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## SUMMARY OF QUALIFICATIONS

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- Solid background in Computer Science and Engineering, with strong competencies in Information Systems, Database Design, Data Structures, Algorithms, and Computer Networks.
- Four years of research experience in Activity Detection, with a focus on deriving actionable intelligence from large volumes of raw data, such as transactional logs and security alerts.
- Experience working in a multidisciplinary environment, and proven ability to conduct research across multiple areas of computer science, from multimedia databases to cyber security.
- Experience in teaching a broad range of subjects and developing new courses.
- Strong technical skills: experience in managing very large databases, and proficiency in a wide range of Data Base Management Systems, including PostgreSQL and Oracle; programming experience in most major development frameworks and programming languages, including Java and C++, and proven ability to learn new languages fast.
- Attention to details, strong interpersonal skills, ability to work under pressure, and strong problem solving attitude.

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## EDUCATION

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- **PhD in Computer Science and Engineering, University of Naples “Federico II”, Naples, Italy, December 2005**
  - *Thesis title:* Extracting and Summarizing Information from Large Data Repositories
  - *Brief thesis description:* Most available data is unstructured in nature. The manuscript presents techniques to extract information from very diverse and unstructured data types – text and video – and defines a set of general design principles for presenting information to the user in a compact yet effective way, through short stories and video summaries respectively.
  - *Thesis Advisors:*
    - Prof. Antonio Picariello, University of Naples
    - Prof. V.S. Subrahmanian, University of Maryland
- **M.S. in Computer Science and Engineering, University of Naples “Federico II”, Naples, Italy, March 2002**
  - *Thesis title:* *Query By Video Algebra: a Probabilistic Approach to Video Retrieval*
  - Final grade: 110/110 cum laude

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## RESEARCH INTERESTS

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- Attack Models, Scalable Detection, Tracking, and Prediction of Cyber Attacks
- Modeling, Detection, and Recognition of Human Activity
- Information Systems and Databases

## CURRENT RESEARCH PROJECTS

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- **Computer-aided Human Centric Cyber Situation Awareness**

*When a security incident occurs, the top three questions security administrators would ask are: What happened? Why did it happen? What should I do? Answers to the first two questions form the core of Cyber Situation Awareness. My main contribution to this project consists in providing the capability to answer the first question efficiently. Indeed, the question becomes: What is happening? Ideally, security administrators want to identify ongoing attacks as they are occurring, possibly before they reach their intended target. Attackers can exploit vulnerabilities to incrementally penetrate a network and compromise critical systems. The enormous amount of raw security data involved in the process and the complex interdependencies among vulnerabilities make manual analysis extremely labor-intensive and error-prone. To address this important problem, I proposed an automated framework to manage very large attack graphs and analyze high volumes of incoming alerts to detect occurrences of known attack patterns in real-time. The proposed framework also integrates dependency analysis, damage assessment, and analysis of future scenarios. We are in the process of filing a provisional patent application.*

- **ADETECT – Activity Detection**

*Numerous applications need to model human activities and continuously monitor a body of data for the occurrence of such activities. Data to be monitored might include video streams from surveillance cameras, and logs generated by web applications, transaction processing systems, and intrusion detection systems. Applications might require activity detection to be performed either in real-time, as data is being received, or offline, after a body of data has been acquired. Activities tend to be high-level and can often be executed in many different ways. The goal of this project is to develop robust models to formally describe what the activities of interest are, and algorithms to efficiently identify occurrences of them from a body of data, both in real-time and offline.*

## WORK AND RESEARCH EXPERIENCE

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- **University of Maryland Institute for Advanced Computer Studies, College Park, Maryland**

August 2006 – Present

**Faculty Research Assistant**

- Conducted research in Information Extraction, Modeling and Detection of Human Activity, Scalable Detection of Cyber Attacks.
- *Key achievements:*
  - Designed and implemented a scalable information extraction system that has crawled and processed over 130 million news articles, at a rate of over 100,000 pages per day.
  - Contributed to the definition of a probabilistic activity detection framework for video data that provably outperforms existing systems, as documented in an article appeared in IEEE Transactions on Pattern Analysis and Machine Intelligence.
  - Contributed to the definition of the first index for concurrent tracking of multiple activities.

- **Department of Computer Science, University of Naples “Federico II”, Naples, Italy**

September 2002 – July 2006

**Graduate Research Assistant**

- Conducted research in the field of Automatic Story Creation and Video Summarization.
- *Key achievements:*
  - Received an honorable mention for the STORY project in Computerworld Horizon Awards for most innovative pre-commercial software.

- **Città della Scienza, Naples, Italy**  
September – October 2005  
**Consultant**
  - Designed and implemented a web-based information system to support distributed data collection centers.
  - *Key achievements:*
    - Drastically improved the efficiency of the data collection process, increasing the number of data entries processed daily by a factor of 5 and reducing the error rate by a factor of 10.
  
