

A Survey of Web Research in Argentina

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Abstract

In this paper we survey current research on Web issues in Argentina. We first describe briefly the current situation in computer science research and next we outline which are the most outstanding achievements in this area. Using the research areas in W3C conferences we describe the current projects, research groups and trends.

1. Introduction and Context

As in other areas of Computer Science there are several factors which hindered the development of research on Web-related areas in Argentina. First, the very late establishment of postgraduate careers, which started in the late '90s, and as a consequence the small number of formed researchers. It is not a coincidence therefore that most of Web research in Argentina is being carried out by people with doctoral degrees obtained in foreign institutions. Additionally, computer science research had little or not support from the government during the 90's and just during 2002, the Secretary of Science and Technology (now a Ministry) began funding research projects. In parallel, CONICET (the national scientific and technological council) opened research positions (that were frozen) and nowadays computing is receiving more support. A good number of the authors of surveyed projects are researchers of CONICET.

In spite of this, somewhat dramatic, reality, many groups launched Web research projects (in some cases in the context of national or international funding programs). Yet, there are few young researchers whose careers have focused specifically on Web themes. Most of the research is performed by people specialized in more mature software disciplines like Artificial Intelligence or Software Engineering, and who are applying their ideas to the Web field. It can also be seen that in many cases argentine researchers are part of a team with researchers from other countries. While this is not bad "per se", it is also a demonstration of the immature status of Web research in Argentina, as compared with neighbor countries such as Chile and Brasil.

In the following sections we enumerate the most important research projects. For the sake of organization, we closely follow the structure of the Minitracks of the W3C International WWW Conference, namely Data Mining, Internet Monetization, Performance, Scalability and Availability, Search, Semantic Web, Social Networks and Web 2.0, User Interfaces and Mobile Web, Web Engineering and XML and Web Data; we add additional sections on Accesibility, Web Services, E-Learning and E-government. Some papers might fall in more than one area and thus we arbitrary selected one of these.

2. Specific Topics

2.1 Data Mining

Data mining techniques in the Web have been explored in [58] at Universidad Nacional de Buenos Aires (UBA) for improving access to frequently used Web pages in a corporative context.

2.2 Internet Monetization

Surprisingly, even though e-commerce has been quite popular in Argentina since 1998 and there have been many successful companies in this area, almost recently we can find academic work on monetization and advertising issues. An interesting work in this area can be read at [20] developed as a joint work between researchers of UBA and Yahoo Research.

2.3 Performance, Scalability and Availability

This area is not very popular in Argentina despite the existence of important groups working on infrastructure issues. We ignore research work on the Grid as we consider it outside the scope of this survey. Recent work in this area can be found in [16] developed at Universidad Nacional del Sur (UNS).

2.4 Search

This is another area in which the quality of researchers is not reflected in the publications related with the Web. Argentina has a solid tradition of research on algorithms, but however existing groups have not yet

worked on search issues in the Web. Web Search has been focused using genetic algorithms in [6] and by analyzing WebCrawls in [56], both at UNS.

2.5 Semantic Web and Web Intelligence

This is one of the strongest areas in Argentina in part motivated by the existence of high quality groups in Artificial Intelligence. The most outstanding research is related with agents [31,52], personalization [19] and user profiling [29,30,32] at Universidad Nacional del Centro (UNICEN), logic, argumentation and reasoning [8,9,10,25,33,34] at UNS, Ontologies [3,4,48] at Universidad Tecnologica Nacional in Santa Fe (UTN), and RDF issues [36] at UBA

2.6. Social Networks and Web 2.0

Some work related with Social Networks in under development at UNICEN and in part reported in 2.5. Besides, specification techniques for Web 2.0 (specifically RIA) applications have been devised in [57] at Universidad Nacional de La Plata (UNLP)

2.7 User Interfaces and Mobile Web

Research on User interfaces (with a bias towards software engineering issues), can be found in [36]. Work on Mobile Web architectures have been developed in [7] and an interesting survey on Best practices for Mobile Web in [14] both at UNLP.

