



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

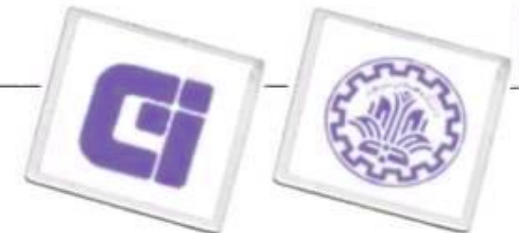
Digital Media Lab

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

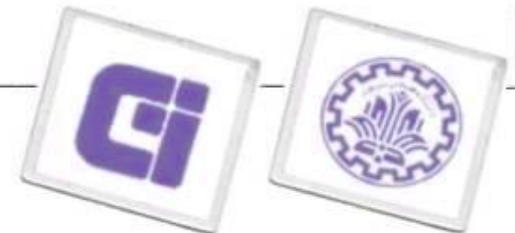
✧ Complex Networks Group- Mostafa Salehi

- ✧ 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

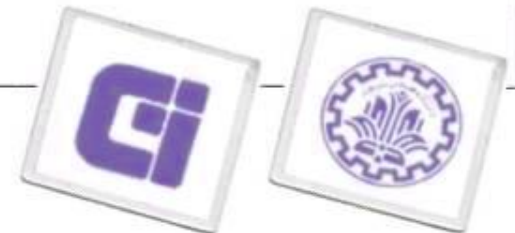
✧ A researcher in DML should be:

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

✧ Writing weekly, monthly and technical reports

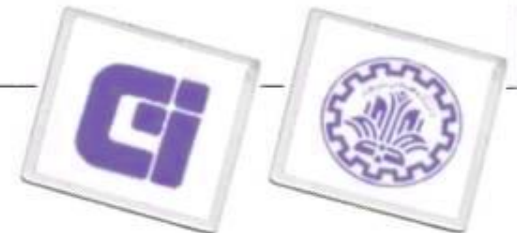
✧ Attendance in all DML weekly group meetings

- ✧ Regard other executive processes based on Lab regulations notebook



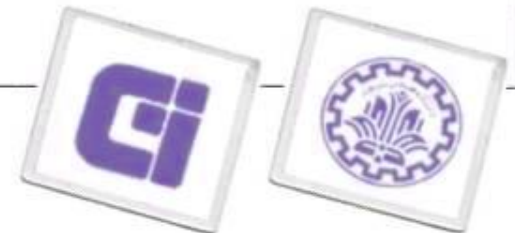
Apply and Admission Process

- ✧ **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

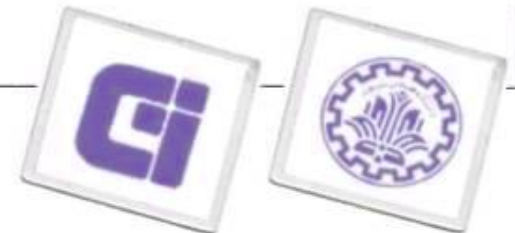
✧ Feature-Based Template Matching

✧ 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

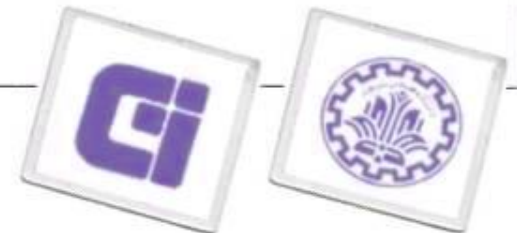


Research Groups - Machine Learning

✧ **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

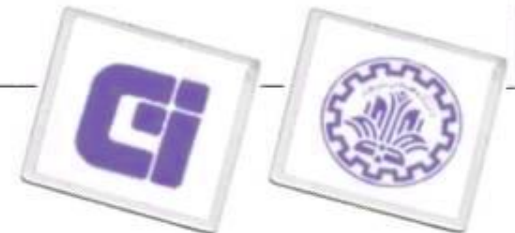
✧ Projects

✧ 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**

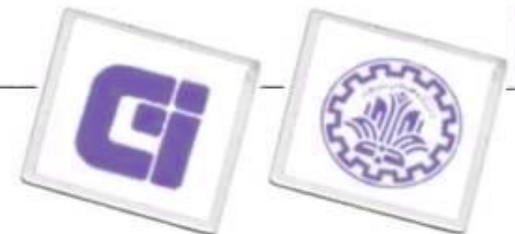
✧ **Human Pose Estimation**

✧ 3D Human Pose Estimation Using a Single Camera

✧ **Activity recognition in Ambient Intelligent Environment**

✧ Using Machine Learning Methods in Activity Recognition

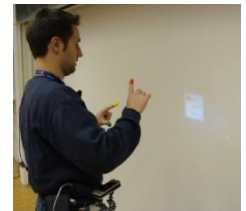
✧ Hidden-Markov Models for Activity Recognition in Ambient Intelligent Environment



