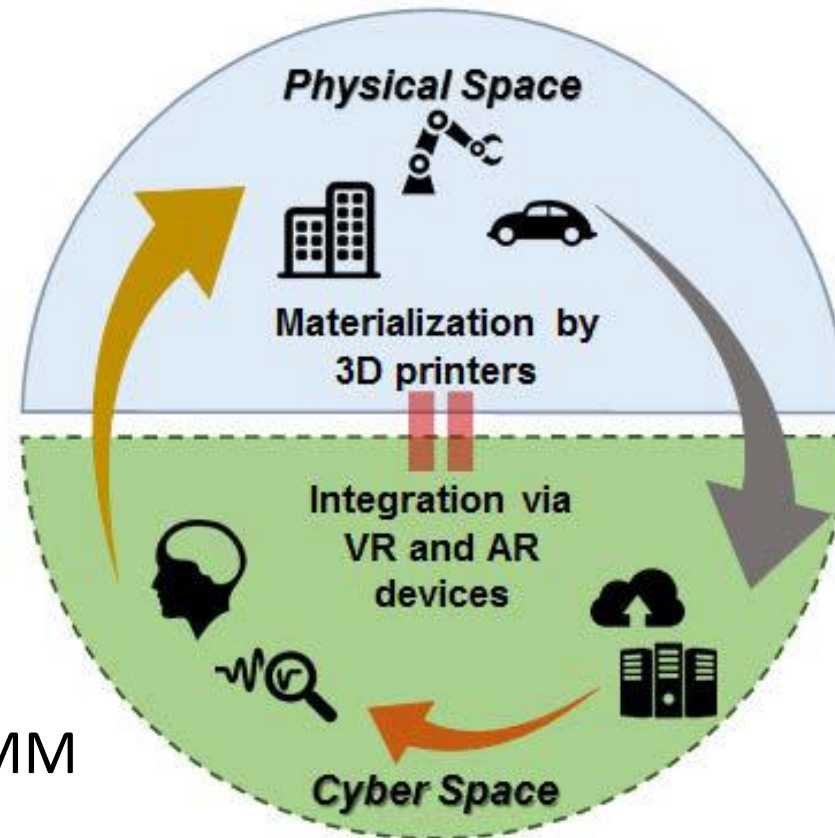# Από Industry 4.0 σε Society 5.0

Εφαρμογές με μηχανές & ρομπότ

Συλλογή δεδομένων με αισθητήρες & συσκευές
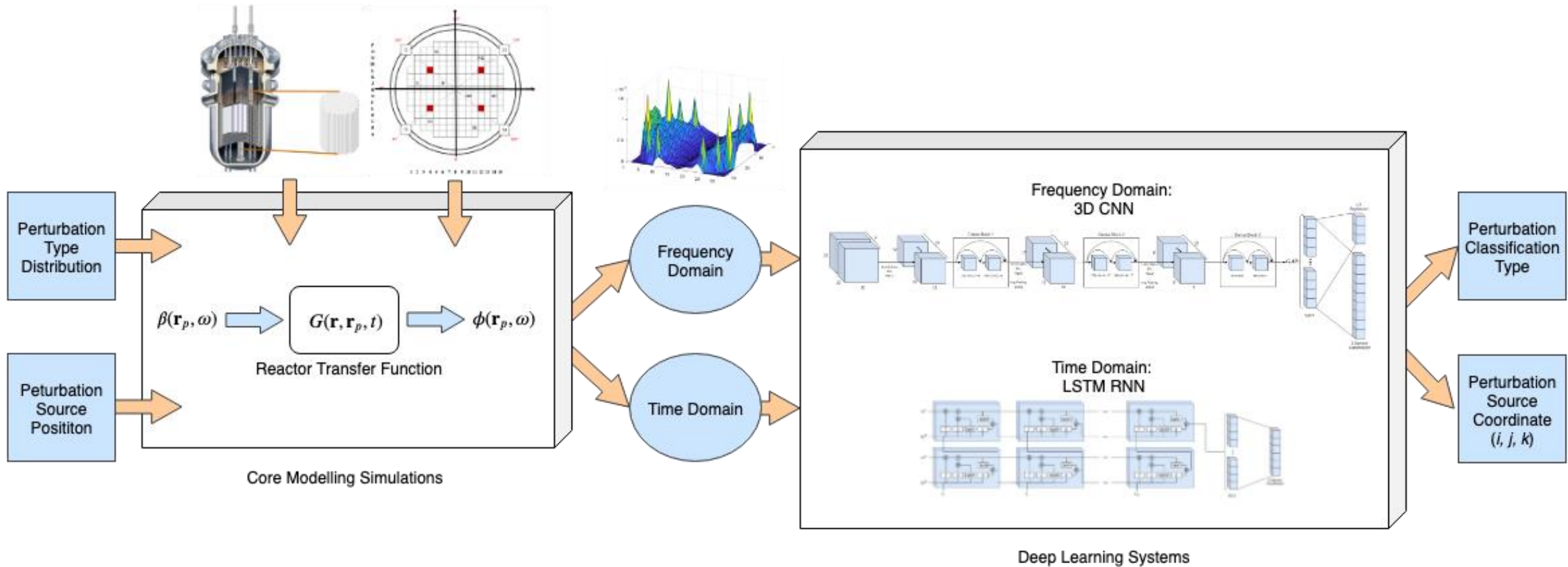

