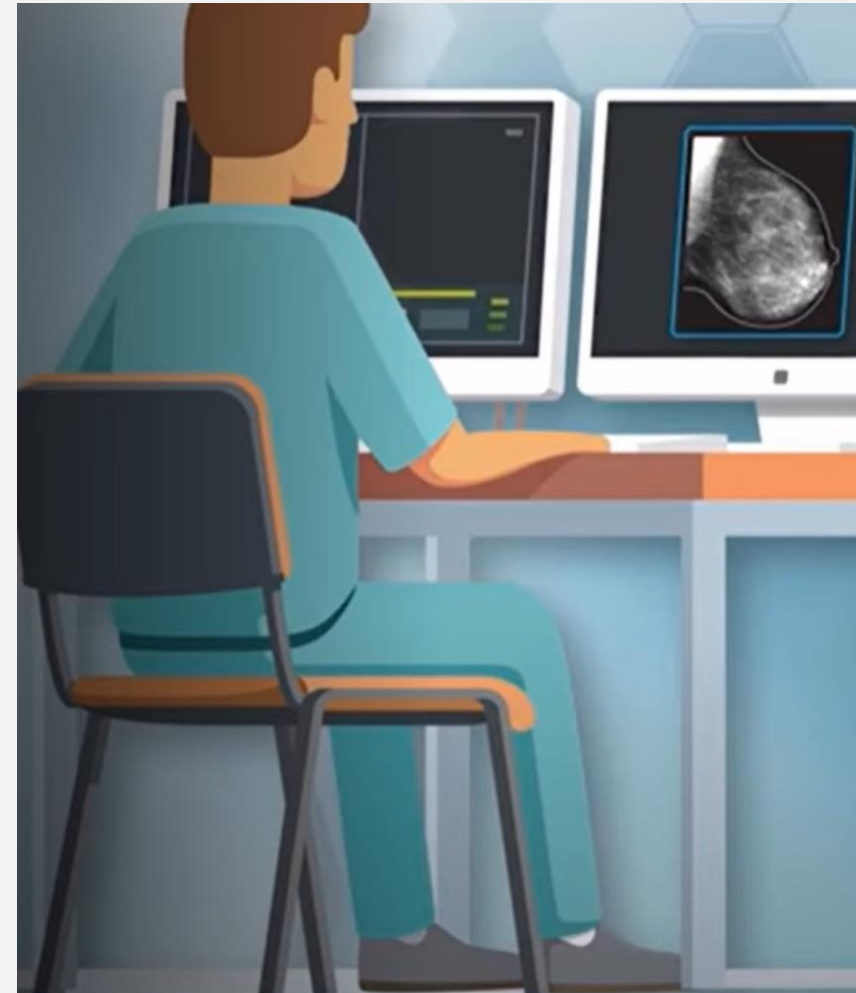


Healthcare solutions for early detection currently under R&D



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- *Breast cancer*
- *Skin cancer*
- *Lung cancer*
- *Acromegaly*
- *Atrial fibrillation*
- *Diabetic retinopathy*
- *Health monitoring*