- **Advanced Research Projects Agency, University of Naples “Federico II”, Naples, Italy**  
June – August 2004  
**Consultant**
  - Defined design principles for a new e-learning platform that would improve the state of the art in e-learning technologies.
  - *Key achievements:*
    - Delivered a comprehensive set of guidelines and specifications that led to the successful prototyping and licensing of the technology.
  
- **Center for IT Services, University of Naples “Federico II”, Naples, Italy**  
May 2002 – May 2003  
**Software Developer**
  - Designed and implemented the e-learning portal of the University of Naples.
  - *Key achievements:*
    - Streamlined the distribution of course materials and the administration of assessment tests in the 30 courses that adopted the system during the first year of the project.
    - The technology was featured on the Italian national TV channel “RAI Educational”.

## AWARDS AND HONORS

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- **2011.** ATTUNE project on analyzing the use of social networks by terrorist groups selected as one of the finalists for the University of Maryland “2010 Inventions of the Year”.
- **2005.** Received an honorable mention for the STORY project in Computerworld Horizon Awards for most innovative pre-commercial software.
- **2002.** Awarded a 3-year scholarship by the PhD Program Admission Committee, University of Naples “Federico II”, Naples, Italy.
- **2002.** Exempted from mandatory military service for scientific merit, under Italian law.

## PUBLICATIONS

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### JOURNAL PAPERS

1. M. Albanese, R. Chellappa, N. Cuntoor, V. Moscato, A. Picariello, V.S. Subrahmanian, and O. Udrea. **“PADS: A Probabilistic Activity Detection Framework for Video Data”**. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 32, no. 12, pages 2246-2261, December 2010.
2. M. Albanese, A. Chianese, A. d’Acierno, V. Moscato, and A. Picariello. **“A Multimedia Recommender Integrating Object Features and User Behavior”**. *Multimedia Tools and Applications*, vol. 50, no. 3, pages 563-585, December 2010.

3. M. Albanese, R. Chellappa, V. Moscato, A. Picariello, V.S. Subrahmanian, P. Turaga, and O. Udrea. **“A Constrained Probabilistic Petri Net Framework for Human Activity Detection in Video”**. *IEEE Transactions on Multimedia*, vol. 10, no. 8, pages 1429-1443, December 2008.
4. M. Fayzullin, V.S. Subrahmanian, M. Albanese, C. Cesarano, and A. Picariello. **“Story Creation from Heterogeneous Data Sources”**. *Multimedia Tools and Applications*, vol. 33, no. 3, pages 351-377, June 2007.
5. V.S. Subrahmanian, M. Albanese, M.V. Martinez, D. Nau, D. Reforgiato, G. I. Simari, A. Sliva, O. Udrea, and J. Wilkenfeld. **“CARA: A Cultural-Reasoning Architecture”**. *IEEE Intelligent Systems*, vol. 22, no. 2, pages 12-16, March/April 2007.
6. M. Albanese, M. Fayzullin, A. Picariello, and V.S. Subrahmanian. **“The Priority Curve Algorithm for Video Summarization”**. *Information Systems*, vol. 31, no. 7, pages 679-695, November 2006.
7. M. Albanese, A. Chianese, V. Moscato, and L. Sansone. **“A Formal Model for Video Shot Segmentation and its Application via Animate Vision”**. *Multimedia Tools and Applications*, volume 24, n. 3, pages 253-272, December 2004.

#### CHAPTERS IN BOOKS

1. M. Albanese, P. Turaga, R. Chellappa, A. Pugliese, and V.S. Subrahmanian. **“Semantic Video Content Analysis”**. In *Video Search and Mining*, vol. 297 of *Studies in Computational Intelligence*, pages 147-176, Springer, 2010.
2. M. Albanese, C. Cesarano, M. Fayzullin, A. Picariello, and V.S. Subrahmanian. **“Video Summarization”**. In *Encyclopedia of Multimedia*, B. Furht (ed.), pages 917-924, Springer, 2006.
3. M. Albanese, A. Chianese, V. Moscato, and A. Picariello. **“E<sup>2</sup>: E-Content & E-Learning” (In Italian)**. In *Didamatica 2002 – Informatica per la didattica, “e-Learning: metodi, strumenti ed esperienze a confronto”*, pages 213-224, 2002.