Ανάλυση με τεχνικές ΤΝ, ΜΜ

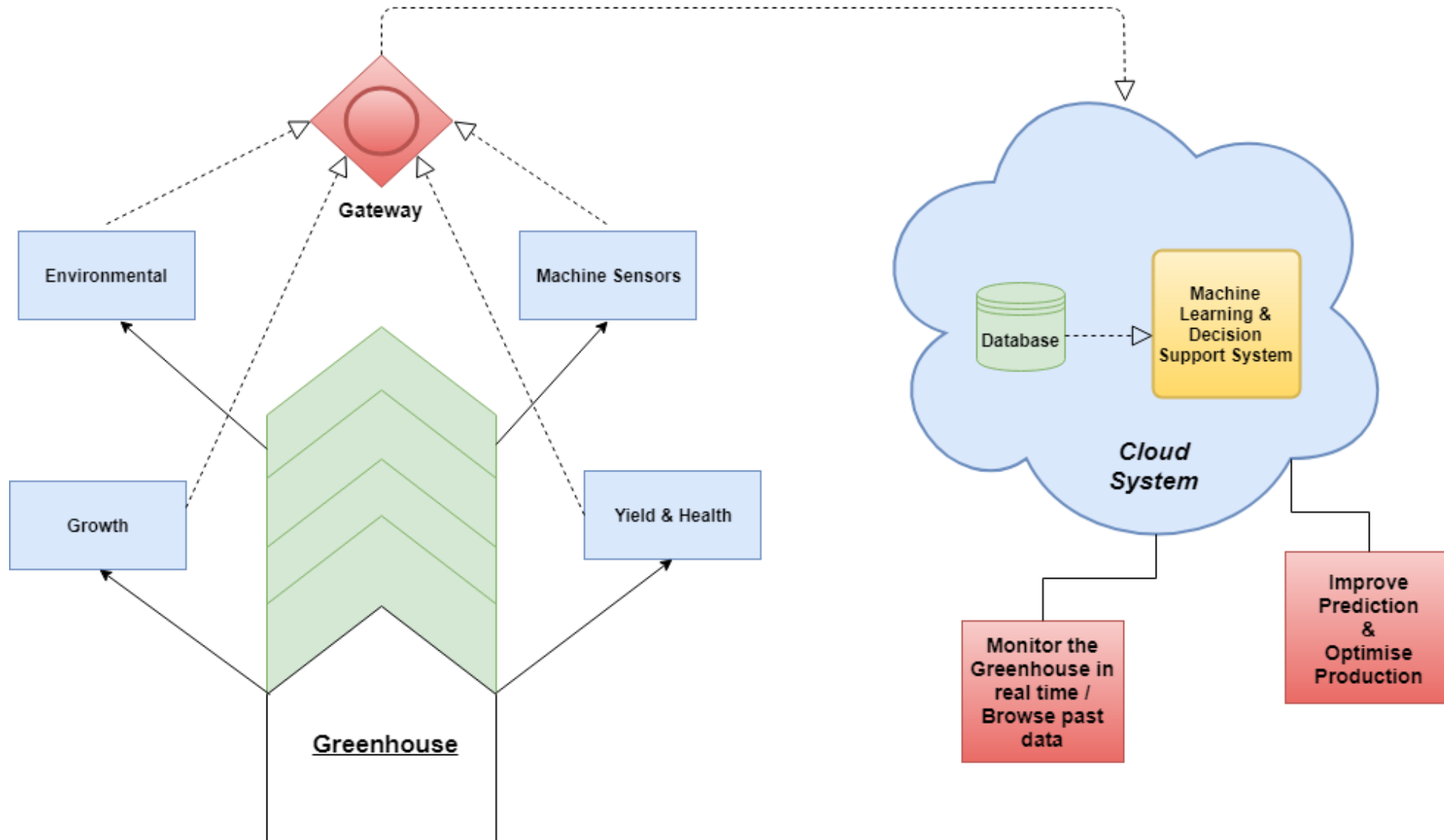Συσσώρευση Μεγάλων Δεδομένων

Εφαρμογές MM/TN

- **Βιομηχανικά περιβάλλοντα: Πρόβλεψη Βλαβών**

  - Siemens Gas Turbine ML/DL Data Analysis
  - Nuclear Power Plant DL Signal Analysis

- **Λειτουργικά περιβάλλοντα: Ελεγχος & ΒελτίωσηΠαραγωγής**

  - Smart DL/AI AgriProduction Prediction
  - Intelligent Refrigeration Systems - Large Energy Supermarket Cuts
  - DL based OCR in Food Packaging – Date/Ingredient Verification
  - Environmental Sensor Data Analysis - Water/Rainfall Prediction

- **Κοινωνικά περιβάλλοντα: Υγεία, Ευημερία, Πολιτισμός & Δημιουργικότητα**