2.8 Web Engineering

This area has developed early in the 90s in three main areas, design approaches [55] and Web patterns [50] at Universidad Nacional de La Plata, and Web quality [42,43,44,45,46,47] at Universidad Nacional de La Pampa. Advanced design features such as business process and personalization design [53,54], separation of concerns [35,41,49,59] (La Plata) and aspect-oriented techniques [5] at Universidad Nacional de Cordoba are also subject of research. Recently, there is some work on validation and verification techniques [1,2] at Universidad Nacional de Rio Cuarto.

2.9 XML and Web Data

Outstanding projects on XML issues have been developed at UBA [11,51], reflecting the maturity of the database group in this University.

2.10 Accessibility

Accessibility in Argentinean Governmental sites have been researched in [13] at UNLP, while engineering techniques for building accessible Web software are being studied in Universidad del Comahue [38].

2.11 Web Services

Research on Web Services can be found in three broad areas: related with intelligent agents and query strategies at UNICEN [39,40,12], from a software engineering point of view at UBA [21,22,23,24] and UTN [60].

2.12 E-Learning and E-Government

Artificial intelligence techniques in e-learning are applied in [24,25] at UNICEN, while Learning Objects are analyzed in [15] at UNLP. Some interesting material on E-government has been developed at UNS [17, 18, 37].

3. Concluding Remarks and Discussion

Academic research on Web issues in Argentina is biased to the strongest and more mature areas in computer science research in the country: Artificial Intelligence and Software Engineering. While the Semantic Web and Web Engineering areas have the largest number of papers, other areas such as Web Services, Web 2.0 and Mobility are also influenced by AI and SE research as can be seen in the references. The small number of papers on XML or data issues reflects the size of the database community in Argentina and similarly there are few research papers on algorithms or more technological issues. Surprisingly too, though E-learning is being used intensively in Argentina and there is a constant movement to incorporate the Web in governmental activities, there is also scarce research in these areas. These facts reflect clearly in the small number of Argentinean papers in conferences like LA-Web. It has to be noticed however that there is a clear message from the funding organization encouraging submissions to indexed journals and therefore, as the number of researchers (and graduate students) is small, this impacts in the lack of submissions to conferences. However, taking into account the profile of senior researchers, the increasing number of scholarships and the high quality of publications, we can predict that this situation will improve fast in the years to come.

4. References

1. Alpuente, M., Ballis, D., Falaschi M., Romero, D.: A Semi-Automatic Methodology for Repairing FaultyWeb Sites. In Proceedings of Fourth IEEE International Conference on Software Engineering and Formal Methods (SEFM 2006), IEEE Press, pp 31-40, 2006.
2. Alpuente, M., Ballis, D., Falaschi M., Ojeda, P. Romero, D.: A Fast Algebraic Web Verification Service. In Proceedings of Web Reasoning and Rule

