



Digital Media Laboratory
Advanced Information & Communication Technology Center
Sharif University of Technology

Digital Media Lab

DML

Winter 2011

List of Topics

- ✧ **DML Mission, Goals, and Objectives**
- ✧ **Management Structure of DML**
- ✧ **General Regulations**
- ✧ **Application and Admission Procedure**
- ✧ **Facilities**
- ✧ **DML Research Groups**
 - ✧ Multi-Media Systems Group
 - ✧ Machine Learning Group
 - ✧ Complex Networks Group
 - ✧ Activity Recognition Group
- ✧ **Technological Projects**
- ✧ **Research Outputs**
- ✧ **Photo Gallery**



DML Mission, Goals, and Objectives

✧ Mission

- ✧ To perform innovative research in the areas of: Multimedia Systems, Complex Networks, Overlay/P2P and Wireless Networks, Human-Centered Computing and Computational Biology and Bioinformatics

✧ Goal

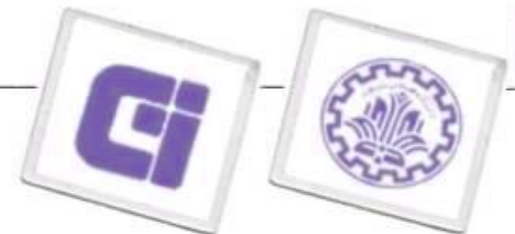
- ✧ To become a pioneer in the research of Multimedia and Networks

✧ DML Objective

- ✧ To prepare future leaders of industry, academia, and government through broad engineering education and high quality research

✧ **Director: Dr. Hamid R. Rabiee** (rabiee@sharif.edu)

✧ **DML Website:** www.dml.ir



Management Structure of DML

✧ Lab Director-Dr. Hamid.R. Rabiee

✧ Multimedia Systems Group- Hadi Asheri

✧ 1 PhD Student: Project Consultant, 3 Research Assistants, 2 Hardware Development Team

✧ Machine Learning Group- Mohammad. H. Rohban

✧ 2 PhD Students, 6 MSc Students, 5 BSc Students and 2 Research Assistants

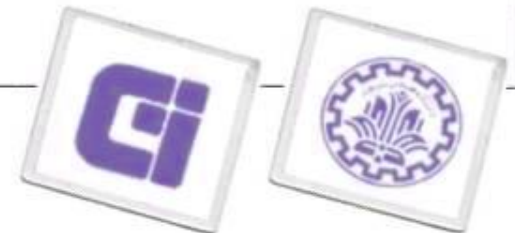
✧ Complex Networks Group- Mostafa Salehi

✧ 1 PhD Student, 7 MSc Students, 6 Research Assistants

✧ Activity Recognition Group- Ali Soltani

✧ 1 PhD student and 2 MSc Students

✧ Executive Director- Arash Zolghadr



General Regulations

✧ Obeying all the DML rules during the research

- ✧ Online access link: edna.dml.ce.sharif.edu/dmlsite/content/dml-rules-and-regulations

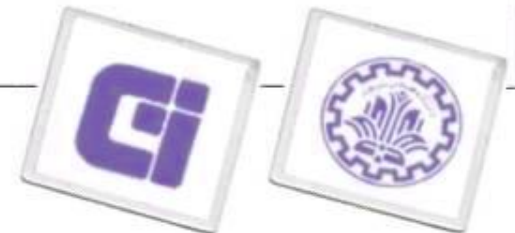
✧ A researcher in DML should be:

- ✧ Responsible for the assigned tasks
- ✧ Commitment
- ✧ Follow the research ethics
- ✧ On-time

✧ Writing weekly, monthly and technical reports

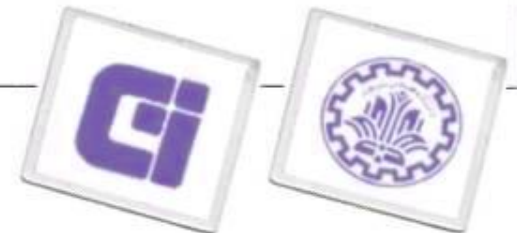
✧ Attendance in all DML weekly group meetings

- ✧ Regard other executive processes based on Lab regulations notebook



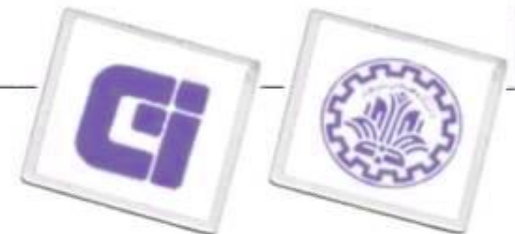
Apply and Admission Process

- ✧ **Reading and Accepting DML Regulations**
- ✧ **Filling the Application Form and Delivering the Application Requirements to DML**
- ✧ **Signing the Research Contract and Confidentiality Agreement**
- ✧ **Defining Clearly the Research Project**
- ✧ **Preparing the Research Time Table**