  - Analysis of Ambulance Calls, Fall Detection of Elderly,
  - Parkinson's / Alzheimer's/ COVID-19/ Cancer Diagnosis
  - Cultural object data (from GLAMs) Re-use

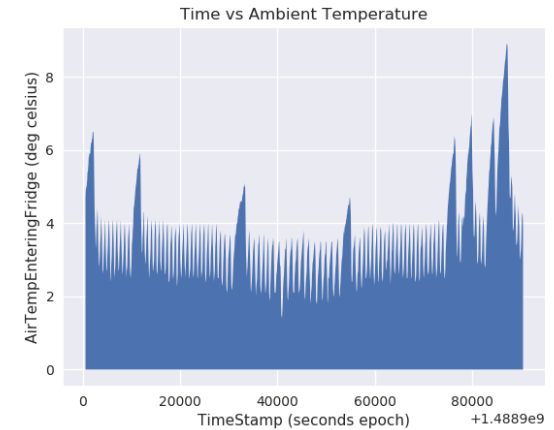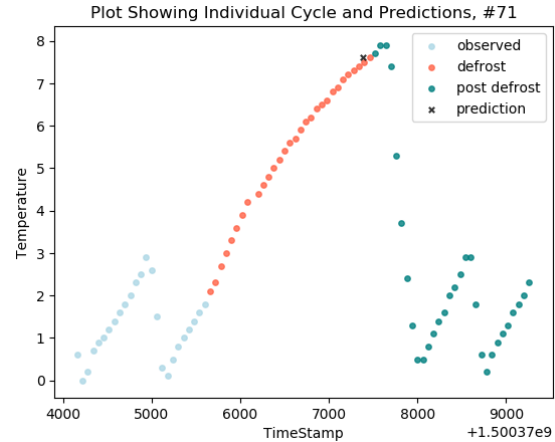# Core Monitoring Techniques and Experimental Validation and Demonstration

Smart agri-food using Machine & Deep Learning

Intelligent Refrigeration Systems

- *Cut energy costs down*
- *React to demands of NationalGrid*
- *Massive IoT network of Fridges/Freezers*
- *Optimise defrosting cycles, accounting for thermal inertia pertaining to food*

