

Aykut Erdem

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Brief Bio

Aykut Erdem is an Associate Professor in the Department of Computer Engineering at Hacettepe University, where he is a member of the Computer Vision Lab. Prior to joining Hacettepe University in 2010, he worked as a post-doctoral researcher in the Computer Science Department of Ca' Foscari University of Venice in Italy. He received his PhD degree in Computer Engineering from METU in 2008, and before that, he obtained his BSc and MSc degrees from the same institution in 2001 and 2003, respectively. During his PhD studies, he was a visiting researcher at Virginia Tech during Summer 2004 and a visiting scholar at MIT for Fall 2007.

His research interests span a diverse set of topics, ranging from image editing to visual data mining, and to multimodal learning for language and vision.

Experience

- **Associate Professor**^{1,2,3} 04/2018 – now
Department of Computer Engineering, Hacettepe University, Beytepe, Ankara, Turkey
- **Assistant Professor** 12/2011 – 04/2018
Department of Computer Engineering, Hacettepe University, Beytepe, Ankara, Turkey
- **Instructor** 11/2010 – 12/2011
Department of Geodesy and Photogrammetry, Hacettepe University, Beytepe, Ankara, Turkey
- **Post-doctoral Researcher**⁴ 11/2008 – 03/2010
Dipartimento di Informatica, Università Ca' Foscari di Venezia, Venice, Italy
- **Visiting Student**⁵, 09/2007 – 11/2007
Department of Architecture, Computation Group, MIT, Cambridge, USA

PhD in Computer Engineering

09/2003–10/2008
METU, Ankara, Turkey
Advisor: Sibel Tari
CGPA: 3.94/4.00

MSc in Computer Engineering

09/2001–07/2003
METU, Ankara, Turkey
Advisor: Volkan Atalay
CGPA: 3.86/4.00

BSc in Computer Engineering

09/1997–06/2001
METU, Ankara, Turkey
CGPA: 3.67/4.00

¹ Co-founder of Hacettepe University Computer Vision Lab (HUCVL).

² Currently supervising 4 PhD and 1 MSc student, and co-supervising 1 PhD and 3 MSc students.

³ Taught courses in *introductory programming, logical design, programming languages, systems programming, machine learning, image processing, computer vision, machine learning and deep learning*.

⁴ Sponsored by EU-FP7 SIMBAD (Beyond Features: Similarity-Based Pattern Analysis and Recognition) Project.

⁵ Visited Prof. George Stiny (sponsored by TUBITAK Program 2214 – Research Fellowship Program for PhD Students).

- **Visiting Student**⁶
07/2006

⁶ Visited Prof. Jayant Shah.
 - **Visiting Research Scholar**⁷
07/2004 – 08/2004

⁷ Worked with Volkan Atalay and Rengul Cetin-Atalay.
 - **Teaching Assistant**⁸
12/2001 – 09/2008

⁸ Assisted courses include *image processing, dynamic systems, scientific computing, logic for CS, and computer graphics*.
- Department of Mathematics, Northeastern University, Boston, USA
 Virginia Bioinformatics Institute, Virginia Polytechnic Institute and State University, Virginia, USA
 Department of Computer Engineering, Middle East Technical University, Ankara, Turkey

Publications

Journal Articles

My Erdos number is 3 (via 1. Arun Kumar Jagota, 2. Marcello Pelillo).

1. Cagdas Bak, Aysun Kocak, Erkut Erdem, and Aykut Erdem, "Spatio-Temporal Saliency Networks for Dynamic Saliency Prediction", *IEEE Transactions on Multimedia*, to appear. doi:10.1109/TMM.2017.2777665.
2. Levent Karacan, Aykut Erdem, and Erkut Erdem, "Alpha Matting with KL-Divergence Based Sparse Sampling", *IEEE Transactions on Image Processing*, Vol. 26, Issue 9, pp. 4523-4536, September 2017.
3. Mert Kilickaya, Burak Kerim Akkus, Ruket Cakici, Aykut Erdem, Erkut Erdem, and Nazli Ikizler-Cinbis, "Data-driven image captioning via salient region discovery", *IET Computer Vision*, Vol. 11, Issue 6, pp. 398-406, September 2017.
4. Yasin Kavak, Erkut Erdem, and Aykut Erdem, "A Comparative Study for Feature Integration Strategies in Dynamic Saliency Estimation", *Signal Processing: Image Communication*, Vol. 51, pp. 13-25, February 2017.
5. Aykut Erdem, "Structure-Texture Decomposition of RGB-D Images", *International Journal of Intelligent Systems and Applications in Engineering*, Vol. 4, No. 4, pp. 111-118, October 2016.
6. Osman Akin, Erkut Erdem, Aykut Erdem, and Krystian Mikolajczyk, "Deformable Part-based Tracking by Coupled Global and Local Correlation Filters", *Journal of Visual Communication and Image Representation*, Vol. 38, pp. 763-774, July 2016.
7. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem, and Erkut Erdem, "An Objective Deghosting Quality Metric for HDR Images", *Computer Graphics Forum*, Vol. 35, Issue 2, pp. 139-152, May 2016.
8. Raffaella Bernardi, Ruket Cakici, Desmond Elliott, Aykut Erdem, Erkut Erdem, Nazli Ikizler-Cinbis, Frank Keller, Adrian Muscat, and Barbara Plank, "Automatic Description Generation from Images: A Survey of Models, Datasets, and Evaluation Measures", *Journal of Artificial Intelligence Research*, Vol. 55, pp. 409-442, February 2016.
9. Bora Celikkale, Aykut Erdem and Erkut Erdem, "Predicting Memorability of Images Using Attention-driven Spatial Pooling and Image Semantics", *Image and Vision Computing*, Vol. 42, pp. 35-46, October 2015.
10. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem and Erkut Erdem, "The State of the Art in HDR Deghosting: A Survey and Evaluation", *Computer Graphics Forum*, Vol. 34, Issue 2, pp. 683-707, May 2015.

