# Curriculum Vitae of Mercan Topkara

## Contact Information:

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## Education:

- **Purdue University, West Lafayette, IN, USA**: Ph.D. Student, Computer Science, August 2001 – August 2007 (*Advisors: Mikhail J. Atallah and Cristina Nita-Rotaru* )
- **Bilkent University, Ankara, Turkey**: M.Sc. Student, Computer Engineering, September 2000 – July 2001 (*Advisor: Ugur Dogrusoz* - Degree not earned); B.Sc., Computer Engineering and Information Sciences, September 1996 – May 2000 (*Advisor: Kemal Oflazer*)

## Research Interests:

- Web 2.0 Systems, Social Tagging, Digital Watermarking, Statistical Natural Language Processing, Natural Language Engineering

## Research Experience:

- **Post-Doctoral Researcher at IBM T. J. Watson Research Labs** (September 2007 - Present)
  - **Collaboration around Recorded Meetings (Agora)**:
    Design and development of a system (Agora) that accepts meetings recorded in video format with an e-meeting tool or a video camera. Agora performs automatic analysis using external tools on uploaded videos (such as speech transcription) to generate a search index to parts of these videos, as well as access to full recording. Users will also have the ability to comment and tag on the timeline of the video, which can later be searched or shared with others using URL links. This feature allows users to share fragments from long meetings together with the slides and transcript associated with that part of the meeting. In case an e-meeting tool is used for recording our system records during meeting events to provide better search results and richer play-back experience (displaying attendee information, slide changes, etc.). (Role: Technical Lead of the team of several researchers and engineers)
  - **Social Tagging of Multimedia Objects (InSight - Agora)**:
    Design and development of an enhanced system for collaboration around video in enterprise environment. This work lead to the introduction of two concepts in social tagging:
    * Collaborative Tag-Editing
      The users are allowed to edit or delete each others' tags. When needed an access control system would allow creator of tags to make their tags readable/editable/deletable. We have done a user study to analyze the effect of collaborative tag-editing on a video tagging environment, and observed that the users create equal or better quality metadata with fewer tags (CHI'09 and under submission to CIVR'09). (Role: Technical Lead of the team of several researchers and engineers)

    * Micro-Tagging
      The users are allowed to attach tags to parts of the shared content object. In the case of videos, users are allowed to select a segment (begin and end time boundaries) on the video timeline, or a region on the video display and attach a tag. In InSight, tags are composed of a textual component (label), begin time, end time, (x,y) coordinates and a snapshot. InSight provides URL links for each tag (which represent a video clip of the original video). Micro-tagging allows users to provide deeper insight into the video content, and time-line. In addition, it opens room for generating better search results, and performing better statistical analysis on an otherwise opaque content. (Role: Technical Lead of the team of several researchers and engineers)
  - **Visual Monitoring:**
    Participated in design and development of a method and a system for analyzing the effect of visual alerts on vigilance in visual monitoring (e.g., survaillance systems). We have performed a user study in order to collect data. (Role: Team member)

- **Ph.D. Studies at Purdue University (August 2001-August 2007)**
  - **Natural Language Watermarking**
    * Design and development of several natural language watermarking systems: (i) a sentence level natural language watermarking system (ENIGMARK) that is based on meaning preserving linguistic transformations (MCPS'06, SPIE'06); (ii) a word level natural language watermarking system (EQUMARK) for edited text that is based on robust synonym substitution (MMSEC'06) (iii) a word level natural language information hiding system (MARKERR) for cursory text that is based on using typographical errors for embedding (SPIE'07)
    * Design and development of a system (WANEMARK) that benefits from collaborative web publishing in order to generate a channel for a covert communication that can slowly destroy its trace (under submission).
    * Design of a steganalysis system for a synonym substitution based linguistic steganography (SPIE'06)
  - **Evaluating Stealthiness of Steganography Systems**
    * Design of a generic stealthiness evaluation system that measures the effect of embedding changes on-the-fly, and actively warns the embedding system about the areas that should be avoided (MMSEC'04)
    * Development and testing of this system for image steganography applications
  - **Phishing Defense**
    * Design and development of a visible image watermarking based defense system (VIWID) against phishing attacks (IWDW'05)
  - **Usable Authentication**
    * Design and development of a system (PassWit) that helps users enter random passwords in input constrained environments (USENIX'07)

- **Research Internship at Google Research Labs (Fall 2005)**
  - Worked with the speech recognition research group
  - Worked on several language understanding projects

