



Integration and analysis of heterogeneous big data for precision medicine and suggested treatments for different types of patients.



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iASiS: Big Data to Support Precision Medicine and Public Health Policy



SC1-PM-18-2016: Big Data supporting Public Health policies

iASiS Basic Facts

- Title: Integration and analysis of **heterogeneous big data** for **precision medicine** and suggested **treatments** for different types of patients
- Topic: H2020-SC1-PM-18-2016 - Big Data supporting Public Health policies
- Contract No.: 727658
- Budget: € 4.3M



Motivation

- Epidemiological data analysis is not sufficient for public health policies in the era of personalized/precision medicine
- We also need explanations, e.g. why a treatment ought to work better for one type of patient than another
- Therefore, we need to combine **breadth** (across a population) with **depth** (e.g. personal genome) in the analysis
- Big data analysis can address both breadth and depth, under the appropriate framework. **That's iASiS!**



Vision and Objectives

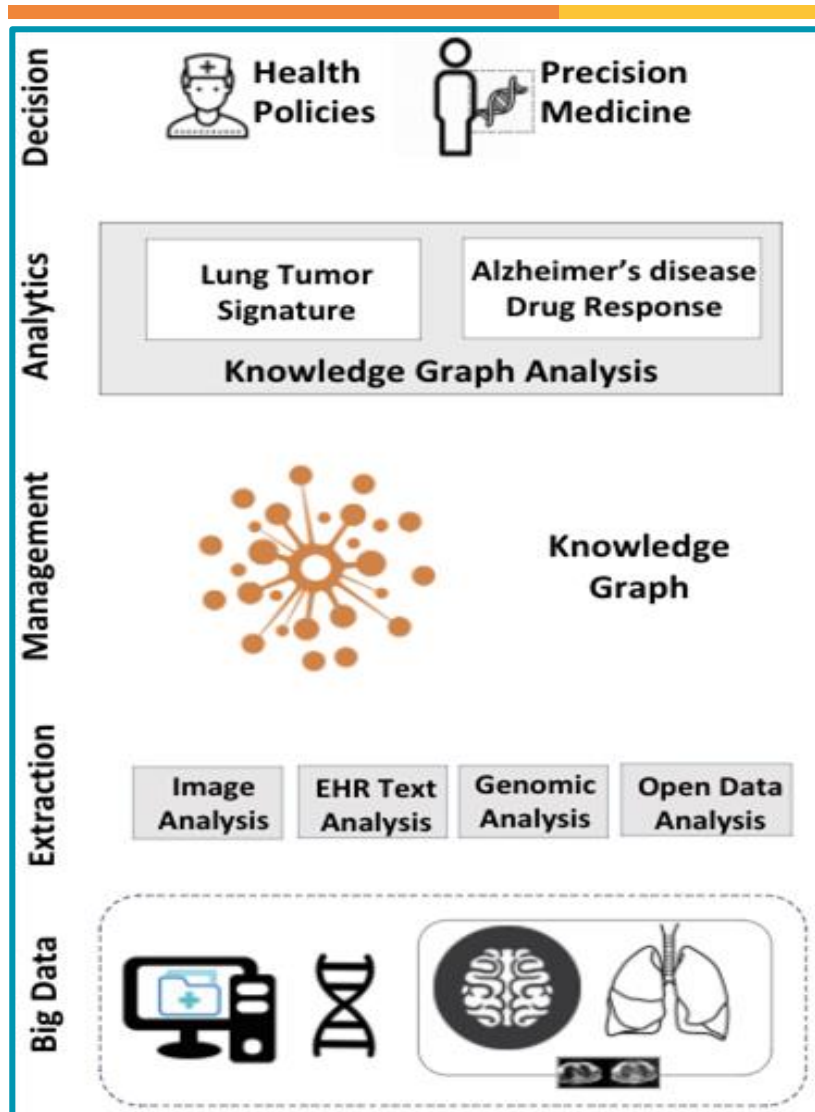
iASiS Vision:

Turn clinical, pharmacogenomics, and other **Big Data** into **actionable knowledge** for personalized medicine and health policy-making