- Systems (RR 2007), Springer Verlag LNCS, pp. 239-248, 2007.
3. Caliusco, M.L., Galli, M.R., Chiotti, O.: Contextual Ontologies for the Semantic Web - An Enabling Technology. In Proceedings of the Latino American WWW Conference (LA-WEB 2005), IEEE Press, pp. 98-101, 2005.
 4. Caliusco, M.L., Galli, M.R., Chiotti, O. Ontology and XML-based Specifications for Collaborative B2B Relationships. CLEI Electron. J. 7(1): (2004)
 5. Casalanguida, H., Duran, J. AOWE : An Aspect Oriented Methodology for the development of Web Applications (In Spanish). In Proceedings of the Argentine Symposium on Software Engineering, ASSE 2007.
 6. Cecchini, R.L., Lorenzetti, C. M., Maguitman, A. G., Brignole, N. B.: Searching the Web in Context: Genetic Algorithms for Exploring Query Space, In proceedings of the Argentine Symposium on Information Society (SSI 2007).
 7. Challiol, C., Muñoz, A., Rossi, G., Gordillo, S. Fortier, A., Laurini, R.: Browsing Semantics in Context-Aware Mobile Hypermedia. Proceedings of the International Workshop on Context-Aware, Mobile Services, (CAMS 2007), LNCS, Springer Verlag Vol 4805, pp 211-221, 2007.
 8. Chesñevar, C., Maguitman, A. Simari, G.: Recommender Systems based on Argumentation In Emerging Artificial Intelligence Applications in Computer Engineering. Frontiers in Artificial Intelligence and Applications, Vol. 160, pp. 53-70. IOS Press, 2007.
 9. Chesñevar, C., Maguitman, A. Simari, G.: Argument-Based User Support Systems using Defeasible Logic Programming. Proc. of the 3rd Intl. IFIP Conference on Artificial Intelligence Applications & Innovations (AIAI 2006). Springer Verlag, pp 61-69, 2006.
 10. Chesñevar, C., Maguitman, A. Simari, G.: Argument-Based Critics and Recommenders: A Qualitative Perspective on User Support Systems. Data Knowl. Eng. 59(2): 293-319 (2006).
 11. Consens, M. P., Rizzolo, F., Vaisman, A. A.: AxPRE Summaries: Exploring the (Semi-)Structure of XML Web Collections. Proceedings of the International Conference on Data Engineering, (ICDE 2008), IEEE Press pp 1519-1521, 2008.
 - 12 Crasso, M., Zunino, A., Campo, M.: Easy Web Service Discovery: A Query-by-Example Approach. Science of Computer Programming. Elsevier Science. Vol. 71, Num. 2, pp. 144-164. 2008.
 13. Diaz, J., Harari, I., Amadeo, P.: Accessibility of Governmental Web Sites (In Spanish). To be presented in the Argentine Symposium on Informatics in the State (SIE 2008).
 14. Diaz, J., Harari, I., Amadeo, P.: W3C Mobile Web Best Practices; evaluation of an Educational Web site, In Proceedings of the International Conference on Information Technology Interfaces, (ITI 2008), Croatia. pp. 421-426, 2008.
 15. Diaz, J., Schiavoni, A., Delucchi, A.: Learning Objects in Open Source environments. In Proceedings of the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (E-learn 2007), 2007.
 16. Estevez, E. Janowski, T.: Building a Dependable Messaging Infrastructure for Electronic Government. Proceedings of the The Second International Conference on Availability, Reliability and Security, (ARES 2007), IEEE Press, pp 948-958, 2007.
 17. Estevez, E., Janowski, T.: Programmable Messaging for Electronic Government - Building a Foundation. Formal Methods and Hybrid Real-Time Systems 2007, Springer Verlag, LNCS, pp 217-236, 2007.
 18. Estevez, E., Janowski, T.: Government-Enterprise Ecosystem Gateway (G-EEG) for Seamless e-Government. Hawaii International International Conference on Systems Science. E-Government track (HICSS 2007), IEEE Press, pp 101, 2007.
 - 19 Eyharabide, V., Amandi, A.: Semantic Spam Filtering from Personalized Ontologies. Journal of Web Engineering, v. 7, n. 2, pp. 158-176, 2008.
 20. Feuerstein, E., Heiber, P., Martínez-Viademonte, J., Baeza-Yates, R.: New Stochastic Algorithms for Scheduling Ads in Sponsored Search. In Proceedings of the Latino American WWW Conference (LA-WEB 2007), IEEE Press, pp: 22-31, 2007.
 21. Foster, H., Uchitel, S., Magee, J. , Kramer, J.: WS-Engineer: A Model-Based Approach to Engineering Web Service Compositions and Choreography. Test and Analysis of Web Services 2007; Springer, pp 87-119, 2007.
 22. Foster, H., Uchitel, S., Magee, J. , Kramer, J.: Model-Based Analysis of Obligations in Web Service Choreography. Advanced International Conference on Telecommunications and International Conference on Internet and Web Applications and Services (AICT/ICIW 2006), IEEE Press, pp 149, 2006.
 23. Foster, H., Uchitel, S., Magee, J. , Kramer, J.: LTSA-WS: a tool for model-based verification of web service compositions and choreography. In Proceedings of the International Conference on Software Engineering (ICSE 2006), ACM Press, pp 771-774, 2006
 24. Foster, H., Uchitel, S., Magee, J. , Kramer, J.: Tool Support for Model-Based Engineering of Web Service Compositions. In Proceedings of International Conference on Web Services (ICWS 2005), IEEE Press, pp 95-102, 2005.