- **Research Internship at IBM T. J. Watson Research Labs (Summer 2005)**
  - Worked with the SITH research group on the Unstructured Information Management Architecture (UIMA) Project
  - Development of an ontology that improves the efficiency of discovery of tools in the UIMA component repository

- **Research Internship at AT&T Research Labs (Summer 2003)**
  - Worked with Voice Enabled Services research group
  - Development of a language understanding system that combines several classifiers for improving the performance of spoken language understanding system (IEEE ASRU'03)
- **M.Sc. Studies at Bilkent University (August 2000 - May 2001)**
  - Worked with the Bioinformatics research group PATIKA
  - Tested the feasibility of using an off-the-shelf data mining tool for sequence matching in DNA
- **B.Sc. Studies at Bilkent University (August 1999 – May 2000)**
  - Worked with Natural Language Processing Group
  - Development of a dependency parsing system with an extended finite state approach (The results of this work appeared as an article at Computational Linguistics Journal in 2003.)

## Patents :

- "A Method for Editing Tags in a Social Network"; through IBM; application in January 2009.
- "Method for Evaluating the Performance of Visual Monitoring Systems"; through IBM; application in December 2008.
- "Usable Password Interfaces for Constrained Environments", ; through Purdue Research Foundation; Provisional application in March 2007.
- "Information Hiding in Natural Language Text Through the Ambiguous Use of Common Errors"; through Purdue Research Foundation; Provisional application in January 2007.
- "Robust Information Hiding in Natural Language Text by Increasing Ambiguity"; through Purdue Research Foundation; Provisional application in September 2006.
- "Natural Language Watermarking"; jointly filed by AT&T and Purdue Research Foundation; application in April 2006.

## Work Experience:

- **IBM T. J. Watson Research, Hawthorne, NY, USA. September, 2007 - Present**
  - Post-Doctoral Researcher
- **Purdue University, West Lafayette, IN, USA. May-August 2007**
  - Research assistant
- **Purdue University, West Lafayette, IN, USA. January 2006-May, 2007**
  - Teaching assistant for CS381 "Algorithms"
- **Google Research, Mountain View, CA, USA. September-December, 2005**
- **IBM T. J. Watson Research, Hawthorne, NY, USA. May-August, 2005**
- **Purdue University, West Lafayette, IN, USA. August 2003- May 2005**
  - Teaching assistant for CS251 "Data Structures", CS354 "Operating Systems", CS 314 "Numerical Analysis" courses
- **AT&T Research Labs, Florham Park, NJ, USA. June-August, 2003**
- **Purdue University, W. Lafayette, IN, USA. August 2001-May 2003**

– Research assistant at Center for Education and Research in Information Assurance and Security

- **Bilkent University, Ankara, Turkey. August 2000-July 2001**
  – Teaching assistant
- **Procter & Gamble, Istanbul, Turkey. May-August, 1999**
  – Implemented an MS-Access based system for warehouse management and developed experience with SAP R/3 software

## Awards and Honors :

- Purdue Graduate School Summer Research Grant, 2007
- Microsoft Travel Award for 2004 Grace Hopper Celebration of Women in Computing, 2004
- Purdue Women in Science Programs Travel Grant, November 2003
- Scholarship by Bilkent University for M.Sc. Education, August 2000 – August 2001
- Fellowship by Bilkent University for B.Sc. Education, August 1996 – August 2000

## Certificates:

- Completion of Applied Management Principles (Mini-MBA) Program in 2006, Krannert School of Management, Purdue University