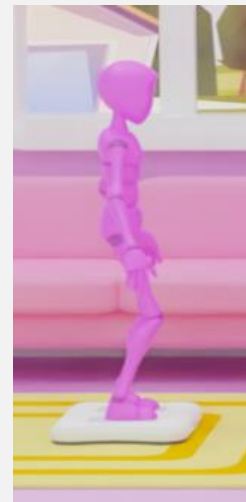
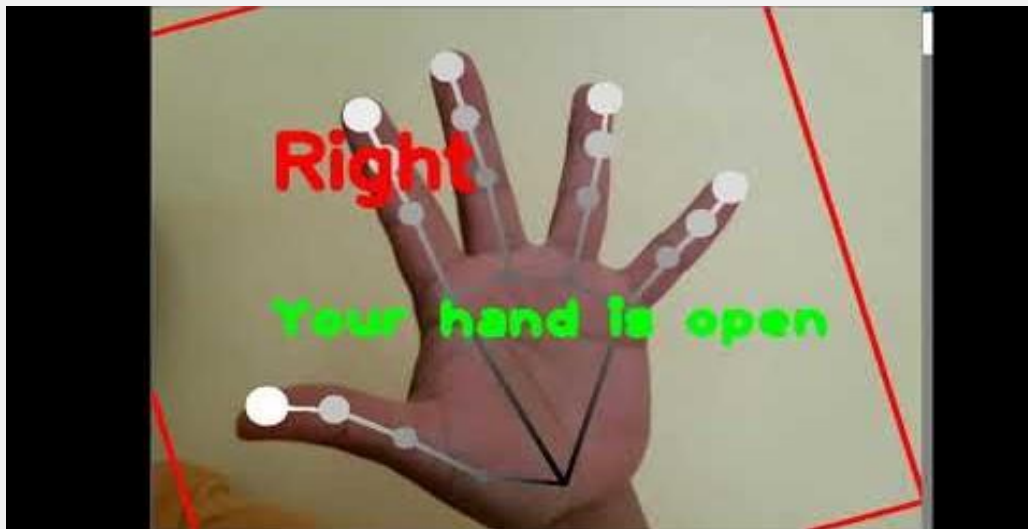
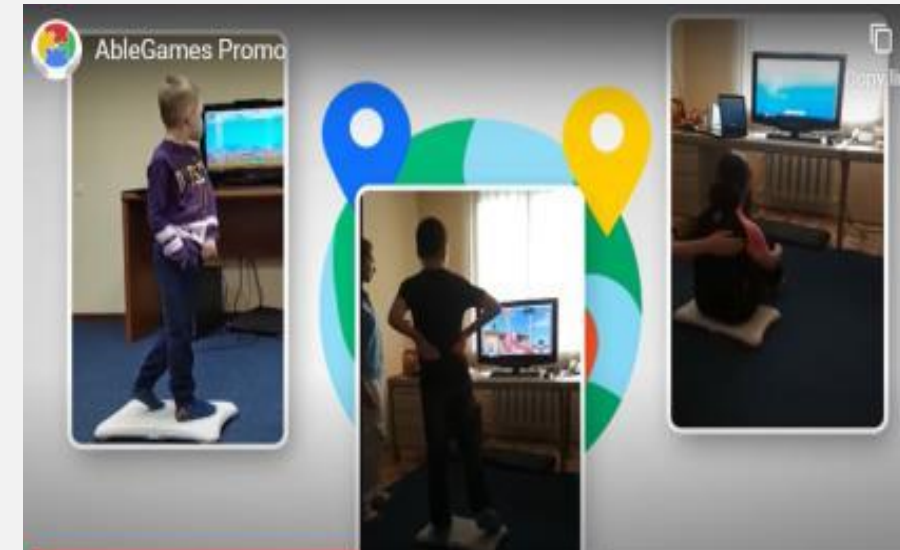


Serious Games (H2020 EU funding projects)



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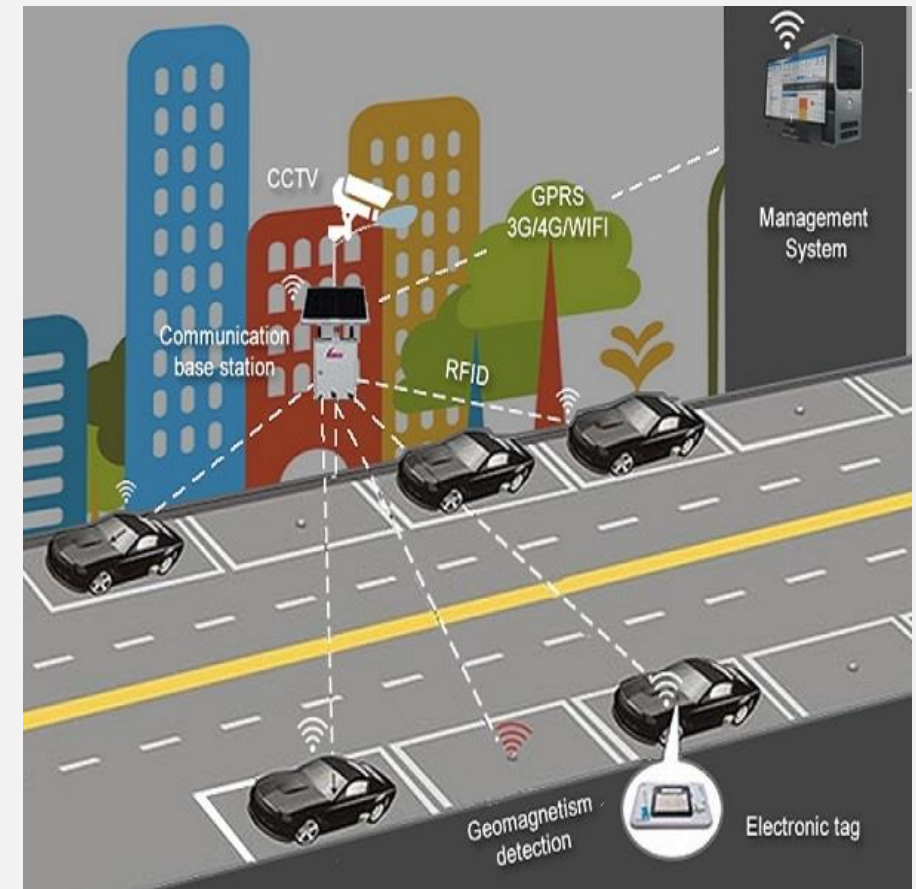
- Online video games service for youths with Cerebral Palsy (CP),
- GABLE and ABLEGAMES Platforms of games for improving motor skills and visual-motor coordination for youths with CP.