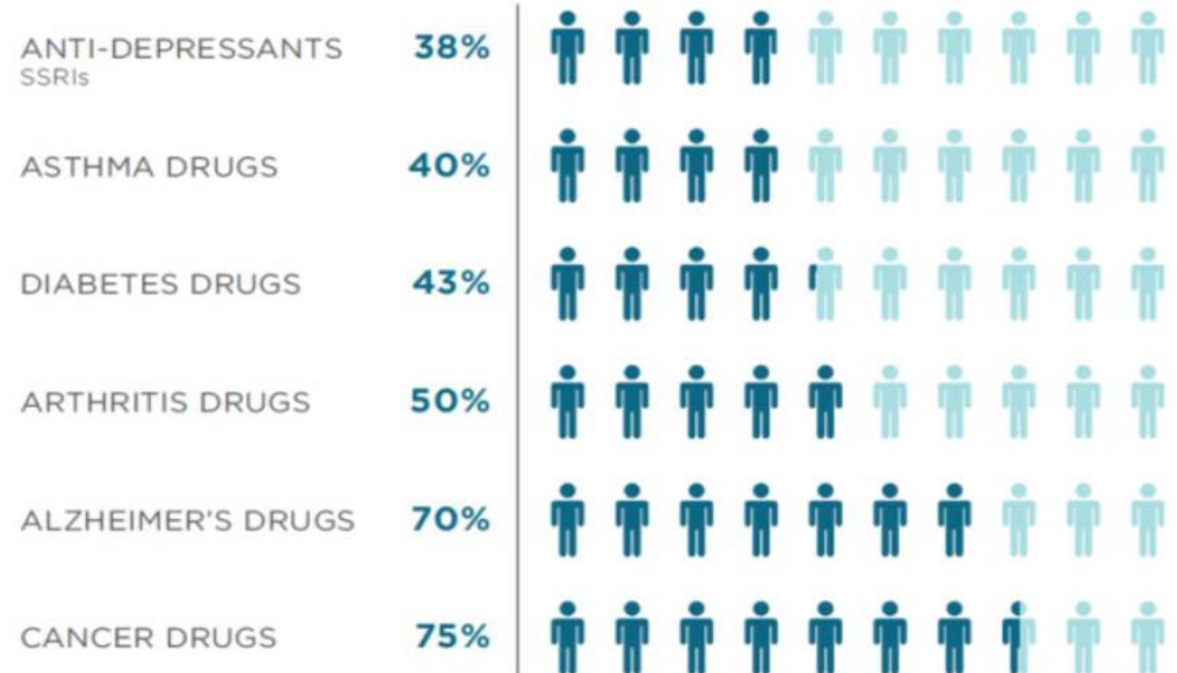
iASiS Objectives:

- Integrate automated **unstructured** and **structured** data analysis, **image** analysis, and **sequence** analysis into a **Big Data** framework
- Use the iASiS framework to support **personalized diagnosis and treatment**