## Publications:

- **In Refereed Conferences and Workshops:**

1. M. Topkara, B. Rogowitz, S. Wood, J. Boston, "Collaborative Editing of Micro-tags", CHI Work-in-Progress **(CHI'09)**, Boston, MA, April 2009.
2. B. Rogowitz, M. Topkara, "Tags, Micro-Tags and Tag Editing: Improving Internet Search", Human Vision and Electronic Imaging **(HVEI'09)**, San Jose, CA, January 2009.
3. U. Topkara, M. Topkara, M. J. Atallah, "Passwords for Everyone: Secure Mnemonic-based Accessible Authentication", Proceedings of USENIX Annual Technical Conference, **(USENIX'07)**, Santa Clara, CA, June 2007.
4. U. Topkara, M. J. Atallah, M. Topkara, "Passwords Decay, Words Endure: Secure and Reusable Multiple Password Mnemonics ", Proceedings of 22d Annual ACM Symposium on Applied Computing **(SAC'07)**, Seoul, Korea, March 2007.
5. M. Topkara, U. Topkara, M. J. Atallah, "Information Hiding through Errors: A Confusing Approach", Proceedings of the SPIE International Conference on Security, Steganography, and Watermarking of Multimedia Contents, **(SPIE'07)**, San Jose, CA, January 29 – February 1, 2007.
6. M. Topkara, U. Topkara, M. J. Atallah, "Words Are Not Enough: Sentence Level Natural Language Watermarking", Proceedings of ACM Workshop on Content Protection and Security (in conjunction with ACM Multimedia) **(MCPS'06)**, Santa Barbara, CA, October 27, 2006.
7. U. Topkara, M. Topkara, M. J. Atallah, "The Hiding Virtues of Ambiguity: Quantifiably Resilient Watermarking of Natural Language Text through Synonym Substitutions", Proceedings of ACM Multimedia and Security Workshop **(MMSEC'06)**, Geneva, Switzerland, September 26 – 27, 2006.
8. C. Taskiran, U. Topkara, M. Topkara, E. J. Delp, "Attacks on Lexical Natural Language Steganography Systems", Proceedings of the SPIE International Conference on Security, **(SPIE'06)**, Steganography, and Watermarking of Multimedia Contents , San Jose, CA, January, 2006.

9. M. Topkara, G. Riccardi, D. Hakkani-Tür, M. J. Atallah, "Natural Language Watermarking: Challenges in Building a Practical System", Proceedings of the SPIE International Conference on Security, Steganography, and Watermarking of Multimedia Contents, **(SPIE'06)**, San Jose, CA , January, 2006.
10. M. Topkara, A. Kamra, M. J. Atallah, C. Nita-Rotaru , "ViWiD: Visible Watermarking based Defense against Phishing", Proceedings of International Workshop on Digital Watermarking **(IWDW'05)**, Siena, Italy, 2005.
11. M. Topkara, C. Taskiran, E. J. Delp, "Natural Language Watermarking", Proceedings of the SPIE International Conference on Security, Steganography, and Watermarking of Multimedia Contents, **(SPIE'05)**, San Jose, CA, January, 2005.
12. M. J. Atallah, M. Bykova, J. Li, and M. Topkara, "Private Collaborative Forecasting and Benchmarking", Proceedings of the ACM Workshop on Privacy in the Electronic Society **(WPES'04)**, Washington, DC, USA, October 28, 2004.
13. M. Topkara, U.Topkara, C. Taskiran, E. Lin, M. J. Atallah, E. J. Delp, "A Hierarchical Protocol for Increasing the Stealthiness of Steganographic Methods", Proceedings of the ACM Multimedia and Security Workshop **(MMSEC'04)**, Magdeburg, Germany, September, 2004.
14. M. Karahan, D. Hakkani-Tür, G. Riccardi, G. Tur, "Combining Classifiers for Spoken Language Understanding", Proceedings of ASRU-2003, 8th biannual IEEE workshop on Automatic Speech Recognition and Understanding **(ASRU'03)**, U.S. Virgin Islands, November 30 – December 3, 2003.
15. M. J. Atallah, V. Raskin, C. F. Hempelmann, M. Karahan, R. Sion, U. Topkara, K. E. Triezenberg, "Natural Language Watermarking and Tamperproofing", Proceedings of Fifth Information Hiding Workshop **(IHW'02)**, LNCS 2578, Springer Verlag, Noordwijkerhout, The Netherlands, October 2002.

- **Other Publications:**

16. M. Topkara, B. Rogowitz, S. Wood, J. Boston, "Pointing to the Needle in the Multimedia Haystack: Wisdom of Crowds Micro-Tagging", Poster at IBM Academy Future Interfaces Conference, in Boston, MA, 2008.
17. M. Topkara, "Natural Language Watermarking", PhD Letter, Grace Hopper Celebration of Women in Computing Conference, in San Diego, California, October 4-7, 2006. (Refereed)
18. M. J. Atallah, M. Bykova, J. Li, and M. Karahan, "Private Collaborative Forecasting and Benchmarking", CERIAS Technical Report TR 2004-22, Purdue University, June 2004.
19. "Natural Language Watermarking", Proposal for Johns Hopkins University Center for Language and Speech Processing Summer Workshops 2004, with Mikhail J. Atallah, Umut Topkara Giuseppe Riccardi (AT&T Research Labs), Dilek Z. Hakkani-Tür (AT&T Research Labs), Srinivas Bangalore (AT&T Research Labs), Owen Rambow (Columbia University), Washington DC, November 2003. (Finalist)