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

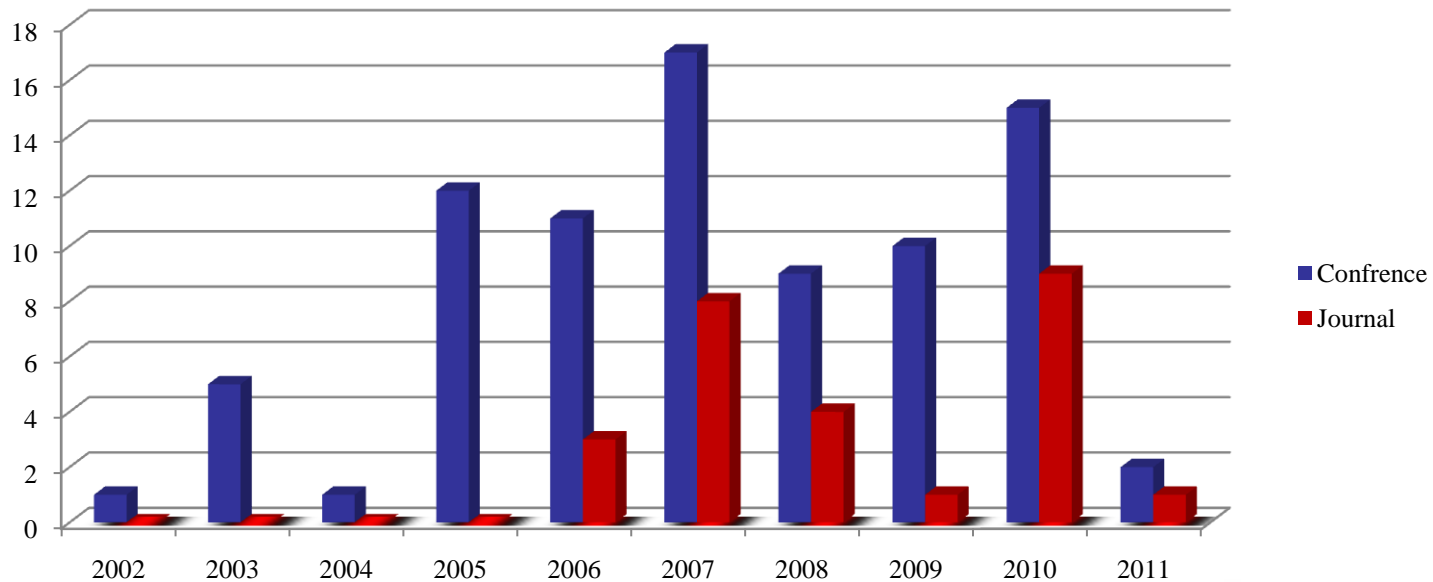


Photo Gallery - Website

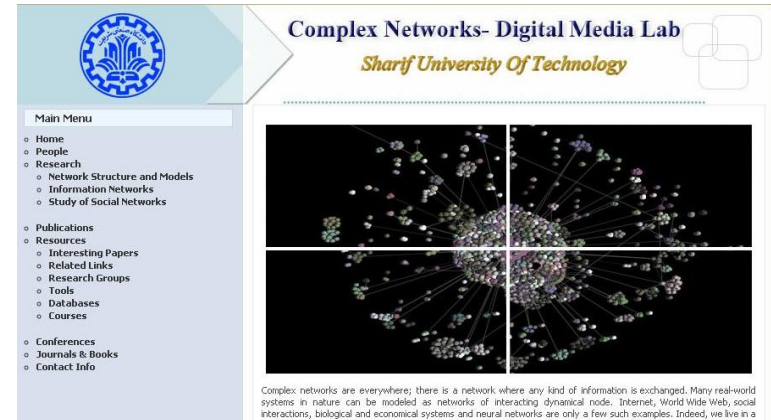


Photo Gallery – Research Activities

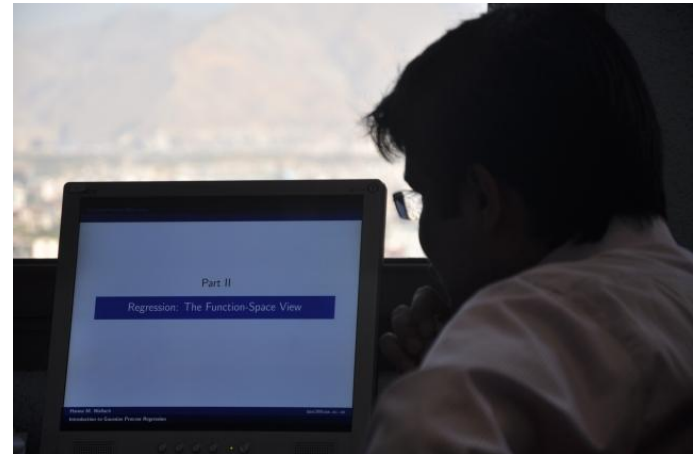
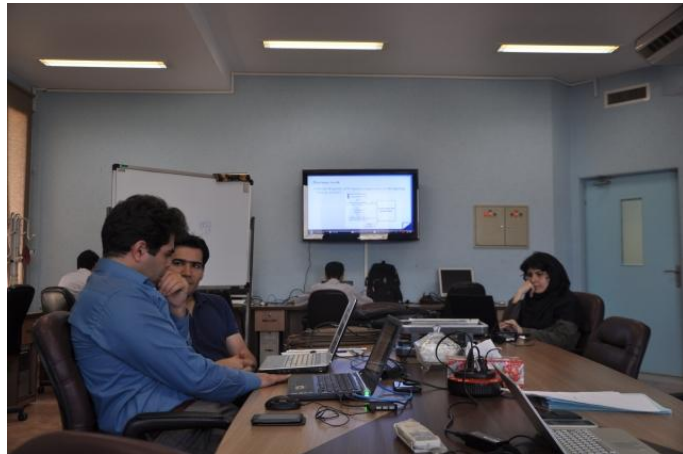


Photo Gallery - Extra-curricular Activities



The End

✧ **Thanks for your attention**

✧ **Winter 2011**

