Aggregating Educational Data for Patient Empowerment

Nick Portokallidis, George Drosatos, Eleni Kaldoudi

School of Medicine, Democritus University of Thrace

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Personalized patient empowerment and
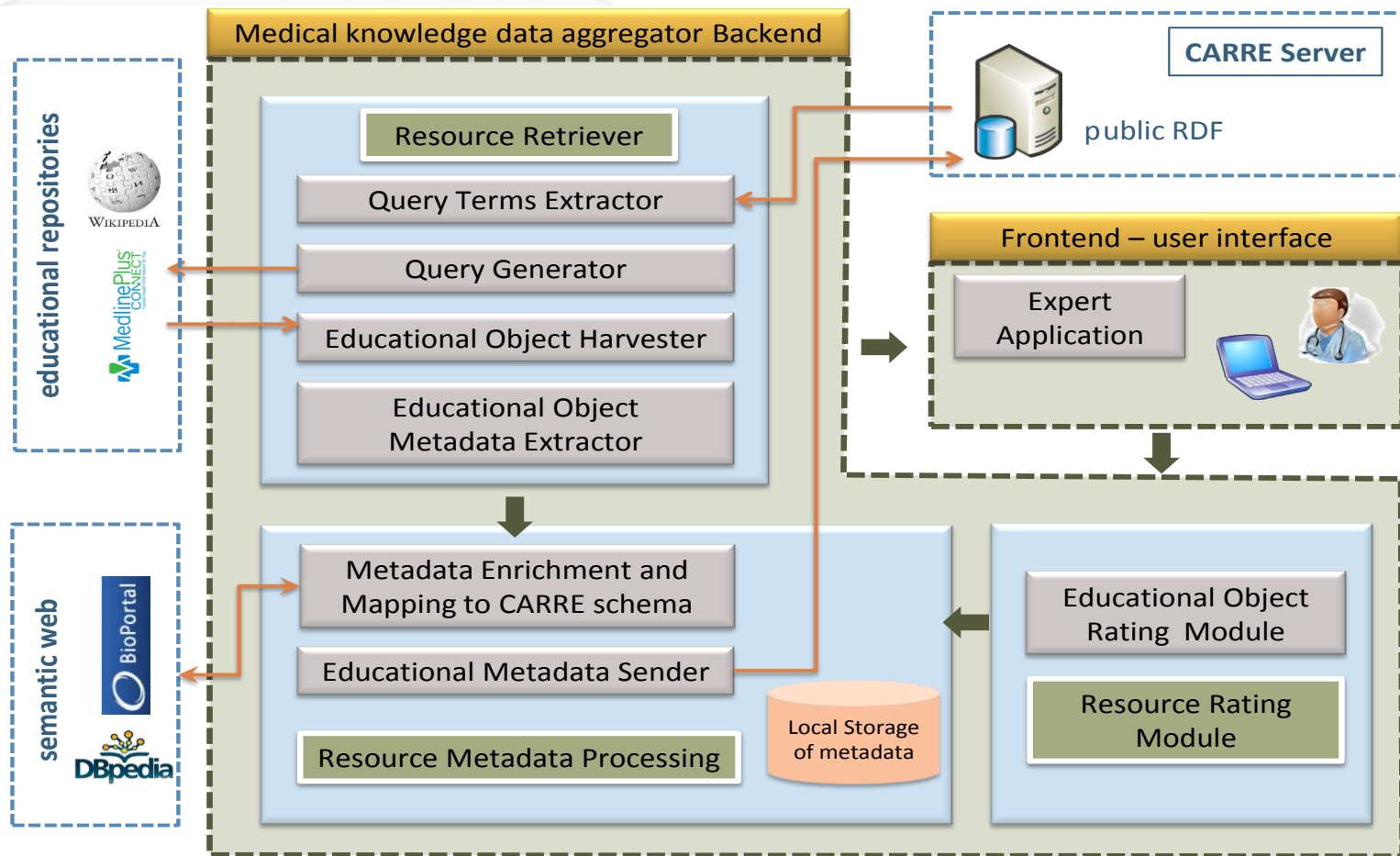shared decision support for
cardiorenal disease and comorbidities

Multi-source aggregation and annotation

– **Goal**: Educational object aggregation from multiple sources, rated and annotated by experts & patients

– **Possible Resources**:
- MedlinePlus
- Emedicine
- Wikipedia
- Healthfinder
- WebMD
- …

– **Decided to use**:
- MedlinePLUS and Wikipedia
  - include both from authoritative and crowd-source repositories
  - API available, free, CARRE related

- Dbpedia, Bioportal for enrichment
  - Dbpedia & Bioportal provide SPARQL endpoint

Component based Architecture

Key Points

– **Personalized patient recommendations on authoritative and non authoritative educational material**

    ↳ Based on current diagnosis

    ↳ Based on prediction models regarding current health status

– **Aggregated Educational material that are approved by Medical Experts and rated accordingly**