#### CONFERENCE PAPERS

1. M. Albanese, S. Jajodia, A. Pugliese, V.S. Subrahmanian, **“Scalable Analysis of Attack Scenarios”**. To appear in *Proceedings of the 16th European Symposium on Research in Computer Security (ESORICS 2011)*, Leuven, Belgium, September 12-14, 2011.
2. M. Albanese, C. Molinaro, F. Persia, A. Picariello, and V.S. Subrahmanian. **“Finding ‘Unexplained’ Activities in Video”**. *Proceedings of the 22nd International Joint Conference on Artificial Intelligence (IJCAI 2011)*, Barcelona, Spain, July 16-22, 2011.
3. M. Albanese, M. Broecheler, J. Grant, M.V. Martinez, and V.S. Subrahmanian. **“PLINI: A Probabilistic Logic Program Framework for Inconsistent News Information”**. In *Proceedings of the Symposium on Constructive Mathematics in Computer Science*, co-located with *NonMon@30: Thirty Years of Non monotonic Reasoning*, Lexington, KY, USA, October 25-26, 2010.
4. M. Albanese, A. d’Acerno, V. Moscato, F. Persia, and A. Picariello. **“Modeling Recommendation as a Social Choice Problem”**. In *Proceedings of the 4th ACM Conference on Recommender Systems (RecSys 2010)*, Barcelona, Spain, September 26-30, 2010.

5. M. Albanese, A. d'Acierno, V. Moscato, F. Persia, and A. Picariello. **“A Ranking Method for Multimedia Recommenders”**. In *Proceedings of the ACM International Conference on Image and Video Retrieval (CIVR 2010)*, pages 311-318, Xi'an, China, July 5-7, 2010.
6. M. Albanese, A. d'Acierno, V. Moscato, and A. Picariello. **“Capturing User Behavior in Multimedia Recommenders”**. In *Proceedings of the 8th International Workshop on Content-Based Multimedia Indexing (CBMI 2010)*, pages 1-6, Grenoble, France, June 23-25, 2010.
7. A. d'Acierno, V. Moscato, A. Picariello, M. Albanese, and A. Chianese. **“A Recommendation System for Browsing Digital Libraries”**. In *Proceedings of the 24th Annual ACM symposium on Applied Computing (SAC 2009)*, pages 1771-1778, ACM, Honolulu, Hawaii, USA, March 8-12, 2009.
8. M. Albanese and V.S. Subrahmanian. **“T-REX: A System for Automated Cultural Information Extraction”**. In *Proceedings of the First International Conference on Computational Cultural Dynamics (ICCCD 2007)*, pages 2-8, AAAI Press, College Park, Maryland, USA, August 27-28, 2007.
9. M. Albanese, A. Pugliese, V.S. Subrahmanian, and O. Udrea. **“MAGIC: A Multi-Activity Graph Index for Activity Detection”**. In *Proceedings of the IEEE International Conference on Information Reuse and Integration (IEEE IRI 2007)*, pages 267-272, Las Vegas, Nevada, USA, August 13-15, 2007.
10. M. Albanese, V. Moscato, A. Picariello, V.S. Subrahmanian, and O. Udrea. **“Detecting Stochastically Scheduled Activities in Video”**. In *Proceedings of the 20th International Joint Conference on Artificial Intelligence (IJCAI 2007)*, pages 1802-1807, Hyderabad, India, January 6-12, 2007.
11. M. Albanese, A. Chianese, A. Penta, A. Picariello, and L. Passariello. **“An Agent Model for User Profiling in an ASP Environment”**. In *Proceedings of the 17th International Conference on Database and Expert Systems Applications Workshops (DEXA 2006), 9th International Workshop on Network-Based Information Systems (NBIS 2006)*, pages 15-19, IEEE Computer Society. Krakow, Poland, September 4-8, 2006.
12. M. Albanese, A. Chianese, V. Moscato, and A. Picariello. **“Experience of Animate Similarity Concepts in Multimedia Database”**. In *Proceedings of the 22nd International Conference on Data Engineering Workshops (ICDE 2006), First IEEE International Workshop on Multimedia Databases and Data Management (IEEE MDDM 2006)*, IEEE Computer Society. Atlanta, Georgia, USA, April 3-7, 2006.
13. M. Albanese, P. Capasso, A. Picariello, and A.M. Rinaldi. **“Information Retrieval from the Web: an Interactive Paradigm”**. In *Proceedings of the 11th International Workshop on Multimedia Information Systems (MIS 2005)*, Sorrento, Italy, September 19-21, 2005.
14. M. Albanese, P. Maresca, A. Picariello, and A.M. Rinaldi. **“Towards a Multimedia Ontology System: an Approach Using TAO\_XML”**. In *Proceedings of the Eleventh International Conference on Distributed Multimedia Systems (DMS 2005)*, pages 52-57, Banff, Canada, September 5-7, 2005.
15. M. Fayzullin, V.S. Subrahmanian, M. Albanese, and A. Picariello. **“The Priority Curve Algorithm for Video Summarization”**. In *Proceedings of the 2nd ACM International Workshop on Multimedia Databases (MMDB 2004)*, pages 28-35, Washington, DC, USA, November 13, 2004.
16. M. Albanese, A. Picariello, C. Sansone, and L. Sansone. **“Web Personalization based on Static Information and Dynamic User Behavior”**. In *Proceedings of the 6th ACM International Workshop on Web Information and Data Management (WIDM 2004)*, pages 80-87, Washington, DC, USA, November 12-13, 2004.