Smart Cities R&D (PECT Project)

Main features that we can provide for smart cities:

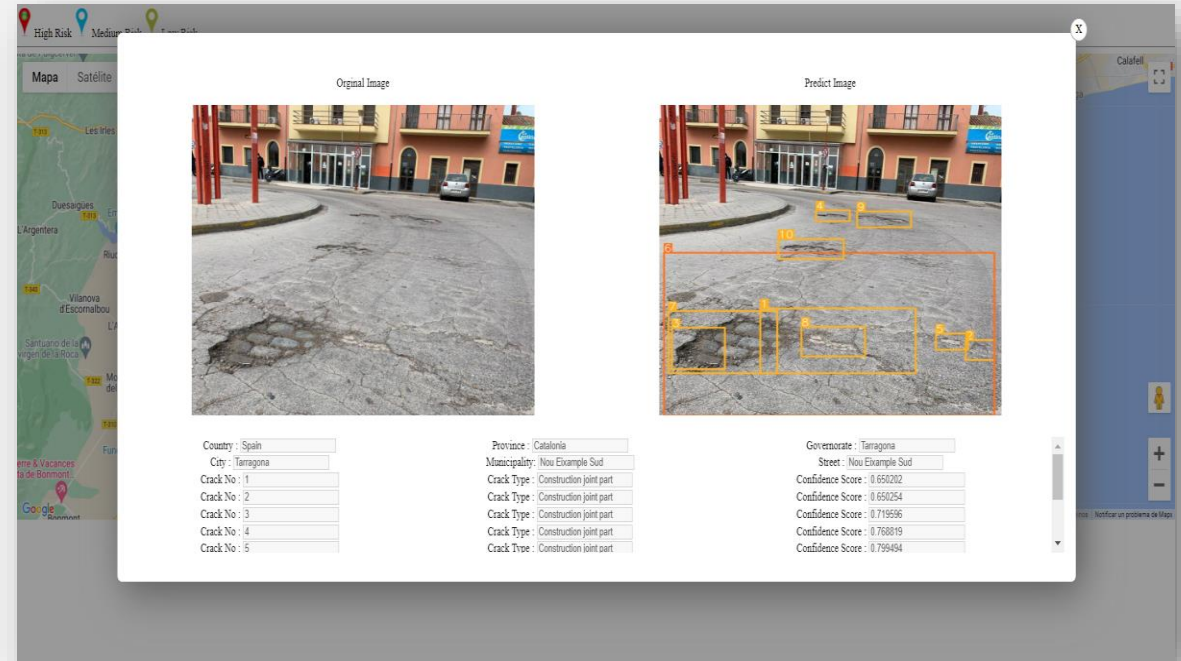
- **Automatic detection of road damage**
- **Free spots** in smart parking detected using cameras
- **Abnormal events detection** in public places
- **Traffic congestion detection** on the road
- **People counting and tracking** in public places to **avoid dangerous situations**
- **Facial verification and identification**
- **Automatic entry registration**