Facilities

- ✧ **Personal Computer, Simulation Servers, Printer, scanner and etc.**
- ✧ **General amenities including Tea Maker, Coffee Maker, Refrigerator, Microwave, Water Dispenser and etc.**
- ✧ **Extra-curricular Activities**
 - ✧ Weekly Futsal
 - ✧ Seasonal Trips
- ✧ **Providing required Software, Hardware and Dataset for Students' Final Projects**
- ✧ **Student Grants**
- ✧ **Grants for Conference Participate**



Research Groups - Multimedia Systems

✧ Group website: mms.dml.ir

✧ Research Areas

✧ Object Detection & Tracking

✧ Projects

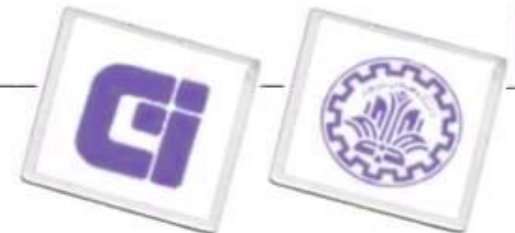
✧ Feature-Based Template Matching

✧ Distinctive Image Features from Scale-Invariant Key points (SIFT)

✧ SURF: Speed Up Robust Features

✧ CenSurE: Center Surround Extremes for Real time Feature Detection and Matching

✧ SUSurE: Speeded Up Surround Extreme Feature Detector and Descriptor for Real-time Applications

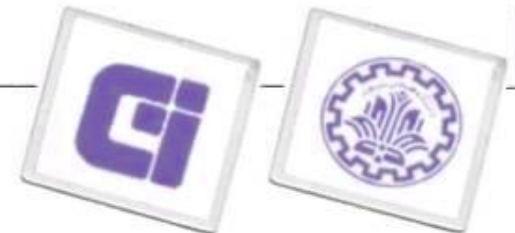


Research Groups - Machine Learning

✧ **Group Website:** ml.dml.ir

✧ **Projects**

- ✧ Neighborhood Graph Construction for Semi-Supervised Classification
- ✧ Video Error Concealment Using the Gaussian Process Framework
- ✧ Spectral Kernel Learning for Semi-Supervised Classification
- ✧ Boosting the Tied Factor Analysis for Face Recognition Across Large Pose Variations



Research Groups - Complex Networks

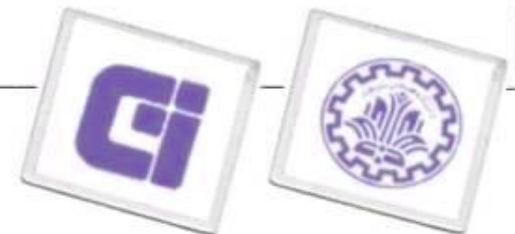
✧ **Group Website:** cnet.dml.ir

✧ **Research Areas**

- ✧ **Network Structure and Models**
- ✧ **Information Networks**
- ✧ **Study of Social Networks**
- ✧ **Wireless and Peer-to-Peer Networks**

✧ **Projects**

- ✧ **Network Structure and Models**
 - ✧ Analysis of Sampling of Network Structure on Analyzing Cooperativity on Complex Networks
 - ✧ A Complex Network Model for Video Streaming in P2P Networks
 - ✧ Navigation and Searching Strategies in Complex Networks
 - ✧ Community Detection in Complex Networks
 - ✧ Centrality Measure of Complex Networks



Research Groups - Complex Networks

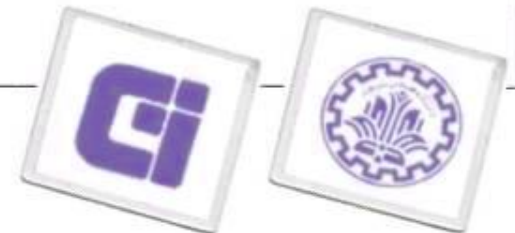
✧ Projects

✧ Information Networks

- ✧ Extracting Cascaded Information Networks From Social Networks
- ✧ Identifying the Influential Propagating Nodes in Complex Networks
- ✧ Maximizing the Spread of Social Influence in Social Networks

✧ Study of Social Networks

- ✧ Prediction in Signed Social Networks
- ✧ Characterization of Twitter
- ✧ Statistics and Characterization of YouTube Social Network



Research Groups - Complex Networks

✧ Projects

✧ Wireless Networks

- ✧ Scheduling in 802.16 (WiMAX)
- ✧ Cross Layer Error Control for Wireless Multimedia Sensor Networks
- ✧ A congestion control protocol for wireless multimedia sensor network using cross layer information
- ✧ Energy efficient framework for Wireless Sensor Network
- ✧ Pricing based routing in MANETs

