Advances in Technology and CRIS

Nikos Houssos

National Documentation Centre / National Hellenic Research Foundation, Greece

euroCRIS Task Group Leader Projects

11th International Conference on Current Research Information Systems (CRIS 2012), Prague, 6-9 June 2012

Agenda

- Introduction
- Indicative overview of a selection of technologies in CRIS systems
- Impact of technology evolution on CRIS

Technologies

- Semantic web technologies/ Linked Data
- Cloud computing / Software as a Service
- Tools to present content
- Mobile devices – context awareness
- Software engineering / application frameworks – interfaces with databases
- Data processing technologies

Semantic web technologies

- Vision: machine processable content and links, “intelligent agents”
- RDF / OWL
- Identifying resources with URIs and linking between them
- Inference capabilities
  - Not widely used
- Extremely high degree of expresiveness
  - But cannot easily express everything, e.g. temporal information in relationships

Semantic web in practice

- Significant advances have been achieved
- Many challenges still to tackle
- Performance / scalability issues
- A range of tools is available
  - Tools to generate / process / edit RDF, OWL
  - Triplestores, unified servers
- Considerably lower degree of tools and platforms maturity compared with their counterparts for relational database back-ends

Linked Open Data

- A method of publishing structured data in a way that facilitates linking / interconnection of information.
- Identify entities / resources with URIs that can be dereferenced and resolve to useful information in RDF.
- In the description of resources include links to other resources.
- Identifying resources with URIs and linking between them.
- Very useful to support information interconnection, navigation and other services.
- Specialised euroCRIS Task Group formed in 2011 to standardise how LOD can be produced from CERIF databases.
- Relevant projects: VOA3R, ENGAGE

Cloud Computing

- Computing as a utility
- Infrastructure as a Service (IaaS)
  - Provision of virtual machines, storage, network
- Platform as a Service (PaaS)
  - Provision of a computing platform and a full stack to develop and run applications.
- Software as a Service
  - Turn-key operation of application software in the cloud, minimal or no need for IT expertise by the client

