

# Piyush Agrawal

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INTERESTS     Multimedia Systems, Networks, Mobile, Cloud Computing, Data Mining

- EDUCATION
- ◇ **M.S. in Electrical Engineering**, 2008 - Present  
Stanford University, USA, GPA:3.77/4.0
  - ◇ **Master of Technology in Computer Science\***, 2003 - 2008  
Indian Institute of Technology (IIT), Kanpur, India, GPA: 9.5/10
  - ◇ **Bachelor of Technology in Computer Science**, 2003 - 2008  
Indian Institute of Technology (IIT), Kanpur, India, GPA: 8.6/10  
*\*5 Year Dual Degree Program*

- DISTINCTIONS
- ◇ Recipient of the **Atheros Founders Fellowship** for graduate studies at Stanford University
  - ◇ Recipient of the **Cadence Gold Medal for Best Masters thesis** in all engineering departments at IIT Kanpur, 2008
  - ◇ Recipient of the **Best Student Paper Award** at ACM Multimedia Conference, Germany, 2007

- INTERNSHIPS
- 1. Microsoft Research India**, May - July 2007  
Mentor: Dr. Venkat N. Padmanabhan, Project: *RFID based Enterprise Intelligence*
    - ◇ Developed a system for identifying people, objects and their mutual relationships
    - ◇ Filed joint patent with Microsoft
    - ◇ Technologies used: C#, Visual Studio .Net, BizTalk RFID, Microsoft SQL Server
  - 2. Deutsche Telekom Laboratories, Berlin, Germany**, May - July 2006  
Mentor: Dr. Jatinder Pal Singh, Project: *Flow assignment policies for heterogeneous networks*
    - ◇ Developed mechanisms for efficient simultaneous usage of multiple access networks (wired, cellular and Wi-Fi) by mobile devices.
    - ◇ Published work in an international conference (IEEE WoWMoM07, Finland)
    - ◇ Technologies used: C++, Perl, Python, TCL, Network Simulator (NS-2)
  - 3. Yahoo! Inc., India**, May - July 2005  
Mentor: Arun Ramanujapuram, Project: *Scalable Clustering for Similarly Structured Webpages*
    - ◇ Developed mechanism to group similarly structured webpages for information extraction
    - ◇ Improved operational efficiency by 98%
    - ◇ Technologies used: C++, PHP, Perl

- WORK
- ◇ **Airtemis Networks, CA**, July 2007 - September 2008
- EXPERIENCE
- Independent Technology Associate*, Mentor: Dr. Reza Ahy (CEO and Founder)  
Designed architecture and algorithms for enhanced performance of data, video and voice communication over 3G and Wimax networks

MAJOR PUBLICATIONS     (Complete list available at <http://www.stanford.edu/~piyushag>)

## Journals

- ◇ Jatinder Pal Singh, Tansu Alpcan, **Piyush Agrawal** and Varun Sharma, A Markov Decision Process based Flow Assignment Framework for Heterogeneous Network Access, *Wireless Networks, Springer Conferences*
- ◇ Xiaoqing Zhu, **Piyush Agrawal**, Jatinder Pal Singh, Tansu Alpcan and Bernd Girod, Rate Allocation for Multi-User Video Streaming over Heterogeneous Access Networks, Proc. *ACM Multimedia (MM), 2007, Germany (Awarded the Best Student Paper Award)*
- ◇ Lenin Ravindranath, Venkata N. Padmanabhan and **Piyush Agrawal**, SixthSense: RFID-based Enterprise Intelligence, Proc. *ACM MobiSys, 2008, Colorado*

- ◇ Jatinder Pal Singh, Tansu Alpcan, **Piyush Agrawal**, and Varun Sharma, An Optimal Flow Assignment Framework for Heterogeneous Network Access, Proc. *IEEE WoWMoM, 2007, Finland (Adjudged amongst top 15 of the accepted papers)*
  - ◇ **Piyush Agrawal**, R.K.Ghosh, Sajal K. Das, Localization of Wireless Sensor Nodes using Proximity Information, Proc. *IEEE ICCCN, 2007, USA*
- RESEARCH PROJECTS
- ◇ **P2P streaming of multi-view videos for free view point TV**, December 2008 - Present  
Mentor: Prof. Bernd Girod, Stanford University  
Working on the problems of efficient coding for multi-view videos, novel view generation, real time P2P streaming
  - ◇ **A Fault-tolerant Kernel for TinyOS Application Threads**, September 2008 - Present  
Mentor: Prof. Philip Levis, Stanford University  
Modifying the TinyOS kernel for sensor nodes to detect memory faults caused by application threads and cause suitable actions without the need to reboot threads
  - ◇ **M-Torrent - A Multicast Enabled BitTorrent Protocol**, Jan 2007 - May 2008  
Mentor: Prof. R. K. Ghosh, IIT Kanpur  
Designed, implemented and evaluated a hybrid BitTorrent protocol, utilizing IP Multicast wherever available, to disseminate data to thousands of clients simultaneously. Showed 44% reduction in download time, 65% reduction in traffic load on internet links and 40% reduction in download of redundant packets compared to conventional BitTorrent protocol. *This work was awarded Best Master's thesis award across all engineering departments at IIT Kanpur.*
  - ◇ **Rate Allocation for Multiple Video Streams in Heterogeneous Networks**, July 2006 - September 2007  
Collaborators: Dr. Jatinder Pal Singh, Dr. Tansu Alpcan, Xiaoqing Zhu, Prof. Bernd Girod  
Developed and evaluated (via NS2 simulations) an analytical framework for optimal video rate allocation, based on observed available bit rate (ABR) and round trip time (RTT) over each access network, as well as the video distortion-rate (DR) characteristics. Showed reduction in average packet loss rate from 45% to below 2% and improvement in received video quality ranging between 1.5 to 10.7 dB in PSNR. *This work was awarded Best Student Paper Award at the ACM Multimedia 2007 Conference in Germany.*
- PROGRAMMING PROJECTS
- ◇ Design and implementation of a speaker recognition based personal memory assistant on mobile.
  - ◇ Extension of the NachOS Operating System to implement features like process scheduling, demand paging, file system etc.
  - ◇ Implementation of a relational database management system using interprocess communication through shared memory.
  - ◇ Implementation of a Stateless Network File Server that supports remote file service model. The server and client were implemented as Sun RPC server and client.
  - ◇ Implementation of a Centralized Networked Polling System with primary key encryption using TCP/IP socket programming in Java.
  - ◇ Design and implementation of a compiler for a subset of the C language using flex and bison.
  - ◇ Implementation of a routing protocol for wireless sensor nodes using TinyOS.
  - ◇ Implementation of algorithm for Data Compression using the Huffman Compression technique.
- RELEVANT COURSES
- Data Mining, Computer Vision, Computer Architecture, Advanced Computer Networking, Operating Systems, Wireless Networking, Mobile Computing, Algorithms and Data Structures
- TECHNICAL SKILLS
- ◇ *Platforms:* Linux, Windows
  - ◇ *Programming Languages:* C++, C, C#, Java, PHP, Python, Perl, Tcl
  - ◇ *Libraries and Tools:* Map Reduce, rpcgen, TinyOS, OpenCV, NS-2, MySQL, L<sup>A</sup>T<sub>E</sub>X, Matlab, Lex, YaCC, CVS, Socket Programming
- REFERENCES Available on request.