Experimental facility

Engineering Transformation for Integration of Sensor Networks
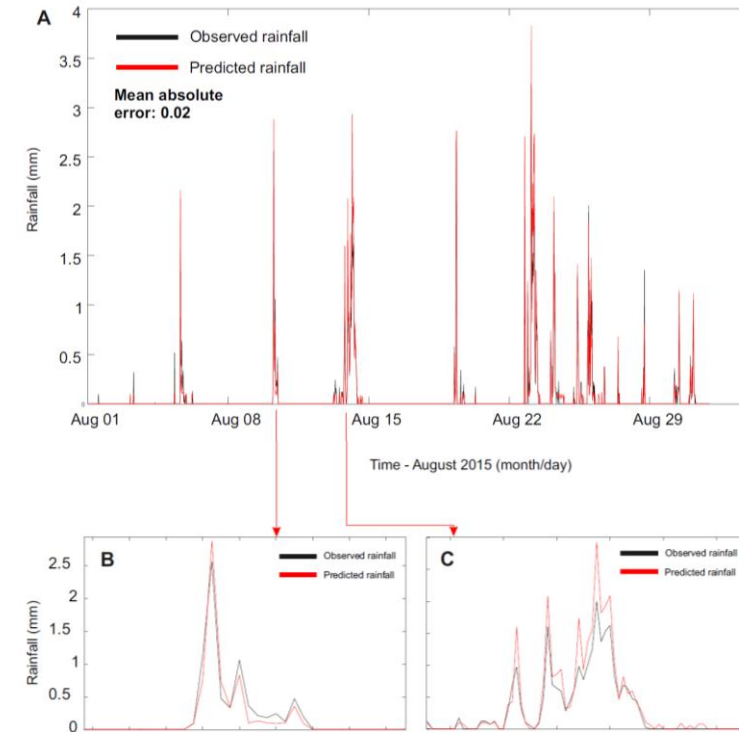
- Integration of sensor network data
- Soil moisture monitoring & prediction
- Enhance environmental observations
- Understand environmental drivers, pressures, status
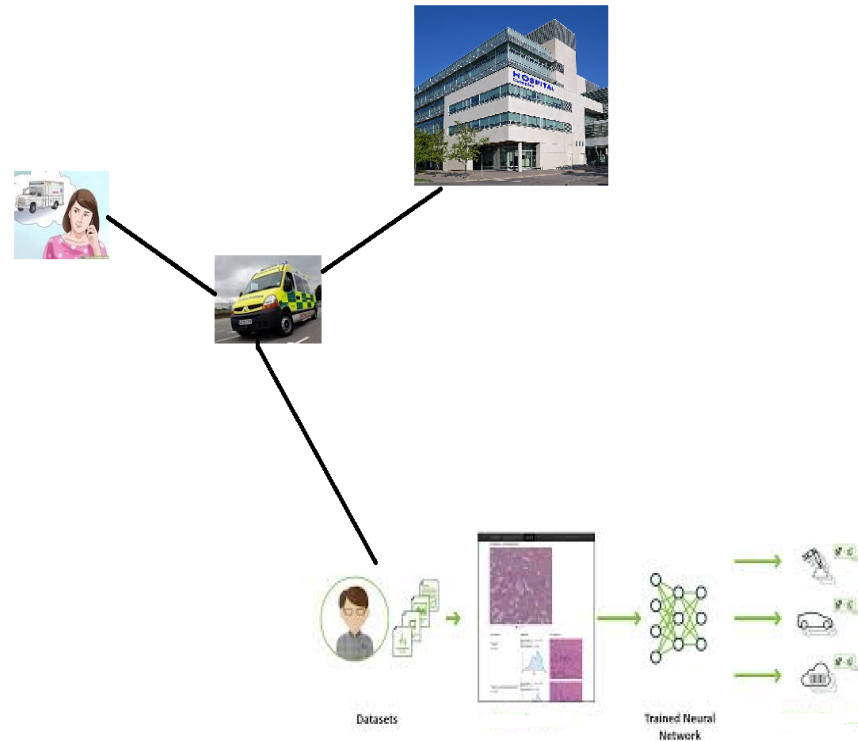