Software as a Service and CRIS

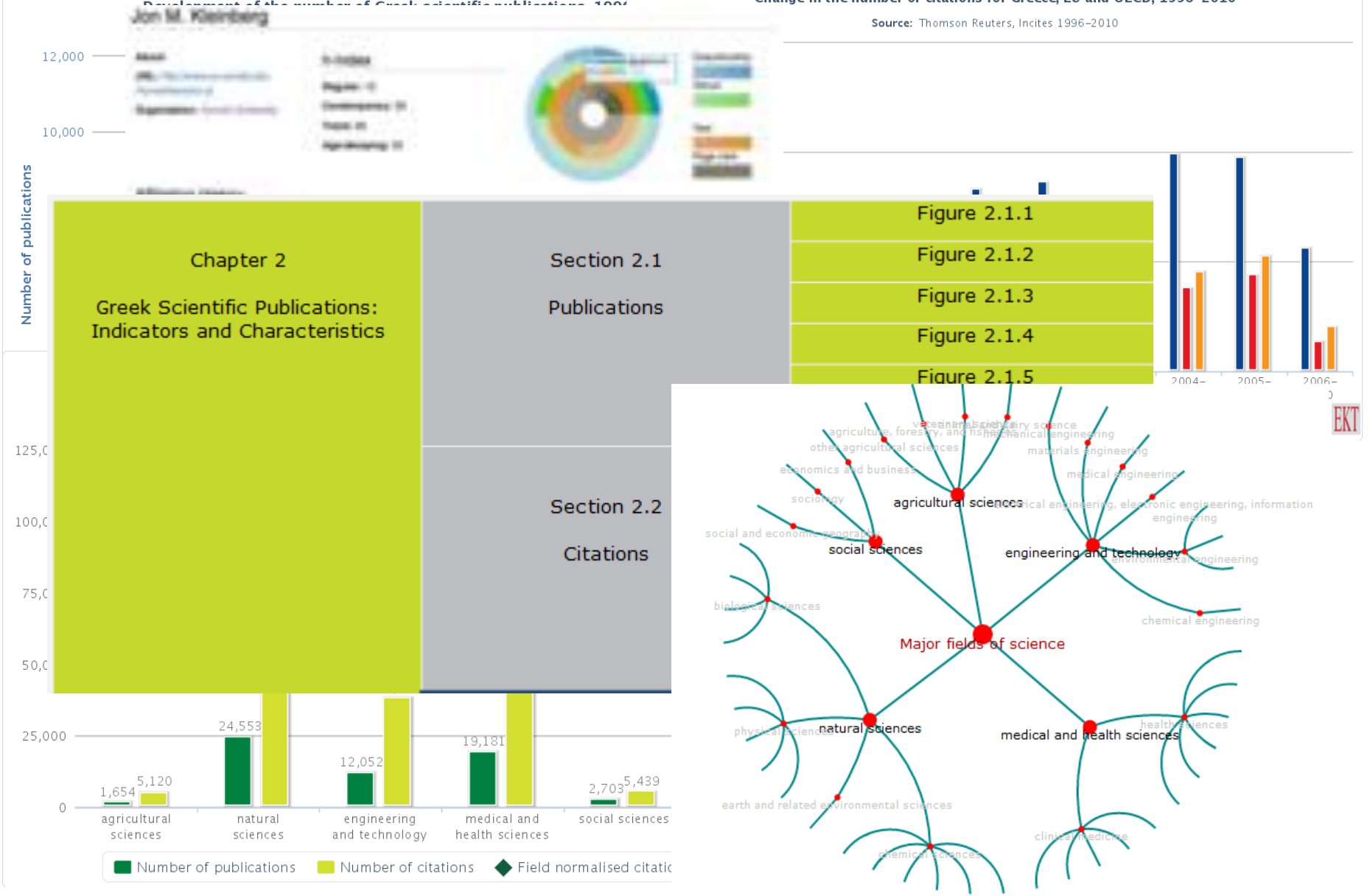
- Minimal or no need for IT expertise by organisations to run the system, very good fit for small-to-medium size institutions (and not only)
- Multi-tenant architecture
  - A single instance serves many clients
  - Substantial gains in efficiency, utilisation
  - Facilitates updates / upgrades
- Considerable effort to develop applications that support multi-tenancy
  - Associate records in the database with tenant identifiers
  - High degree of paremeterisation capabilities required by application to allow transparent customisation on a per tenant basis.
  - Need to address security, access control, monitoring/billing
- Need to interoperate with systems that might run locally at the institution.
- Can be used as a model for running institutional CRIS in a single infrastructure at the regional or national level.

Tools and technologies to present content

- Visualisation
- Online readers / browsers for digital material
- Specialised tools for datasets

Visualisation

- Many open source tools and free online systems available
- Based on standard, open, widely supported technologies (e.g. non-Flash)
- Dynamic generation of practically all types of common graphs
- More sophisticated visualisations (e.g. network diagrams, tree maps, timelines)
- Maps / geospatial information visualisation
- High degree of interactivity


Change in the number of citations for Greece, EU and OECD, 1996–2010
Source: Thomson Reuters, Incites 1996–2010
Number of publications
Chapter 2
Greek Scientific Publications: Indicators and Characteristics
Section 2.1
Publications
Section 2.2
Citations
Figure 2.1.1
Figure 2.1.2
Figure 2.1.3
Figure 2.1.4
Figure 2.1.5
1,654
5,120
24,553
12,052
19,181
2,703
5,439
agricultural sciences
natural sciences
engineering and technology
medical and health sciences
social sciences
Number of publications
Number of citations
Major fields of science
agricultural sciences
social sciences
engineering and technology
natural sciences
medical and health sciences

Online readers / browsers for digital material

- Significant capabilities not available with off-line reading / browsing:
  - Bookmarking and sharing at the page level
  - Annotations at the page level – available anywhere
  - Detailed access statistics – navigation / bookmarking information
  - Better promotion of the overall system - back links to CRIS
  - Progressive, incremental streaming of content – very useful for files of large sizes.
- Many tools available based on standard, open, widely supported technologies (e.g. non-Flash)
- Many specialised tools for domain-specific material and datasets

Καρτηία.