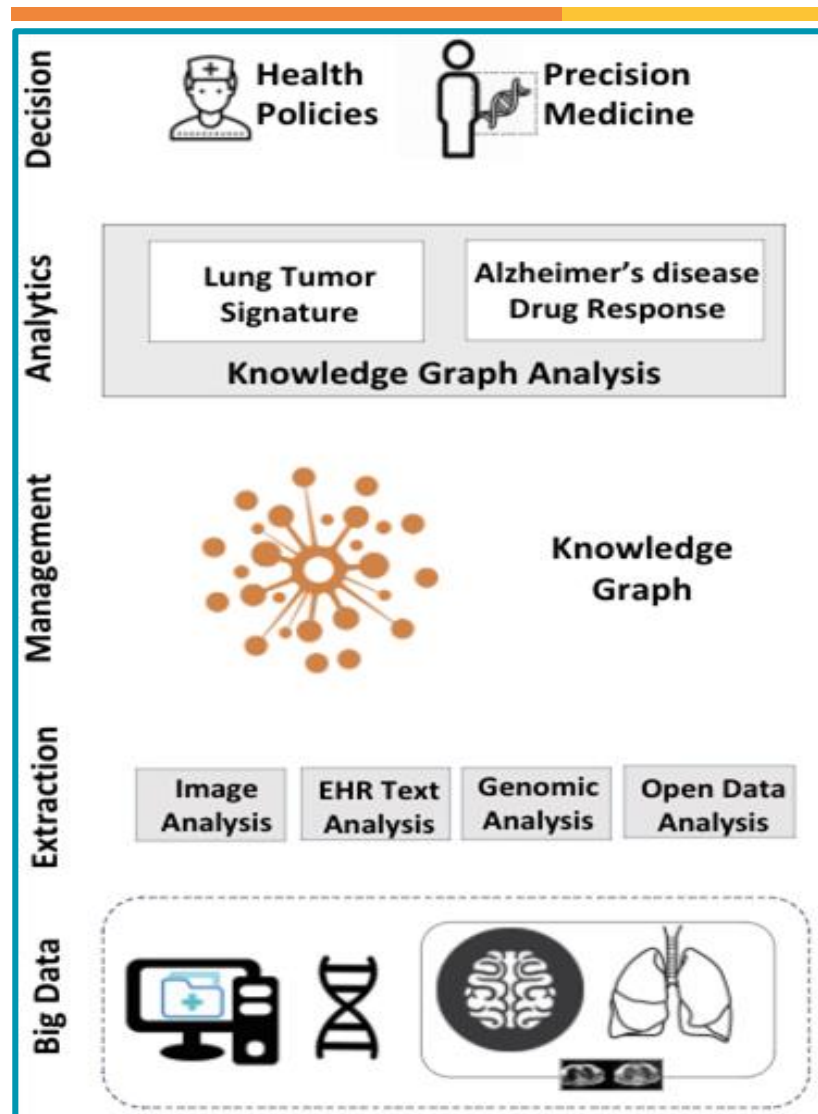
The iASiS Framework



- iASiS focuses on **two use cases**:
 - Lung cancer
 - Alzheimer's disease
- General-purpose drugs are often ineffective