Enhancing the COSMOS-UK network with new measurements

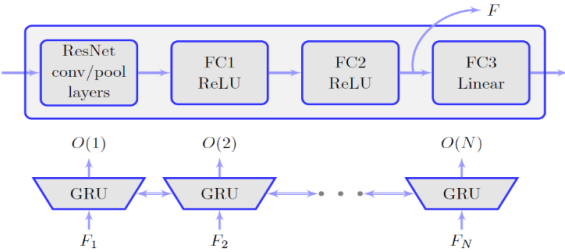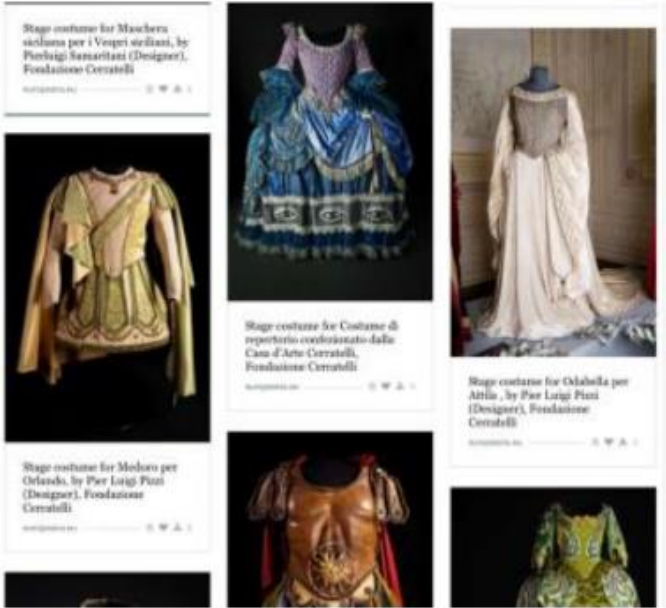

Linking sensor monitoring sites using digital rivers

Rainfall and preliminary predictions of rainfall for August 2015 from the site North Wyke (NWYKE). **A.** Level 2 rainfall (black) and predictions from machine learning models (red). Over the month, mean absolute error is 0.02. **B & C.** Details of the predictions on rain events from A.

Machine learning for predictive modelling of Ambulance calls to Care Homes

- **Target:** use ML/DL to explore demographic & clinical predictors of ambulance attendance and conveyance to hospital for people residing in care homes

Datasets

Trained Neural Network

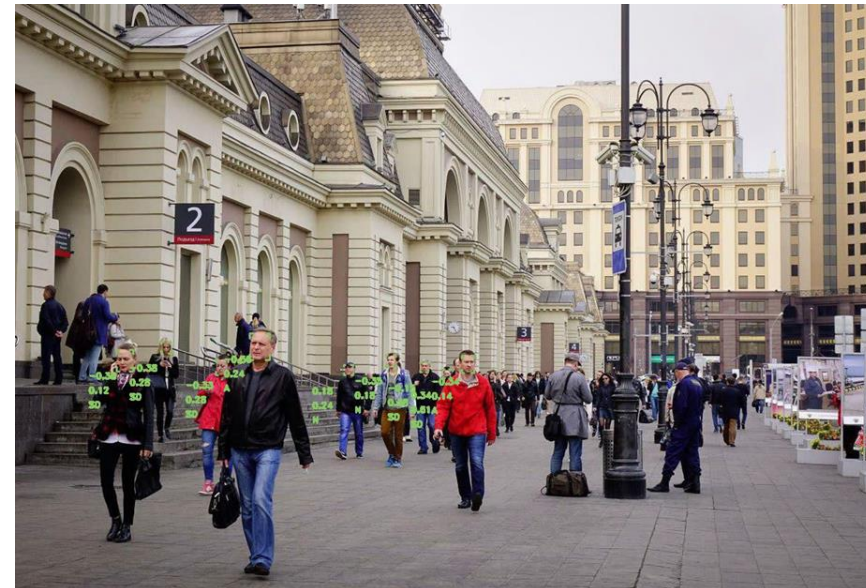# Enrich & Creatively Re-use Content for Cultural Heritage with AI/DL