    ↳ Protect patients from getting false information

    ↳ Speed up patient knowledge with more relevant content

– **Allow non-authoritative information in a controlled manner**

    ↳ Extend patient point of view of a condition

    ↳ Patients get enough information to protect themselves from medical malpractice

Examples cases

– Recommendations regarding "**acute kidney disease**"

    ↳ Top 5 related articles

    ↳ Educational material from authoritative sources

    ↳ Approved and rated resources from Medical Experts

– Compare sources regarding "**Diabetes**"

    ↳ Most accurate information

    ↳ Most complete articles

    ↳ Most helpful articles found by patient

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Summary results for CARRE risk elements

CARRE risk elements	Education material
Atrial fibrillation	12
Obesity	14
Central obesity	19
Dyslipidaemia	19
Age	19
Death	20
Left ventricular hypertrophy	21
Hypoglycaemia	21
Diabetes	22
Acute myocardial infarction	27
Ischemic stroke	28
Depression	30
Cardiovascular disease	32
Heart failure	33
Ischemic heart disease	34
Hypertension	34
Chronic kidney disease	34

Source	Educational Material
wikipedia	71%
Medlineplus	29%

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Implementation
(Open Source)

- **Frontend Aggregator** as a web application
  - ⇖ Desktop PC
  - ⇖ Mobile / Tablet

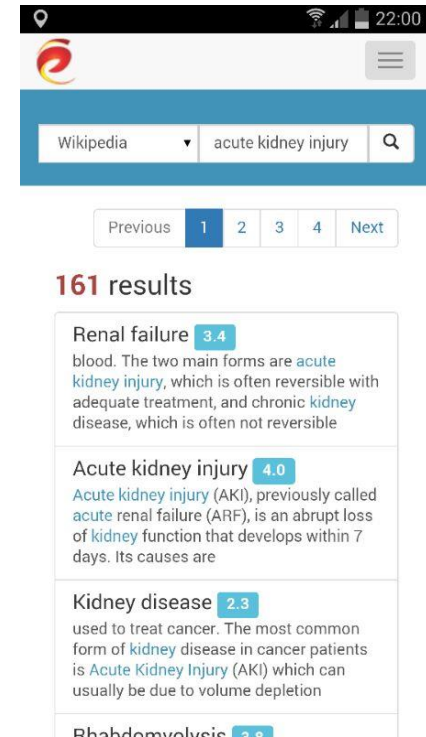- **Backend Annotator** as a SPARQL query service
  - ⇖ NodeJS server

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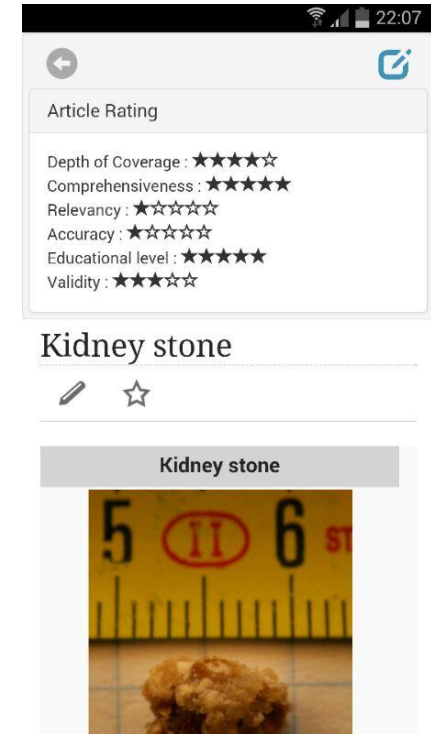
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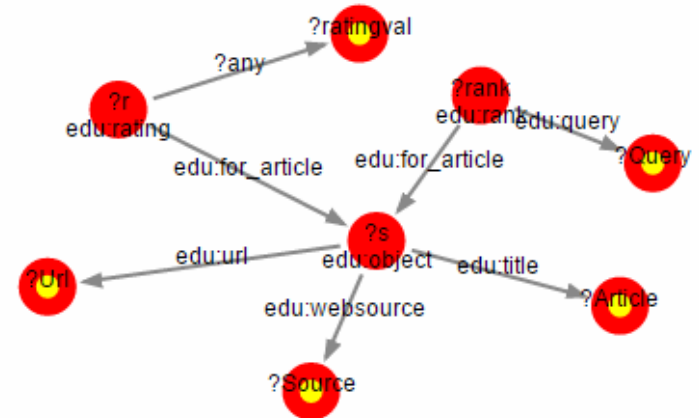   ↳ NodeJS server

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– **Online RDF data demonstration: http://goo.gl/qVeVoE**

– **Online Video demonstration: http://youtu.be/vuu-1n0KVNc**

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Thank you!

- try the Aggregator at:

   https://edu.carre-project.eu

- download the source from:

   https://github.com/telemed-duth/carre-edu

Acknowledgement

cite as: