

Arvind Menon

319 6th Ave SE, Fl 2
Minneapolis, MN 55414
Phone: 612-803-3602
amenon@me.umn.edu
<http://www.menet.umn.edu/~amenon>

Intelligent Vehicles Laboratory
University of Minnesota
111 Church St SE
Minneapolis, MN 55455
Phone: 612-624-4374

CAREER OBJECTIVE Research, design and development of real-time automation and embedded systems

EDUCATION **M.S., Mechanical Engineering (Minor - Computer Science)**, May 2005
“Sensor Fusion for Real-time Gap Tracking and Vehicle Trajectory Estimation at Rural Intersections”
Advisor: Dr. Max Donath
University of Minnesota, Minneapolis, MN

B.E., Mechanical Engineering, July 2002
Sri Venkateswara College of Engineering (SVCE),
University of Madras, Chennai, India

RELEVANT COURSE WORK

- Robotics, Sensing and Estimation in Robotics
- Analog and Digital Controls
- Electronics and Microprocessors

RESEARCH AND EXPERIENCE *Research Fellow,* **University of Minnesota**
Intelligent Vehicles Laboratory **Minneapolis, MN**
June 2005 – Present
Involved in the development of a portable intersection surveillance and real-time gap tracking system for rural intersections.

Research Assistant, **University of Minnesota**
Intelligent Vehicles Laboratory **Minneapolis, MN**
December 2002 – May 2005

- Developed a **radar-based vehicle detection system and mainline system state estimator**
- Developed a **lidar-based vehicle detection and classification system** that provides system state and vehicle type information about slow moving vehicles approaching an intersection.
- Developed a **vision-based vehicle detection system** that provides system state in the cross-roads of an intersection. The system works with both visible-light cameras as well as infra-red cameras and adapts to provide data in all lighting conditions. The system extensively uses the Intel OpenCV® library.
- Developed a **sensor-based, real-time vehicle sensing and sensor fusion algorithm** for an Intersection Decision Support System. System state estimators

and sensor fusion (radar, lidar, and vision-based systems) determine the intersection state (vehicle positions, trajectory, gaps, etc) at 10Hz. This data is used to study driver behavior at rural intersections, and eventually will be used to assist drivers in making decisions about when to make maneuvers to enter the intersection.

- Designed, instrumented and implemented the experimental system at the intersection at US Hwy52 and MN CSAH 9 in Goodhue county, MN. Worked with the design and construction team and was responsible for construction quality assurance.
- Developed the interface and data extraction techniques for a large scale data acquisition system used at test intersections.

*Research Assistant,
HumanFirst Group*

**University of Minnesota
Minneapolis, MN
July 2003 - September 2003**

Developed a data visualization program using Visual C++/MFC to graphically illustrate data collected during field and driving simulator studies. The visualizer plays back vehicle parameters, embeds video and plots graphs with full playback control.

*Control System Team Lead,
A.L.I.E.N*

**Artec Sriman Controls Limited
Chennai, India
December 2001 - May 2002**

Designed and developed the control and motion mechanism for a **four-legged autonomous robot** with obstacle avoidance and stair-climbing capabilities. The robot had a hardwired controller with inputs from infra-red range-sensors and a low-resolution vision system.

UNDERGRADUATE PROJECTS

- Developed a simulation program to test various collision avoidance strategies for robots operating in a multi-robot environment.
- Prototype design of a low cost prosthetic hand with tactile sensors for force feedback.
- Built several manually-controlled and autonomous robots for robotics competitions held all over India.

CONFERENCE PUBLICATIONS

A. Menon, A. Gorjestani, C. Shankwitz, and M. Donath, "Roadside Range Sensors for Intersection Decision Support Systems," *IEEE Conference on Intelligent Transportation Systems*, Washington D.C., September 2004, p. 210-215

A. Menon, and A. Ramachandran, "Collision Avoidance in a Multi-robot System by Emulating Human Behaviour," *World Multi-conference on Systemics, Cybernetics and Informatics*, Orlando, FL, June 2001, Volume III, p. 22-27

A. Menon, and S. Sayeram, "Proposed System of Virtual Video Conferencing for Low Bandwidth Connections," *International Conference on Information Systems Analysis and Synthesis*, Orlando, FL, June 2001, Volume XII, p. 512-516

SPECIAL SKILLS

- Expert knowledge of the Unix operating system and all related applications, QNX Neutrino RTOS, and Windows.
- Expert knowledge of scripting and programming languages: C++, Java, Visual C++ with MFC, Visual Basic, MATLAB.
- RDBMS Knowledge: PostgreSQL, Sybase.
- CAD Software: AutoCad, Pro-E, ANSYS.
- Strong writing, grammar, and linguistic skills.
- Strong graphic-design skills useful in presentations, publications, and schematics.

HONORS

- Best Undergraduate Design Project - Mechanical Engineering Department, 2002 at SVCE, Chennai
- President of the Society of Mechanical Engineers for the year 2001-02 at SVCE, Chennai
- Best Paper Award in the session titled '*Applications of Emergent Computing*' – "Collision Avoidance in a Multi-robot System by Emulating Human Behaviour".
- Best Paper Award in the session titled '*Transmission Systems*' – "Proposed System of Virtual Video Conferencing for Low Bandwidth Connections".

REFERENCES

Available upon request.