Video Understanding & Automated Annotation

- Target: Use DL/AI methods for Object/People/Behavior/Place/Concept Extraction and Automatic Annotation, through visual, speech & text analysis

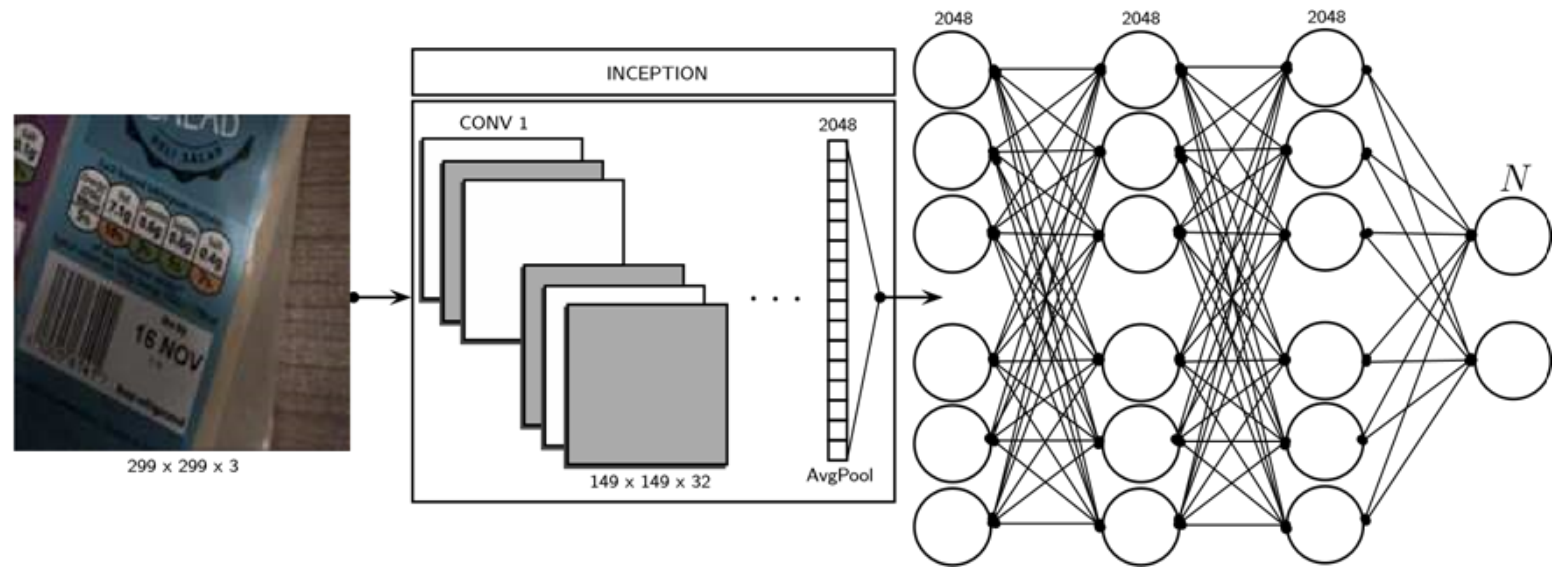audio.svg

Deep Learning for Optical Character Verification of Food Packaging Images(UoL, NCFM, OAL, 2017 - 2019)

- Target: use DL for real time visual analysis and optical character verification of food packaging images

- Participants: 1) School of Computer Science UoL 2) UK National Centre for Food Manufacturing 3) OAL Company 4) users: Tesco, big supermarkets.

Deep Learning for predicting Parkinson's Disease from MRI & DaTScans (UoL, NTUA, G. Gennimatas & Lincoln Hospitals)

- Target: use DL to analyse medical imaging (MRI, DatScans) & clinical information for predicting Parkinson's disease providing transparency, person & domain adaptation.

- Datasets: Different datasets created and/or used (NTUA/UoL; PPMI)