25. Garcia, A. J., Rotstein, N. D., Tucut, M., Simari, G. R.: An Argumentative Reasoning Service for Deliberative Agents. Springer-Verlag. Proc. 2nd Int. Conf. on Knowledge Science, Engineering and Management (KSEM 2007), Springer Verlag, LNAI v. 4798, pp 128-139, 2007.
26. Garcia, P., Schiaffino, S., Amandi, A.: eTeacher: Providing personalized assistance to e-learning students. To appear in Computers & Education, Elsevier, 2008.
27. Garcia, P., Amandi, A., Schiaffino, S., Campo, M.: Evaluating Bayesian Networks' Precision for Detecting Student' Learning Styles. Computers & Education, v. 49, issue 3, pp. 794-808, Elsevier, 2007.
28. Ginzburg, J., Rossi, G., Urbiet, M., Distant, D.: Transparent Interface Composition for Web Applications. Proceedings of the International Conference of Web Engineering (ICWE 2007), Springer Verlag LNCS, Vol 4607, pp 562-576, 2007.
29. Godoy, D., Amandi, A.: Exploiting User Interests to Characterize Navigational Patterns for Web Browsing Assistance. New Generation Computing. Special issue on Web-based Recommendation Systems Technologies and Applications, Springer, v. 26, n. 3, 2008.
30. Godoy, D., Amandi, A.: Modeling Interests of Web Users for Recommendation: A User Profiling Approach. In: Evolution of Web in Artificial Intelligence Environment, Springer, 2008.
31. Godoy, D., Schiaffino, S., Amandi, A.: Interface Agents Personalizing Web-based Tasks. Cognitive Systems Research, Special Issue on Intelligent Agents and Data Mining for Cognitive Systems, Elsevier, Vol.5, Issue 3, pp. 207-222, September 2004.
32. Godoy, D., Amandi, A.: User Profiling for Web Page Filtering. IEEE Internet Computing, v.9, n.4, pp.55-63, July/August 2005.
33. Gomez, S. A., Chesñevar, C. I., Simari, G. R.: Defeasible Reasoning in Web-Based Forms through Argumentation. International Journal of Information Technology and Decision Making (IJITDM), World Scientific Publishing Company, Singapore, (in press 2008).
34. Gomez, S. A., Chesñevar, C. I., Simari, G. R.: Inconsistent Ontology Handling by Translating Description Logics into Defeasible Logic Programming. Iberoamerican Journal of Artificial Intelligence, Vol. 11, No. 35, pp.11-22. AEPIA, 2007
35. Gordillo, S., Rossi, G., Araujo, J., Moreira, A., Vairetti, C., Urbiet, M.: Modeling and Composing Navigational Concerns in Web Applications. Requirements and Design Issues". In Proceedings of The Latin-American Conference on the WWW (LA-Web 2006). IEEE Computer Society Press, pp 25-31, 2006.
36. Gutierrez, C., Hurtado, C. A., Abisman, A. A.: Introducing Time into RDF. IEEE Trans. Knowl. Data Eng. 19(2): 207-218 (2007).
37. Janowsky, T., Estevez, E., Khan, I., Ojo, A. K.: UNeGov.net: community of practice for electronic governance. Proceedings of the 7th Annual International Conference on Digital Government Research (DG.O 2006), ACM Press, pp. 402-403.
38. Martin, A., Cechich, A., Rossi, G., Gordillo, S.: A Three-Layered Approach to Model Web Accessibility for Blind Users". Proceedings of The Latin-American Conference on the WWW (LA-Web 2007), IEEE Computer Society Press, pp 76-83, 2007.
39. Mateos, C., Zunino, A., Campo, M.: Extending MoviLog for Supporting Web Services. Computer Languages, Systems and Structures. Elsevier Science. ISSN: 0096-0551. Ed.: R. S. Ledley. Vol 31, Num. 1. pp 11-31. 2007.
40. Mateos, C., Zunino, A., Campo, M.: Integrating Intelligent Mobile Agents with Web Services. International Journal of Web Services Research. Idea Group. Vol 2, Num. 2, pp. 85-103. 2005.
41. Nanard, J., Rossi, G., Nanard, M., Gordillo, S., Perez, L.: Concern-Sensitive Navigation: Improving Navigation in Web Software through Separation of Concerns". Proceedings of the International Conference on Advanced Information Systems Engineering (CAiSE 2008), Springer Verlag, LNCS Vol 5074, pp. 420-434, 2008.
42. Olsina, L., Garrido, A., Rossi, G., Distant, D., Canfora, G.: Web Application Evaluation and Refactoring: A Quality-Oriented Improvement Approach . To appear in Journal of Web Engineering, 2008.
43. Olsina, L., Lafuente, G., Pastor, O.: Towards a Reusable Repository for Web Metrics. Journal of Web Engineering. 1(1): 61-73 (2002).
44. Olsina, L., Rossi, G.: Measuring Web Application Quality with WebQEM. IEEE MultiMedia 9(4): 20-29 (2002).
45. Olsina, L., Papa, F., Molina, H.: Organization-Oriented Measurement and Evaluation Framework for Software and Web Engineering Projects. Proceedings of the International Conference of Web Engineering (ICWE 2005), Springer Verlag LNCS, pp 42-52, 2005.
46. Olsina, L., Martin, M. A.: Ontology for Software Metrics and Indicators: Building Process and Decisions Taken. Proceedings of the International Conference of Web Engineering (ICWE 2004), Springer Verlag LNCS, pp 176-181, 2004.
47. Olsina, L., Martín, M. A., Fons, J., Abrahão, S. M., Pastor, O.: Towards the Design of a Metrics Cataloging System by Exploiting Conceptual and Semantic Web Approaches. Proceedings of the International Conference of Web Engineering (ICWE 2003), Springer Verlag LNCS, pp 324-333, 2003.

