

Ramaswamy Hariharan

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Objective

A challenging and exciting position to pursue innovative research and development in the area of Digital Geographics that would best utilize expertise in geographic data search, geographic data management, and location data mining.

Research Interests

- Geographic Information Systems (GIS)
- Geographic data management, search, indexing, and query processing
- Location-based data mining

Education

- **Ph.D. Candidate** in Information and Computer Science, Expected Summer 2008.
University of California, Irvine, GPA: 3.71
- **M. S.** in Information and Computer Science, March 2005
University of California, Irvine, GPA: 3.71
- **M. S.** in Spatial Information Science and Engineering, Dec. 2001
University of Maine, Orono, GPA: 3.85
- **B. S.** in Geo-Informatics, May 1999
Anna University, India, GPA: 3.32

Work Experience

- University of California, Irvine, CA (Jan 2004 – present)
Research Assistant: Working in the RESCUE project towards doctoral dissertation on the topic *Discovering GIS Sources on the Web*.
- Microsoft Research, Redmond, WA (Summer 2004)
Research Intern: Developed web-enhanced GPS applications that tap into tagged location data on the Web.
- Microsoft Research, Redmond, WA (Summer 2003)
Research Intern: Developed algorithms for extracting and modeling personal information from the GPS location tracks of an individual.
- Northern Geomatics, Inc., Augusta, ME (Aug 2001 – July 2002)
Software Developer: Implemented many Web GIS applications for state agencies in Maine using Java, ArcObjects, and HTML.
- University of Maine, Orono, ME (Sep 1999 – May 2001)
Research Assistant: Developed novel computational geometry algorithms for determining 3D intersections of individual's geospatial lifelines formed from space-time samples.

Projects

- **Discovery of GIS Sources**, UC Irvine
Description: Developed novel histogram based **approximation algorithms** to summarize a GIS source. The summaries were used in discovering GIS sources for user queries such as: <earthquake zones in California>. The response time for search queries improved significantly using summaries over using raw data, without affecting much the quality of search rankings.
Prototype GIS Search Engine: Developing a prototype **search engine** system enabling GIS discovery over hundreds of data sources downloaded from the web. Tools: Java
- **Indexing Spatial-Keyword Data**, UC Irvine
Description: Designed and implemented a **hybrid index structure** combining spatial (R*-tree) and keyword (inverted file) indices for fast retrieval of GIS objects for user queries containing a set of keywords and a spatial region. Tools: Java
- **Web-enhanced GPS**, Microsoft Research
Description: Developed three **location-based applications** namely, *Pin Point Search*, *XRay*, and *Travelogue* that take advantage of existing Web data combined with location measurements from a GPS receiver. Suggested probabilistic inference models that make use of the contextual information available on the Web to infer location during GPS signal loss. Tools: C#

- **Lachesis: Parsing and Modeling Location Histories**, Microsoft Research
Description: Collected location data of individuals called *location tracks* using GPS. The tracks were collected for over a year. Developed **data-mining algorithms** to extract individual's personal information from the tracks and used them to develop **probabilistic models** to learn and infer individual's travel activities. Tools: C#
- **Citizen Assessment, Mitigation and Analysis (CAMAS)**, UC Irvine
Description: Implemented a GIS **3D visualization system** to create situational awareness from the events reported in the University of California, Irvine campus. Extracted various dimensions of the events such as location, time, problem description, etc, from the raw reports. Developed a set of tools to visualize these events by location, problem-type, time, etc. or their combinations. Tools: ArcScene, VisualBasic, ArcObjects
- **Record-Oriented File System**, UC Irvine
Description: Developed an extent-based **file system** to support standard file management functions to create, open, delete, write, and read files. Used the file-system to develop a **database system** to support creation of tables, schemas, etc., and storing, deleting, and reorganizing records. Tools: C++

Publications

- **R. Hariharan**, B. Hore, S. Mehrotra. Discovering GIS Sources on the Web using Summaries. *To appear in JCDL 2008*, Pittsburgh, USA.
- **R. Hariharan**, B. Hore, C. Li, S. Mehrotra. Processing Spatial-Keyword (SK) Queries in Geographic Information Retrieval (GIR) Systems. In **SSDBM 2007**, Banff, Canada.
- Y. Ma, D. V. Kalashnikov, **R. Hariharan**, S. Mehrotra, N. Venkatasubramanian, N. Ashish, J. Lickfett. On-Demand Information Portals for Disaster Situations. In **ISI 2007**, pp. 133-136, New Jersey, USA.
- D.V. Kalashnikov, Y. Ma, S. Mehrotra, **R. Hariharan**, N. Venkatasubramanian, N. Ashish. SAT: Spatial Awareness from Textual Input (Demo). In **EDBT 2006**, pp. 1159-1163, Munich, Germany.
- D. V. Kalashnikov, Y. Ma, S. Mehrotra, **R. Hariharan**, C. Butts. Modeling and Querying Uncertain Spatial Information for Situational Awareness Applications. In **ACM-GIS 2006**, pp. 131-138, Arlington, VA.
- D. V. Kalashnikov, Y. Ma, S. Mehrotra, **R. Hariharan**. Index for Fast Retrieval of Uncertain Spatial Point Data. In **ACM-GIS 2006**, pp. 195-202, Arlington, VA.
- **R. Hariharan**, M. Shmueli-Scheuer, C. Li, S. Mehrotra. Quality-Driven Approximate Methods for Integrating GIS Data. In **ACM-GIS 2005**, Bremen, Germany.
- **R. Hariharan**, J. Krumm, E. Horvitz. Web-Enhanced GPS. In **LoCA 2005**, pp. 95-104, Munich, Germany.
- **R. Hariharan**, K. Toyama: Project Lachesis. Parsing and Modeling Location Histories. In **GIScience 2004**, pp. 106-124, Maryland, USA.
- S. Mehrotra, C. Butts, D. Kalashnikov, N. Venkatasubramanian, K. Altintas, H. Lee, J. Wickramasuriya, **R. Hariharan**, Y. Ma, R. Eguchi, C. Huyck. CAMAS. A Citizen Awareness System for Crisis Mitigation (Demo). In **ACM-SIGMOD 2004**, Paris, France.

Patents

- J. Krumm, E. Horvitz, **R. Hariharan**. Sensing and Analysis of Ambient Contextual Signals for Discriminating between Indoor and Outdoor Locations. U.S. Patent No. 7,327,245. Feb 5th, 2008.

Computer Skills

- Languages C++, C#, Java
- GIS Software ArcIMS, ArcGIS
- IDE Eclipse, Microsoft Visual Studio .NET

References

Prof. Sharad Mehrotra Director, RESCUE Project School of Info. and Comp. Sciences University of California, Irvine sharad@ics.uci.edu www.ics.uci.edu/~sharad	Prof. Nalini Venkatasubramaniam Associate Professor School of Info. and Comp. Sciences University of California, Irvine nalini@ics.uci.edu www.ics.uci.edu/~nalini	Dr. Kentaro Toyama Assistant Managing Director Microsoft Research India Kentaro.Toyama@microsoft.com http://research.microsoft.com/toyama
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