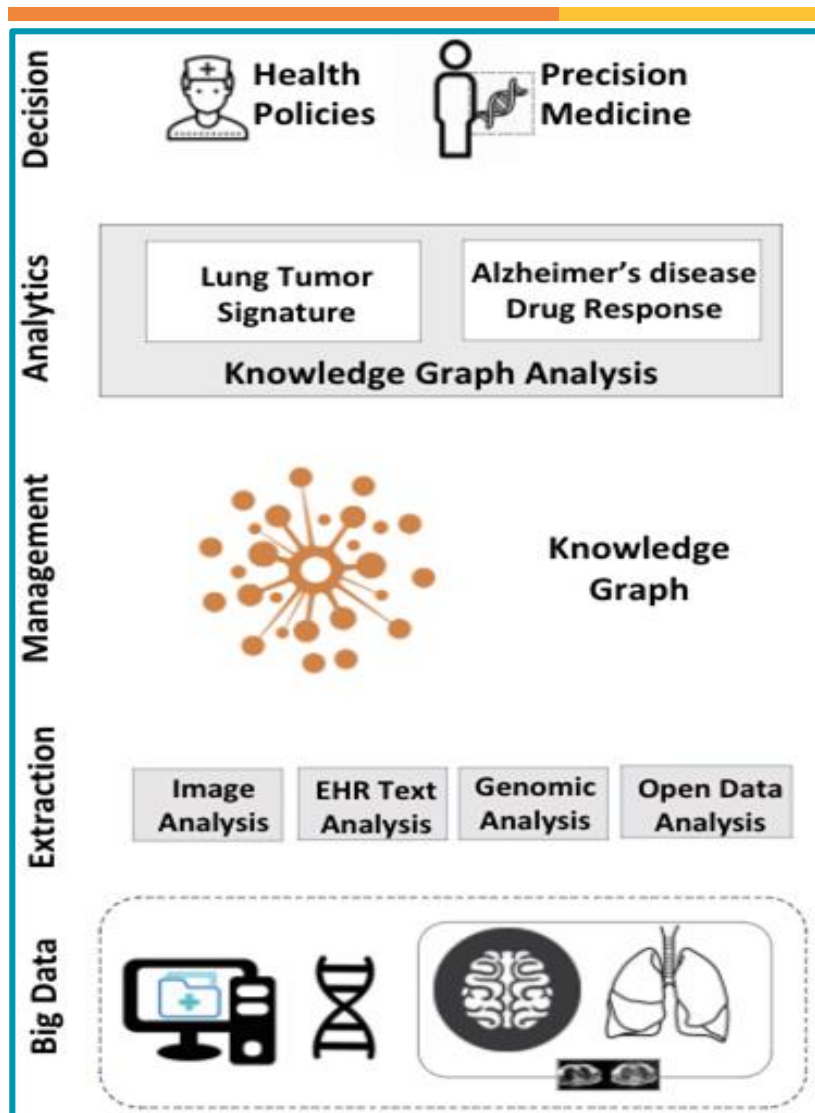


The iASiS Framework



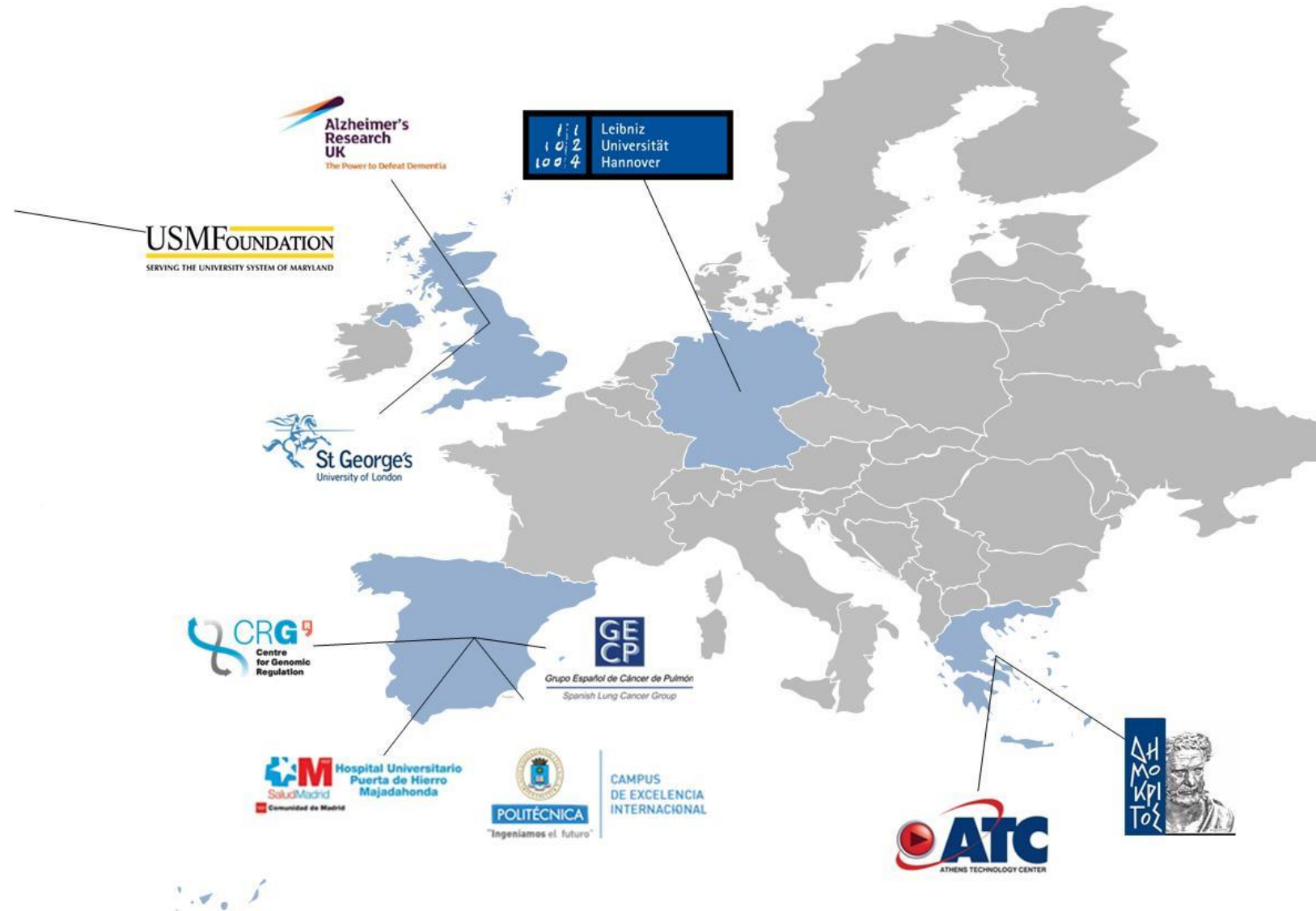
- iASiS **analyzes:**
 - EHRs (English & Spanish)
 - MRI & PET/CT images
 - Genomic data (e.g. liquid biopsy samples)
 - Related bibliography (e.g. PubMed)
 - Biomedical databases (e.g. DrugBank)
 - Biomedical ontologies (e.g. GO, UMLS)

The iASiS Framework



- Extracted knowledge is fused in the iASiS **knowledge graph**
 - Unified semantic schema
 - Linked data
 - Machine-processable knowledge
- iASiS **end-users can:**
 - Perform natural language questions
 - Receive answers along with justifications
 - Identify patterns in patient populations
 - Make informed decisions
- All steps of data management and analytics enforce **privacy** and **access** control

iASiS Partners



Thank you for your attention



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