4. CERMANICO — ET DRVSO των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Κεφαλὴ γυναικὸς πωγωνόρος πρ. δ.
Ὀπ. CAESARIBVS — IIIIVIR C[ART] των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Πηδάλιον ὀρθὸν ἐστραμμένον πρ. ἀ. Νόμισμα κατωμένον.
Ⲁ. 4. — Γραμμ. 3,55

5. CARTEIA κυκλοτερῶς ἐμπροσθεν ὁμοίας κεφαλῆς πρ. δ.
Ὀπ. Ι Α ἔμπροσθεν Ποσειδῶνος ἱσταμένου πρ. ἀ., ἐρείδοντος τὸν δ. αὐτοῦ πόδα ἐπὶ βράχου, κρατοῦντος τῇ μὲν δ. δελφῖνα πρ. δ., τῇ δ' ἀ. τρίαιναν. Νόμισμα κατωμένον.....
Ⲁ. 5 1/2. — Γραμμ. 6,12

6. Ὡς ἐν τῷ προηγουμένῳ νομίσματι.
Ὀπ. Ἐπιγραφὴ ἐφθαρμένη. Ἁλιεὺς καθήμενος ἐπὶ βράχου πρ. ἀ., ἁλιεύων διὰ τῆς ὁρμιᾶς μικρὸν ἰχθὺν· πρὸ τῶν ποδῶν δὲ τοῦ ἁλιέως τὸ κάνιστρον τὸ περιέχον τὸ ὄλεαρ. Νόμισμα μεθ' ἡμιῤῥάκτων τύπων.....
Ⲁ. 5. — Γραμμ. 4,66

Κορδύβη ἡ καὶ Πατρικία.

Αὔγουστος.

7. PERM CAES — AVG των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Κεφαλὴ τοῦ αὐτοκράτορος ἀστεφὴς πρ. ἀ.
Ὀπ. COLONIA PATRICIA ἐντὸς στεφάνου δρυός. Νόμισμα κατωμένον.
Ⲁ. 7. — Γραμμ. 9,825

Γάδειρα.

8. Κεφαλὴ Ἡρακλέους ἀγένειος μετὰ λεοντῆς πρ. ἀ.· ὄπισθεν ῥόπαλον πλάγιον.
Ὀπ. Ἐπιγραφὴ Φοινικικὴ ἡμιῤῥάκτου (ὅρα πίν. Β'. ἀρ. 1). Δύο θύννοι παράλληλοι πρ. ἀ., μεταξὺ αὐτῶν στρογγύλιον καὶ ἡμιῤῥάκτων Φοινικικῶν στοιχείων ἄλφ (ὅρα αὐτόθ. ἀρ. 2)· ἐν δὲ τῷ πεδίῳ, ἔμπροσθεν τῶν θύννων, μηνίσκος ἐστραμμένος πρ. ἀ. ἐν ᾧ στρογγύλιον.....
Ⲁ. 7. — Γραμμ. 12,05

9. Ὡς ἐν τῷ προηγουμένῳ νομίσματι.
Ὀπ. Ἐπιγραφὴ ὁμοία τῇ ἐν τῷ προηγουμένῳ νομίσματι. Θύννος πρ. ἀ. Νόμισμα κατωμένον.....
Ⲁ. 4 1/2. — Γραμμ. 2,72

10. Ὁμοία κεφαλὴ πρ. ἀ.
Ὀπ. Δύο θύννοι παράλληλοι πρ. ἀ., μεταξὺ αὐτῶν τὸ Φοινικικὸν στοιχεῖον ἄλφ (ὅρα αὐτόθ. ἀρ. 2)· ἐν δὲ τῷ πεδίῳ, ἔμπροσθεν τῶν θύννων, μηνίσκος.

Ἴλιπα ἡ Ἰλλίπα.

11. Στάχυς.
Ὀπ. Ἰχθὺς πρ. δ., ἄνωθεν αὐτοῦ μηνίσκος· κάτωθεν δὲ τρία στρογγύλια ὁριζοντίως διατεθειμένα. Νόμισμα καλῶς κατωμένον.....
Ⲁ. 4. — Γραμμ. 3,865

Ἰταλικὰ ἡ Ἰταλική.

Τιβέριος.

12. IMP TI CAESAR AVGVSTVS PONT MAX των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Κεφαλὴ τοῦ αὐτοκράτορος ἀστεφὴς πρ. δ.
Ὀπ. PERM DIVI AVG MV[NIC] ITALIC των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Βωμὸς φέρων τὴν τρίστιχον ἐπιγραφὴν PROVIDE — NTIAE — AVGVSTI Νόμισμα κατωμένον.
Ⲁ. 8. — Γραμμ. 13,79

Μάλακα.