✧ Peer-to-Peer networks

- ✧ Video streaming system in Peer-to-Peer Networks
- ✧ A Scheme for Improving Security in Video Streaming over Peer-to-Peer Networks
- ✧ Applying Network Coding in mesh-based P2P streaming
- ✧ A Hybrid Push/Pull P2P video Streaming Protocol
- ✧ Efficient content partitioning and block scheduling in mesh based P2P video streaming
- ✧ Implementation of CoolStreaming Protocol in OMNeT++ 4.x



Research Groups - Activity Recognition

✧ **Group Website:** ar.dml.ir

✧ **Research Areas**

✧ **Human Pose Estimation**

✧ Applications: Human-Machine Interaction, Medicine, Game industries and Animation.

✧ **Activity Recognition in Ambient Intelligent Environment**

✧ Applications: Human-Machine Interactions, Elderly Observation, Daily Activity Reminding

✧ **Projects**

✧ **Human Pose Estimation**

✧ 3D Human Pose Estimation Using a Single Camera

✧ **Activity recognition in Ambient Intelligent Environment**

✧ Using Machine Learning Methods in Activity Recognition

✧ Hidden-Markov Models for Activity Recognition in Ambient Intelligent Environment



Technological Projects

✧ Wearable Gestural Interface

- ✧ It is a wearable tool on which the user navigates with hand gestures.
- ✧ It permits to project the information in front of the user either on a wall or on another object.
- ✧ This makes the usability of the tool more natural and simpler, since hand gestures are often used by humans.
- ✧ The tool is wearable so the user does not have to take it out of the pocket
- ✧ The project was done under the collaboration of the University of Fribourg UNIFR and the University of Applied Sciences of Western Switzerland, Fribourg EIA-FR.



Research Outputs

✧ Alumni Students (since 2002)

✧ # of PhD : 3 / MSc : 35/ BSc: 52

✧ DML Publications/ Journal and Conference Papers

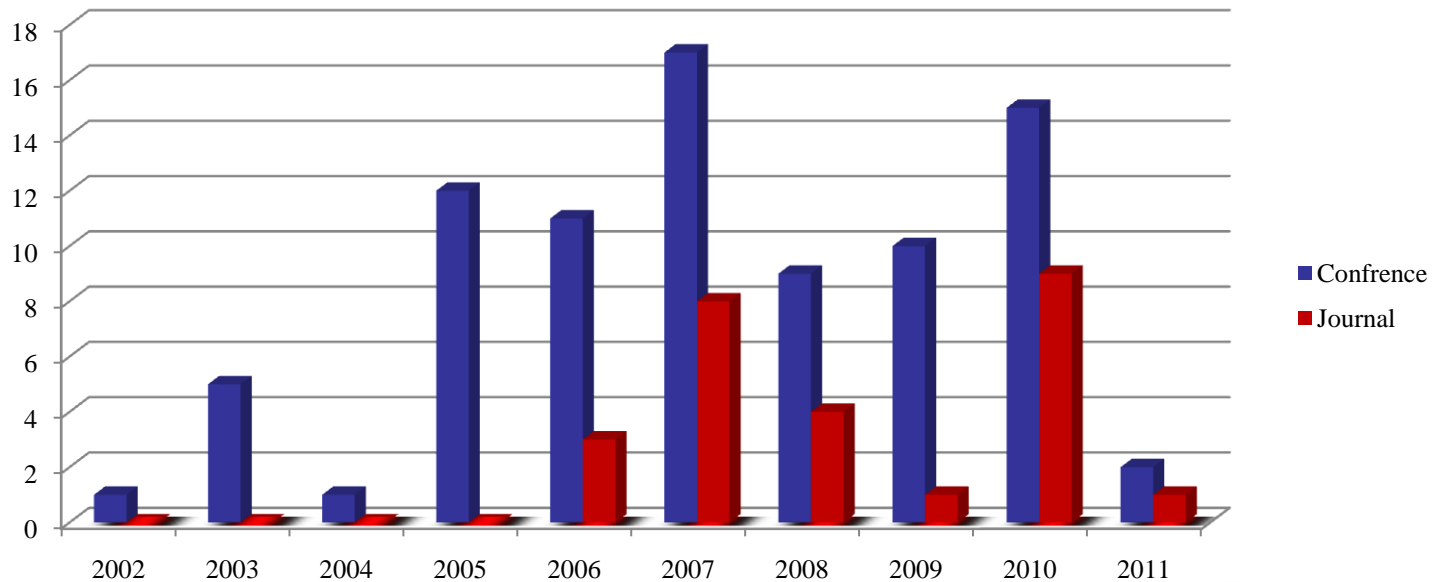


Photo Gallery - Website

The screenshot shows the top section of the website. On the left is the Sharif University of Technology logo. To its right is the text "Digital Media Lab" in a large, bold font, with "Sharif University Of Technology" underneath. Below this is a horizontal navigation bar with links: Home, About, Research Groups, Resources, Courses, Contact Info, and Members Portal. The main content area features a large photograph of two men in a lab setting looking at a laptop. The text "Digital Media Lab" is overlaid on the top left of the photo. At the bottom of the photo are several small icons labeled DML, VMS, AR, ML, and CNET.