48. Rico, M. , Caliusco, M. L. , Taverna, M. L., Chiotti, O. : A Comprehensive Framework for Representing Semantics via Context and Ontology in the Collaborative Commerce Area. Proceedings of the Latin-American Conference on the WWW (LA-WEB 2007), IEEE Press, pp 110-119, 2007.
49. Rossi, G., Nanard, J., Nanard, M., Koch, N.: Engineering Web Applications using Roles. Journal of Web Engineering, Vol 6, N 1, pp 19-48, 2007.
50. Rossi, G., Schwabe, D., Lyardet, F. Improving Web Applications with Navigational Patterns. Computer Networks. Vol 31, pp 1667-1678, 1999.
51. Rizzolo, F. , Vaisman, A. A.: Temporal XML: modeling, indexing, and query processing. VLDB J. 17(5): 1179-1212 (2008).
52. Schiaffino, S., Amandi, A.: Building an expert travel agent as a software agent. Expert System with Applications. Elsevier. To appear v. 39, n. 3.
53. Schmid, H., Rossi, G.: Modeling and Designing Processes in E-Commerce Applications, IEEE Internet Computing, Vol 8, N. 1, pp 19-27, 2004.
54. Schwabe, D., Guimaraes, R., Rossi, G.: Cohesive design of Personalized Web Applications. IEEE Internet Computing, Vol 6, N 2. pp 34-43 March 2002.
55. Schwabe, D., Rossi, G. An Object-Oriented Approach to Web-Based Application Design. Theory and Practice of Object Systems (TAPOS). Vol 4 (1998) 207-225.
56. Serrano, M. A., Maguitman, A. G., Boguñá, M., Fortunato, S., Vespignani, A. : Decoding the structure of the WWW: A comparative analysis of Web crawls. ACM Transactions on the Web 1(2): (2007).
57. Urbietta, M., Rossi, G., Ginzburg, J. Schwabe, D.: Designing the Interface of Rich Internet Applications. Proceedings of The Latin-American Conference on the WWW (LA-Web 2007), IEEE Computer Society Press, pp 144, 153, 2007.
58. Vaisman, A. A., Dandretta G., Sapia, M.: Enhancing Web Access Using Data Mining Techniques. DEXA Workshops 2003, IEEE Press, pp. 327-331, 2003.
59. Valderas, P., Pelechano, V., Rossi, G., Gordillo, S.: From Crosscutting Concerns to Web Models. Proceedings of the International Conference on Web Information Systems Engineering (WISE 2007) Springer Verlag LNCS Vol 4831, pp 573-582, 2007.
60. Villarreal, P. D., Salomone, E., Chiotti, O.: Transforming Collaborative Business Process Models into Web Services Choreography Specifications. Data Engineering Issues in E-Commerce and Services (DEECS 2006), Springer Verlag LNCS, pp 50-65, 2006.