13. Ἐπιγραφὴ Φοινικικὴ ἡμιῤῥάκτου (ὅρα πίν. Β'. ἀρ. 3) ἐκατέρωθεν κεφαλῆς Ἡρακλέους μετὰ πίλου κωνοειδοῦς πρ. δ.· ὄπισθεν δ' αὐτῆς πυράγρα.
Ὀπ. Κεφαλὴ Ἡλίου κατὰ μέτωπον ἔχουσα ἀκτῖνας. Νόμισμα μεθ' ἡμιῤῥάκτων τύπων.....
Ⲁ. 6. — Γραμμ. 10,47

Ὀβούλκων ἡ Ὀβούλκων, Ὄριππον καὶ Ἀττουβίς.

14. OBVLCO κυκλοτερῶς ἐμπροσθεν κεφαλῆς γυναικὸς μετὰ διπλοῦ περιδεραίου πρ. δ.
Ὀπ. Ἐπιγραφὴ γράμμασι Τουρδετανικοῖς ἡμιῤῥάκτοις (ὅρα αὐτόθ. ἀρ. 4)· ἄνωθεν αὐτῆς ἄροτρον πρ. ἀ., κάτωθεν δὲ στάχυς ὁριζοντίως πρ. ἀ. Νόμισμα κατωμένον.....
Ⲁ. 8 1/2. — Γραμμ. 19,95

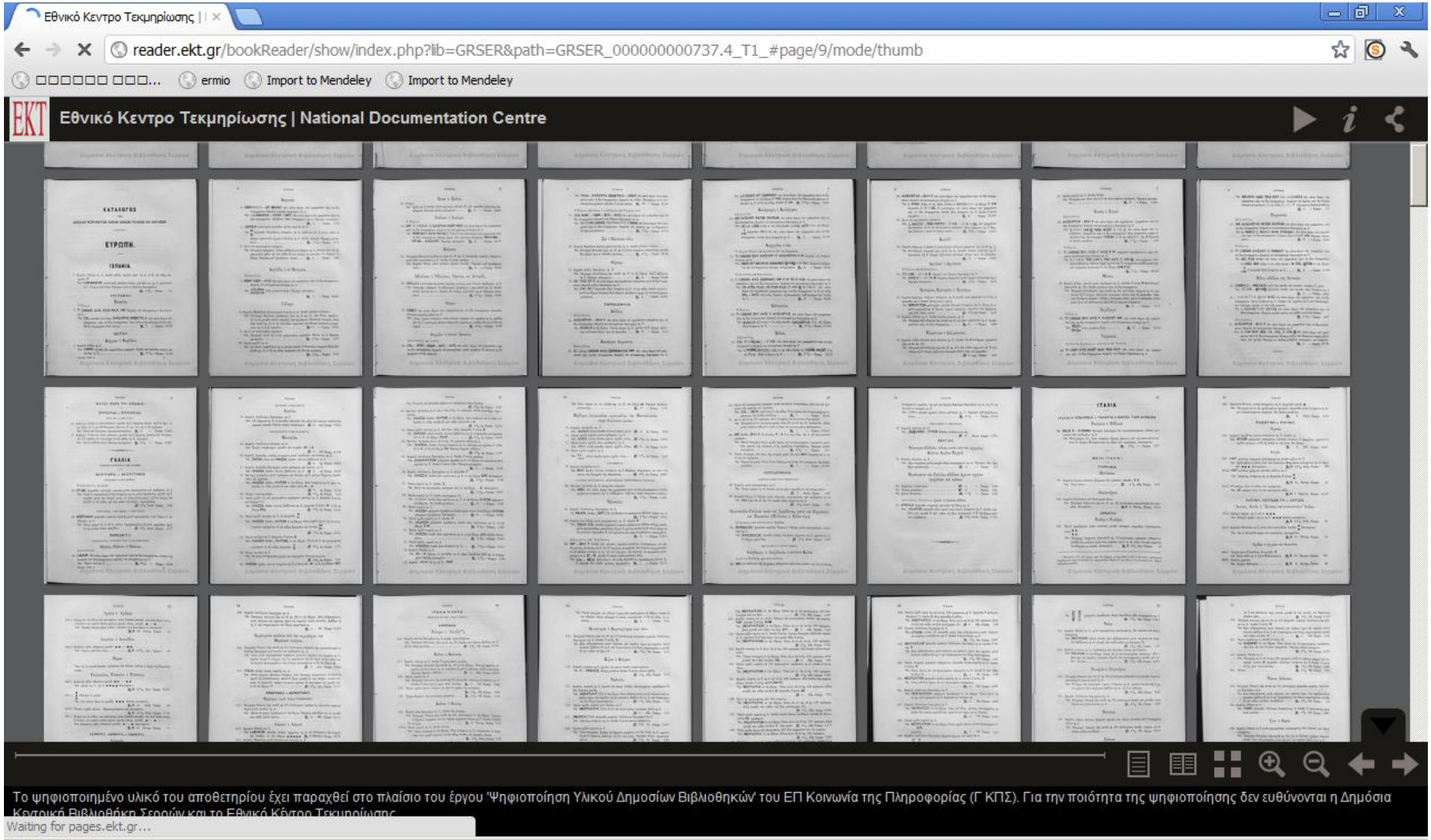
Ὄσσετ.