17. M. Fayzullin, V.S. Subrahmanian, M. Albanese, C. Cesarano, and A. Picariello. **“STORY: Architecture of a system to create stories about Pompeii and other applications”**. In *Proceedings of the 10th International Workshop on Multimedia Information Systems (MIS 2004)*, pages 2-13, College Park, Maryland, USA, August 25-27, 2004.
18. M. Albanese, A. Picariello, and A. M. Rinaldi. **“A Semantic Search Engine for Web Information Retrieval: an Approach Based on Dynamic Semantic Networks”**. In *Proceedings of the 2nd ACM SIGIR Semantic Web and Information Retrieval Workshop (SWIR 2004)*, Sheffield, United Kingdom, July 25-26, 2004.
19. M. Albanese, A. Picariello, and A. M. Rinaldi. **“A Technological Framework for Personalized Museum Visiting”**. In *Proceedings of the 10th International Conference on Information Systems Analysis and Synthesis (ISAS 2004) and International Conference on Cybernetics and Information Technologies, Systems and Applications (CITSA 2004)*, pages 273-278, Orlando, Florida, USA, July 21-25, 2004.
20. M. Albanese, C. Cesarano, and A. Picariello. **“A Multimedia Data Base Browsing System”**. In *Proceedings of the First International Workshop on Computer Vision meets Databases (CVDB 2004)*, pages 35-42, Paris, France, June 13, 2004.
21. M. Albanese, A. Picariello, C. Sansone, and L. Sansone. **“A Web Personalization System based on Web Usage Mining Techniques”**. In *Proceedings of the 13th International World Wide Web Conference (WWW 2004)*, pages 288-289, New York, USA, May 17-22, 2004.
22. M. Albanese, A. Chianese, V. Moscato, and L. Sansone. **“Dissolve Detection in a Video Sequence Based on Animate Vision”**. In *Proceedings of the 9th International Workshop on Multimedia Information Systems (MIS 2003)*, pages 115-122, Ischia, Italy, May 26-28, 2003.
23. M. Albanese, G. Boccignone, V. Moscato, and A. Picariello. **“Image Similarity Based on Animate Vision: Information Path Matching”**. In *Proceedings of the 8th International Workshop on Multimedia Information Systems (MIS 2002)*, pages 66-75, Tempe, Arizona, USA, October 30 - November 1, 2002.

## TEACHING EXPERIENCE

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- **University of Maryland Institute for Advanced Computer Studies, College Park, Maryland**  
2009 – 2010  
**Instructor**
  - Developed and taught two courses in the Honors College:
    - **HONR229C - Information Extraction and Integration (Spring 2009)**: the course offered a survey of the issues faced by researchers in Information Extraction and Integration, current solutions, current and future applications.
    - **HONR299B - Internet Technologies in the Information Era (Fall 2010)**: the course offered a survey of the technologies and issues underlying the use of the Internet for communication, research, and dissemination of information, and covered topics including computer and network security, encryption, public key infrastructure, and cyber crime.
- **Department of Computer Science, University of Naples “Federico II”, Naples, Italy**  
September 2002 – July 2006  
**Graduate Teaching Assistant**
  - Assisted three different professors with courses on “Basics of Computer Science”, “Data Base

Systems”, “Information Systems”, and “Computer Design”. Duties included giving classes on select topics, grading projects and final exams.

- **3F Data Systems, Naples, Italy**

May 2004

**Instructor**

- Trained working professionals on XML and related technologies.

- **Fondazione IDIS – Città della Scienza, Naples, Italy**

May 2003

**Instructor**

- Trained working professionals on Data Base Administration.

- **University of Naples “Federico II”, Naples, Italy**

July 2002

**Instructor**

- Trained working professionals on Computer Networks and Dynamic Web Sites Design.

## **OTHER RELEVANT ACTIVITIES**

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- Program Committee Member of the IEEE International Conference on Information Reuse and Integration since the 2008 edition.
- Thesis Advisor for 10 master students between 2005 and 2006.

## **TECHNICAL SKILLS**

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- Operating systems: Windows, Linux.
- Programming languages: C++, C#, Java, JavaScript, PL/SQL, Basic, PHP.
- Other languages: HTML, CSS, XML.
- Development frameworks: Visual Studio, Visual Studio .NET, JBuilder, JDeveloper, web design tools (e.g., Dreamweaver).
- DBMS's: PostgreSQL, Oracle, MySQL, SQL Server.

## **LANGUAGES**

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- Italian: native
  - English: fluent, spoken and written
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