## Refereed for:

- Computer Human Interaction (CHI) Conference 2010
- International Journal of Computers and Applications 2009
- IEEE Transactions on Information Forensics and Security Journal 2008
- IEEE Transactions on Multimedia Journal 2008 (Special Issue on Communities and Media Computing)
- ACM Transactions on Information and System Security (TISSEC) 2007
- Eighth International Conference on Information and Communications Security (ICICS) 2006

- Journal of Research in Computational Molecular Biology (JRECOMB) 2005
- International Conference on Research in Computational Molecular Biology (RECOMB) 2005
- Symposium on Network and Distributed System Security (NDSS) 2005
- IEEE Global Telecommunications Conference (GlobeCom) 2005

## Invited Talks and Guest Lectures:

- "The Hiding Virtues of Ambiguity: Advances in Natural Language Watermarking", CERIAS Security Seminar, February 2007.
- "Introduction to Information Hiding" for CS519 Cryptography and Network Security at Bilkent University, January 2005.
- "Introduction to Information Hiding" for CS555 Cryptography at Purdue University, February 2005.

## Press Coverage:

- "Granular Collaboration in IBM Innovation Labs at Lotusphere 2009", by Clint Boulton, eWeek, January 2009.

## Teaching Experience:

- Purdue University, IN, USA
  - Teaching assistant for CS 381 Algorithms course for three semesters (Fall 2005 - Spring 2007) and two different professors. Responsibilities included holding office hours, helping in designing and grading homework assignments and exams.
  - Teaching assistant for CS 251 Data Structures course for four semesters (Fall 2003 - Spring 2005) and three different professors. Responsibilities included teaching and assisting students for programming projects in Practical Study Option hours (4 hours a week), holding office hours, helping in designing and grading the project assignments, giving guest lectures.
  - Teaching assistant for CS 354 Operating Systems course for one semester (Fall 2003). Responsibilities included teaching and assisting students for programming projects in Practical Study Option hours (2 hours a week), helping in designing and grading project assignments and exams.
  - Teaching assistant for CS 314 Numerical Analysis course for one semester (Summer 2004). Responsibilities included holding office hours, grading homework assignments and exams.
- Bilkent University, Ankara, Turkey (English Medium)
  - Teaching assistant for CS421 Computer Networks course for one semester (Spring 2002). Responsibilities included holding office hours, grading project and homework assignments.
  - Teaching assistant for CS101 Algorithms & Programming course for one semester (Fall 2001). Responsibilities included teaching and assisting students for programming projects in laboratory hours (8 hours a week) and grading project assignments.

## Services and Professional Activities:

- Program Commitee Member at IUI 2010
- Session Chair for Multimedia Applications: Videoconferencing and Collaboration Environment at ICME 2009.
- IBM Hawthorne New Hire Network Committee, November 2008 – April 2009.
- Co-Chair of Natural Language Watermarking Session at the SPIE International Conference on Security, Steganography, and Watermarking of Multimedia Contents IX, San Jose, CA, January 28 – February 1, 2007.
- Co-Chair of Natural Language Watermarking Session at the SPIE International Conference on Security, Steganography, and Watermarking of Multimedia Contents VIII, San Jose, CA, January 15 – 19, 2006.
- Purdue University International Awareness Week Committee Member February, 2004 - April, 2005
- Organizer of movies@cs events, Spring 2005
- Organizer of movies@cerias events, Fall 2004
- Vice President of Purdue Turkish Student Association June, 2003 - June, 2004
- Member of Purdue Turkish Folk Dance Club August, 2001 - May, 2005
- Speaker and host for several events at the Grad Day for accepted students at Computer Science Department of Purdue University (2003-2007)
- Panel speaker for several events organized by Computer Science Women Network and Women in Science Program at Purdue University (2004-2006)
- Member of organization committee at NATO ASI Summer School for Lesser-Studied Languages Conference June, 2000
- Board Member of Bilkent International Students Club January, 1999-July,1999
- Board Member of Environment Club January, 1999-June, 2000
- Member of Computer Club October, 1998- August, 2001
- Member of IEEE Bilkent Student Branch January, 1999-January, 2002

## Grant Writing Experience:

- "Blurring the Water for Phishing: An Information Hiding Approach", Proposal for Cyber Trust, with Mikhail J. Atallah and Cristina Nita-Rotaru, January 2005 (Not Funded)