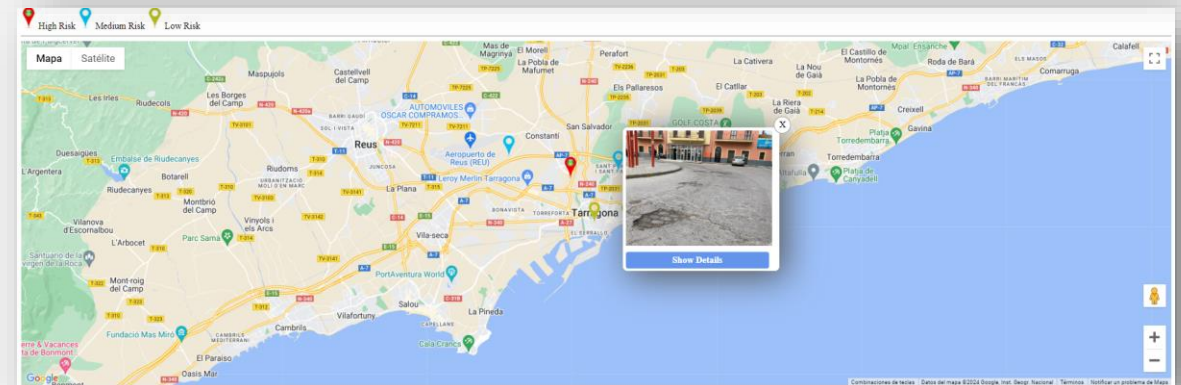
Smart Cities R&D (PECT Project)



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- Real time assets/events localization, inspection and monitoring:
 - Heatmaps generation, automatic reporting with geolocated data.
 - Automatic detection and classification of damaged sectors in the roads/train railways, etc.



Automatic object detection in real-time



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Diabetic retinopathy R&D (ETH EU project- NEVERBLIND)



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Retinal Fundus images analysis:

- Quality assessment techniques
- DR risk prediction
- DR grading
- DR detection

The screenshot displays the 'UP2SMART' web interface. At the top, there are navigation buttons for 'Retiprogram', 'MIRA', 'Logout', and a 'Language' dropdown. Below this, the 'Images attached' section shows a small thumbnail of the fundus image. The main area features a large, circular fundus image with a black circle highlighting a specific region. To the right, the 'Analysis result' section provides the following data:

- Image type: Eye
- Probability: 100.00 % (indicated by a full green bar)
- Gradability: 99.85 % (indicated by a nearly full green bar)
- Diabetic level: NO Dr

The screenshot shows the 'UP2SMART' web interface for the 'Retiprogram' section. It includes a form for 'Patient's input data' and a 'The results' section. The form contains the following fields:

Patient's input data		
Current age in years	Gender	Evolution time of diabetes in years
50	Female	15
Type of treatment	HbA1c: Glycated hemoglobin	CKDEPI: Estimated glomerular filtration rate
Insuline	15	25
MA: Microalbuminuria	BMI: Body Mass Index	HTAR: Control of arterial hypertension
2	25	Good control

Below the form is a blue button labeled 'Calculate the risk of developing diabetic retinopathy'. The 'The results' section displays:

Is there any risk?	Certainty in percentage	Need to be checked by a:
POSITIVE	96	OPHTHALMOLOGISTS

At the bottom of the interface, there are logos for the University of Rovira i Virgili, UP2SMART, and IISPV (Institut d'Investigació Sanitària Pere Virgili).

UP2Smart products business line: NeverBlind

UP2Smart healthcare solutions

NEVERBLIND

AI based platform for **prevention** and **early detection** of Diabetic Retinopathy neverblind.ai