This screenshot shows the header and main menu for the "Complex Networks- Digital Media Lab" website. The header includes the Sharif University of Technology logo and the text "Complex Networks- Digital Media Lab" and "Sharif University Of Technology". Below the header is a "Main Menu" section with a list of links: Home, People, Research (with sub-links for Network Structure and Models, Information Networks, and Study of Social Networks), Publications, Resources (with sub-links for Interesting Papers, Related Links, Research Groups, Tools, Databases, and Courses), Conferences, Journals & Books, and Contact Info. To the right of the menu is a large image of a complex network graph with many nodes and edges.

This screenshot shows the main content area of the website. At the top is the "Digital Media Lab" logo and navigation links: Home, People, Research, Publications, QuickLinks, Galleries, Groups, and Contact Us. A search bar is located on the right. Below the navigation is a "Primary links" section with a list of links: Home, People, Research, Publications, QuickLinks, Galleries, Groups, and Contact Us. The main content area is titled "About DML" and contains the following text: "Welcome to the Digital Media Lab (DML) at the Department of Computer Engineering, Sharif University of Technology (SUT). The mission of the DML is to perform innovative research in the areas of: Multimedia Systems, Complex Networks, Overlay/P2P and Wireless Networks, Human-Centered Computing, and Computational Biology and Bioinformatics." Below this is a section titled "DML Rules and Regulations" with a date of 2009-12-08 13:39, and a section titled "Paper Status & Presentations" with a date of 2009-12-08 13:51. At the bottom is a "New User Considerations" section with a date of 2009-04-08 22:02.



Photo Gallery – Research Activities

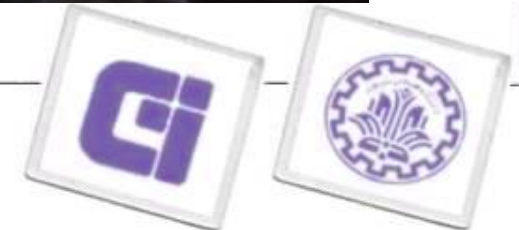
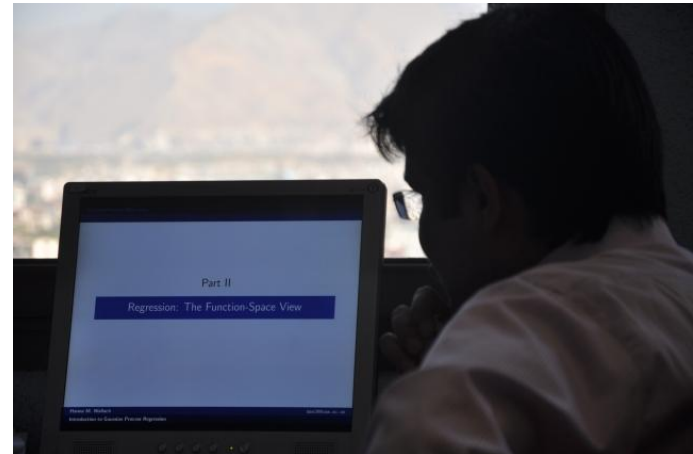
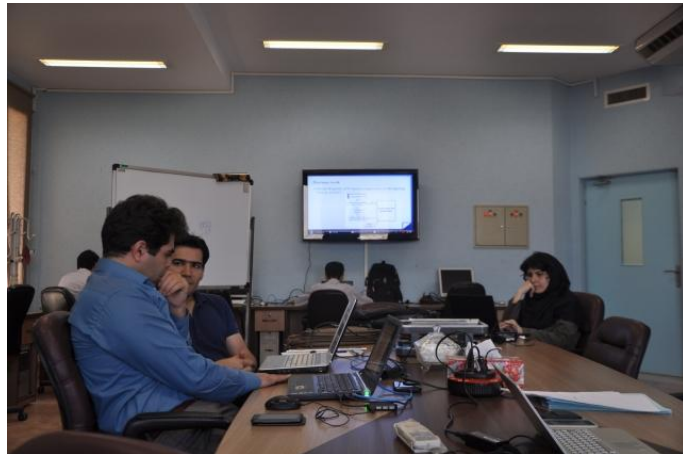


Photo Gallery - Extra-curricular Activities



The End

✧ **Thanks for your attention**

✧ **Winter 2011**