15. OSSET των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων ἔμπροσθεν ἀστεροῦς κεφαλῆς ἀνδρὸς πρ. δ.
Ὀπ. Ἀνὴρ γυμνὸς ἱστάμενος κατὰ μέτωπον στρέφων τὴν κεφαλὴν πρ. ἀ., κρατῶν μὲν τῇ δ. ἐκτεινομένῃ βότρυν ὑπερμεγέθη κριμάμενον, ἐρείδων δὲ τὴν ἀ. ἐπὶ τοῦ μηροῦ.....
Ⲁ. 6 3/4. — Γραμμ. 6,93

Ῥωμύλα ἡ πρώτη Ἰσπαλις.

Αὔγουστος καὶ Λιβία.

16. COL — ROM — PERM — DIVI — AVG των κάτω άκρων των γραμμάτων πρὸς τὰ ἔξω ἐστραμμένων. Κεφαλὴ τοῦ αὐτοκράτορος μετὰ στεφάνου ἐξ ἀκτίνων πρ. δ.·


Εθνικό Κεντρο Τεκμηρίωσης
reader.ekt.gr/bookReader/show/index.php?lib=GRSER&path=GRSER_000000000737.4_T1_#page/9/mode/thumb
ermio
Import to Mendeley
Import to Mendeley
EKT
Εθνικό Κεντρο Τεκμηρίωσης | National Documentation Centre
Το ψηφιοποιημένο υλικό του αποθετηρίου έχει παραχθεί στο πλαίσιο του έργου 'Ψηφιοποίηση Υλικού Δημοσίων Βιβλιοθηκών' του ΕΠ Κοινωνία της Πληροφορίας (Γ ΚΠΣ). Για την ποιότητα της ψηφιοποίησης δεν ευθύνονται η Δημόσια
Waiting for pages.ekt.gr...

Mobile devices / context-awareness

Mobile devices / context-awareness

- Does it make sense for CRIS?
- The answer is definitely Yes!
- Anywhere access to research information
- Particularly useful when combined with visualisation / online reading-browsing capabilities
- Personalisation and context awareness can be really important
- Considerable cost for application developers
  - Portability to different device characteristics (e.g. size, screen resolution, execution environment)
  - Native application execution environments may (still) offer better experience, but the implementation cost is high
  - Making applications context-aware might be quite complex

Application frameworks - interfaces to databases

- Application frameworks and interfaces to databases
- Object-to-relational mapping tools
- Automatic generation of source code to interface with the database
- Dynamic generation / execution of code on-the-fly
- Ready components for common tasks (e.g. user management, authentication, web services, etc.)
- Easy to build simple applications from the database specification
- In practice, significant additional effort is required to achieve high performance, scalability, appropriate user interfaces, customisability
- Dependency on a stack of complex tools that can be buggy

Data processing

- Automating tasks for data quality and interoperabilty
  - Automatic data cleaning, entity identification, schema mapping
  - Many techniques (e.g. machine learning, statistical)
  - Great advances in research in the last decade, further automation is very challenging
- Automatic metadata extraction / citation parsing
  - Machine learning techniques (e.g. based on Conditional Random Fields)
  - Open source tools available
    - ParsCit, FreeCite, etc.

Thank you for your attention!