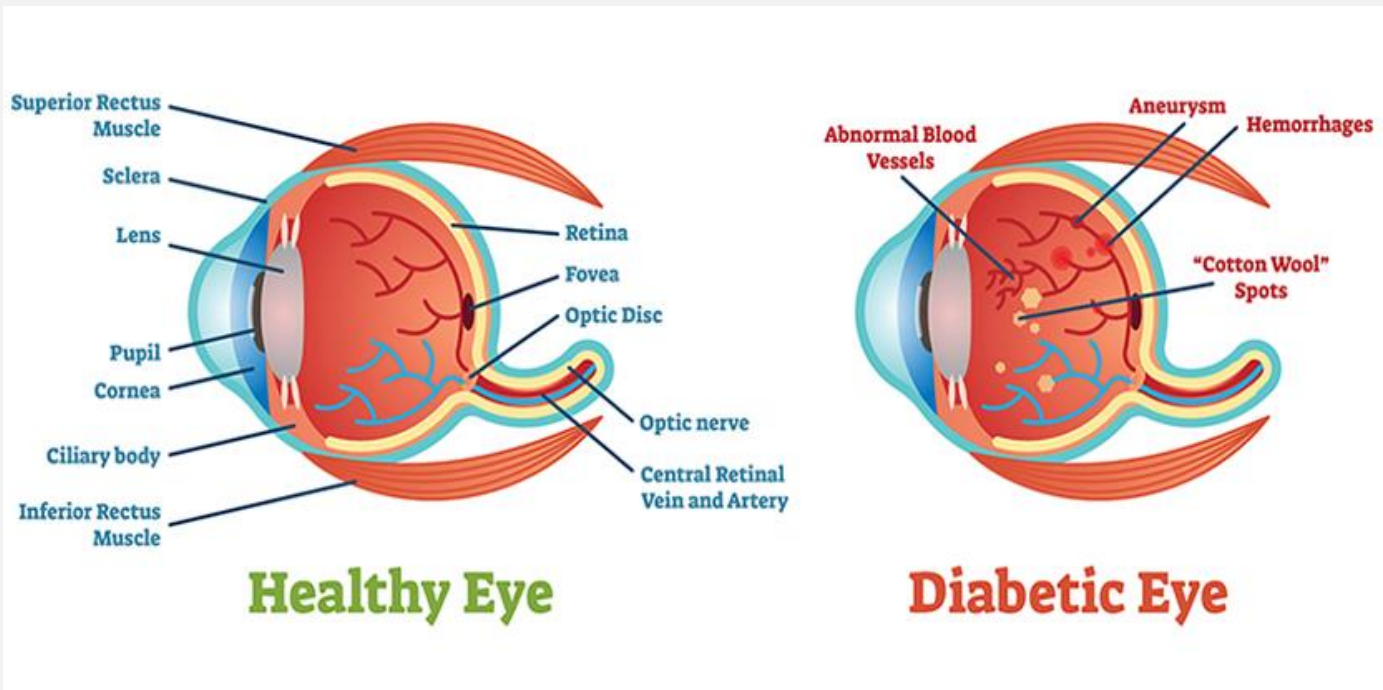
Currently, in the process of medical software certification (CE mark).
The software will be sold by www.retinareadtisk.eu



NEVERBLIND

AI based platform for **prevention** and **early detection** of Diabetic Retinopathy

neverblind.ai





NEVERBLIND

MIRA

RETIPROGRAM

Two copyrighted softwares which are the result of more than 10 years of multidisciplinary research



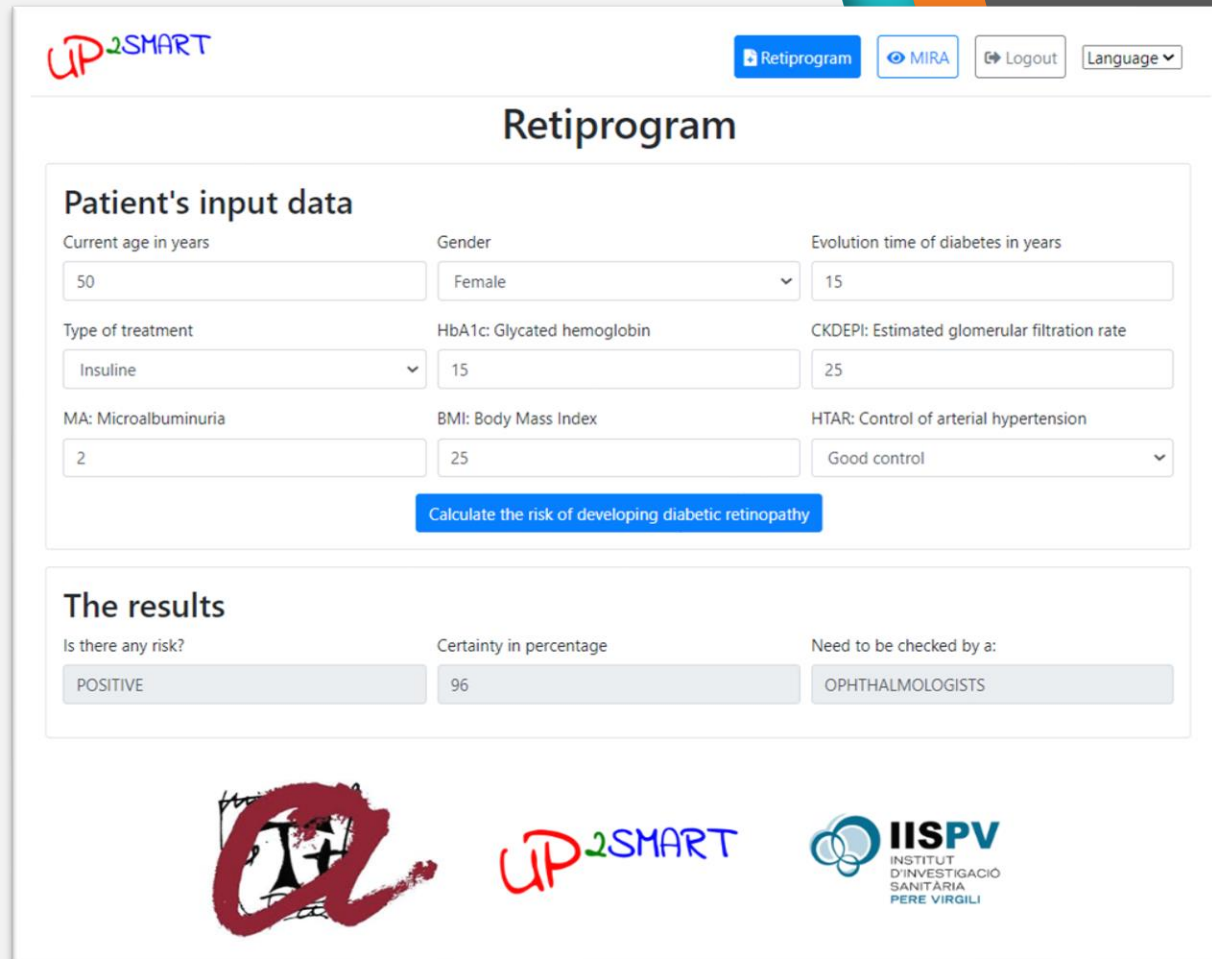
MIRA: Automatic classifier of eye fundus images for detecting the degree of diabetic retinopathy

The screenshot displays the MIRA web application interface. At the top left is the logo for UP-SMART. Navigation buttons include 'Retiprogram', 'MIRA', and 'Logout', along with a 'Language' dropdown menu. The interface is divided into three main sections:

- Images attached:** A small thumbnail of the fundus image is shown with the label 'ljpeg' below it. A button at the bottom left of this section says 'Upload or drag more images'.
- Image view:** A large, circular fundus image is displayed in the center. A small black circle is visible at the bottom of the image, likely indicating a region of interest or a specific feature.
- Analysis result:** This section on the right provides the following information:
 - Image type: Eye
 - Probability: 100.00 % (indicated by a full green progress bar)
 - Gradability: 99.85 % (indicated by a nearly full green progress bar)
 - Diabetic level: NO Dr

RETIPROGRAM: A clinical decision support system for Diabetic Retinopathy prevention and early detection using clinical data

- Fuzzy expert systems
- Continuous dynamic learning from examples
- Sequential analysis of retrospective health care data
- Explainability

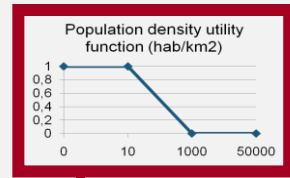


The screenshot shows the Retiprogram web application interface. At the top left is the logo 'UP2SMART'. On the top right are navigation buttons for 'Retiprogram', 'MIRA', 'Logout', and a 'Language' dropdown menu. The main heading is 'Retiprogram'. Below this is a section titled 'Patient's input data' containing several input fields: 'Current age in years' (50), 'Gender' (Female), 'Evolution time of diabetes in years' (15), 'Type of treatment' (Insuline), 'HbA1c: Glycated hemoglobin' (15), 'CKDEPI: Estimated glomerular filtration rate' (25), 'MA: Microalbuminuria' (2), 'BMI: Body Mass Index' (25), and 'HTAR: Control of arterial hypertension' (Good control). A blue button labeled 'Calculate the risk of developing diabetic retinopathy' is positioned below these fields. The 'The results' section displays: 'Is there any risk?' (POSITIVE), 'Certainty in percentage' (96), and 'Need to be checked by a:' (OPHTHALMOLOGISTS). At the bottom of the interface are three logos: a red circular logo with a stylized 'A', the 'UP2SMART' logo, and the 'IISPV INSTITUT D'INVESTIGACIÓ SANITÀRIA PERE VIRGILI' logo.

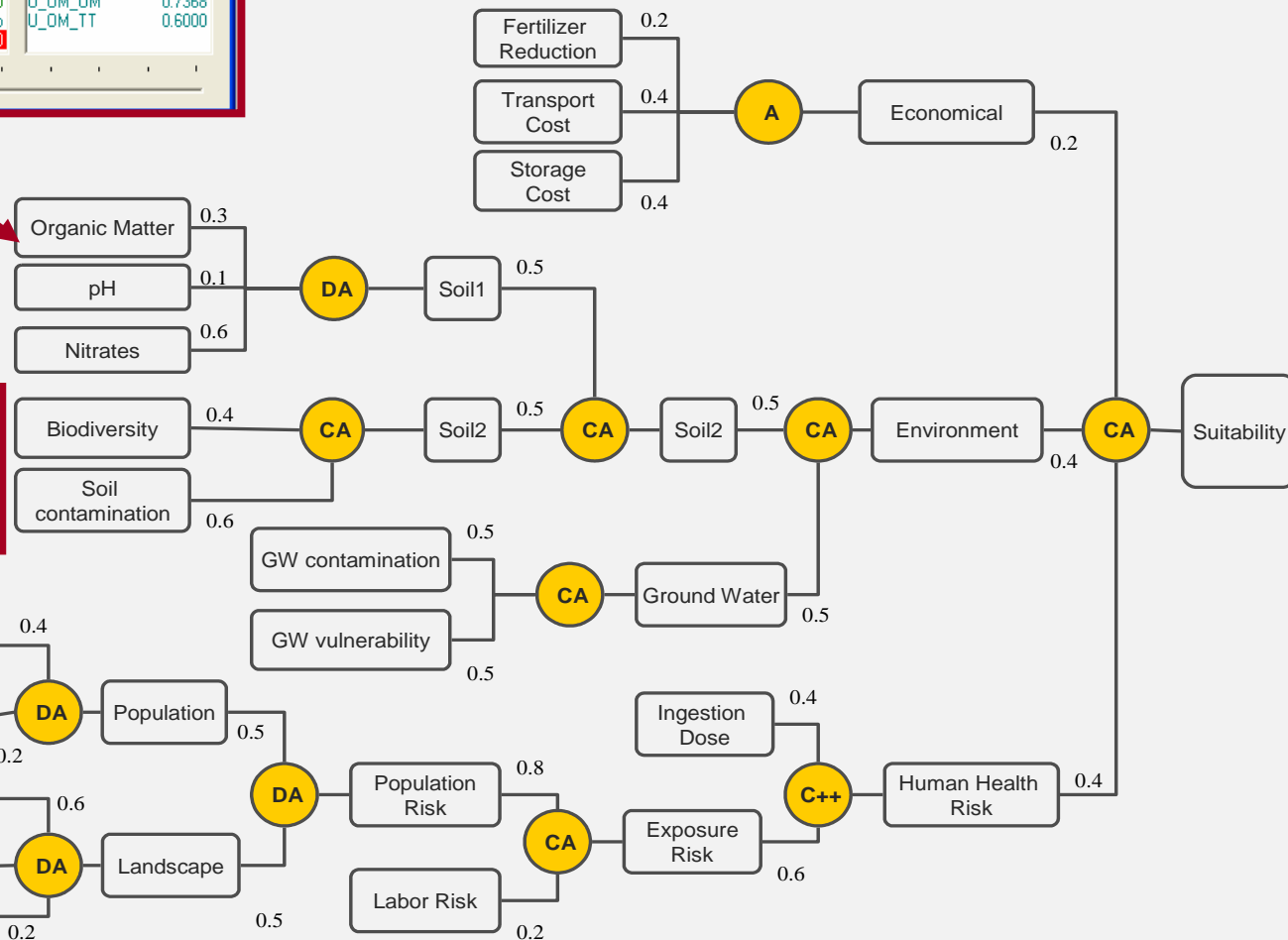
Data analysis and decision support



Watch: Interactive Debug Mode			
Inputs:		Outputs:	
Sludge_DM	50.5000	U_DM_DM	0.7368
Sludge_TT	Termico	U_DM_TT	0.6000
Soil_DM	0.5000		



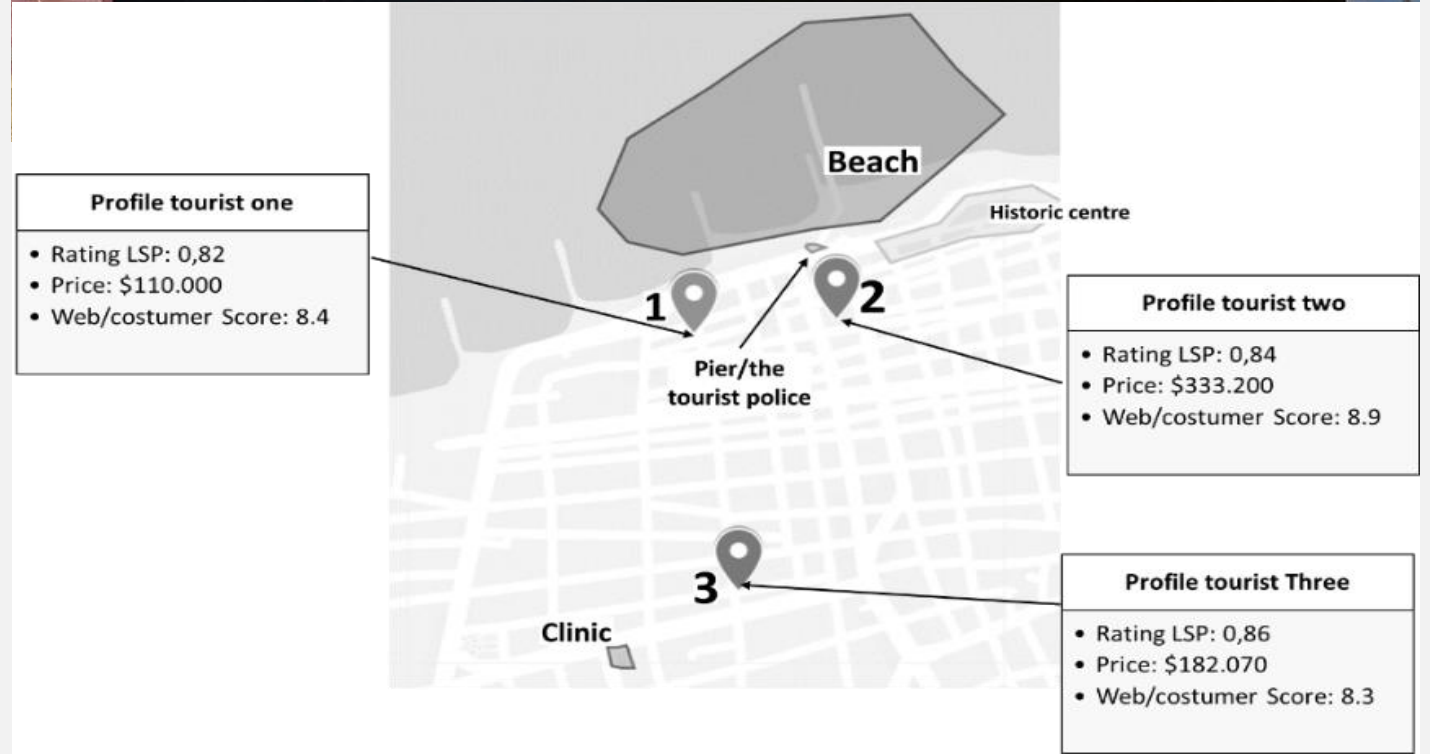
- Decision Support Systems
- Complex problems
- Uncertainty modelling
- Data fusion



Data analysis: recommender systems in Tourism



- Personalization
- Multi-criteria evaluation
- Rating and ranking of: hotels, restaurants, touristic activities
- Social media analysis for brand communication, sentiment detection, etc.





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