11. Levent Karacan, Erkut Erdem and Aykut Erdem, "Structure-Preserving Image Smoothing via Region Covariances", *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia 2013)*, Vol. 32, Issue 6, November 2013.
12. Erkut Erdem and Aykut Erdem, "Visual saliency estimation by nonlinearly integrating features using region covariances", *Journal of Vision*, Vol. 13, Issue 4, Article 11, March 2013.
13. Aykut Erdem and Marcello Pelillo, "Graph Transduction as a Non-Cooperative Game", *Neural Computation*, Vol. 24, No. 3, pp. 700-723, March 2012.
14. Aykut Erdem and Sibel Tari, "A similarity-based approach for shape classification using Aslan skeletons", *Pattern Recognition Letters*, Vol. 31, Issue 13, pp. 2024-2032, October 2010.
15. Emre Baseski, Aykut Erdem and Sibel Tari, "Dissimilarity Between Two Skeletal Trees in a Context", *Pattern Recognition*, Vol. 42, Issue 3, pp. 370-385, March 2009.
16. Cagri Aslan, Aykut Erdem, Erkut Erdem and Sibel Tari, "Disconnected Skeleton: Shape at its Absolute Scale", *IEEE Trans. Pattern Anal. Mach. Intell.*, Vol. 30, No. 12, pp. 2188-2203, December 2008.
17. Aykut Erdem, Erkut Erdem, Volkan Atalay and A. Enis Cetin, "Vision-based continuous Graffiti-like text entry system", *Optical Engineering*, Vol. 43, Issue 3, pp. 553-558, March 2004.

Conference/Workshop Publications

1. K. Berker Logoglu, Hazal Lezki, M. Kerim Yucel, Ahu Ozturk, Alper Kucukkomurler, Batuhan Karagoz, Erkut Erdem, and Aykut Erdem, "Feature-Based Efficient Moving Object Detection for Low-Altitude Aerial Platforms", *1st International Workshop on Computer Vision for UAVs – in conjunction with ICCV 2017*, Venice, Italy, October 2017.
2. Raffaella Bernardi, Ruket Cakici, Desmond Elliott, Aykut Erdem, Erkut Erdem, Nazli Ikizler-Cinbis, Frank Keller, Adrian Muscat, and Barbara Plank, "Automatic Description Generation from Images: A Survey of Models, Datasets, and Evaluation Measures", *International Joint Conference on Artificial Intelligence (IJCAI 2017)*, Journal track, Melbourne, Australia, August 2017.
3. Mert Kilickaya, Aykut Erdem, Nazli Ikizler-Cinbis, and Erkut Erdem, "Re-evaluating Automatic Metrics for Image Captioning", *The 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2017)*, Valencia, Spain, April 2017.
4. Mert Kilickaya, Nazli Ikizler-Cinbis, Erkut Erdem, and Aykut Erdem, "Leveraging Captions in the Wild to Improve Object Detection", *The 5th Workshop on Vision and Language (VL'16) – in conjunction with ACL 2016*, Berlin, Germany, August 2016.
5. Levent Karacan, Aykut Erdem, and Erkut Erdem, "Image Matting with KL-Divergence Based Sparse Sampling", *IEEE International Conference on Computer Vision (ICCV 2015)*, Santiago, Chile, December 2015.
6. Semih Yagcioglu, Erkut Erdem, Aykut Erdem, and Ruket Cakici, "A Distributed Representation Based Query Expansion Approach for Image Captioning", *The 53rd Annual Meeting of the Association for Computational Linguistics (ACL 2015)*, Beijing, China, July 2015.
7. Semih Yagcioglu, Erkut Erdem, and Aykut Erdem, "City Scale Image Geolocalization via Dense Scene Alignment", *IEEE Winter Conference on Applications of Computer Vision (WACV 2015)*, Hawaii, USA, January 2015.

8. Aysun Kocak, Kemal Cizmeciler, Aykut Erdem, and Erkut Erdem, "Top down saliency estimation via superpixel-based discriminative dictionaries", *British Machine Vision Conference (BMVC 2014)*, Nottingham, UK, September 2014.
9. Yasin Kavak, Erkut Erdem, and Aykut Erdem, "Visual saliency estimation by integrating features using multiple kernel learning", *6th International Symposium on Attention in Cognitive Systems (ISACS 2013)*, Beijing, China, August 2013.
10. Bora Celikkale, Aykut Erdem, and Erkut Erdem, "Visual Attention-driven Spatial Pooling for Image Memorability", *IEEE Computer Vision and Pattern Recognition Workshops (CVPRW 2013)*, Portland, Oregon, USA, June 2013.
11. Aykut Erdem and Erkut Erdem, "Multiple-Instance Learning with Instance Selection via Dominant Sets", *1st International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2011)*, Venice, Italy, Springer LNCS, Vol. 7005, pp. 177-191, September 2011.
12. Aykut Erdem and Marcello Pelillo, "Graph Transduction as a Non-cooperative Game", *8th IAPR -TC-15 Workshop on Graph-based Representations in Pattern Recognition (GbR 2011)*, Munster, Germany, Springer LNCS, Vol. 6658, pp. 195-204, May 2011.
13. Aykut Erdem and Andrea Torsello, "A Game Theoretic Approach To Jointly Learn Shape Categories and Contextual Similarities", *Joint IAPR International Workshop on Structural, Syntactic, and Statistical Pattern Recognition (SSPR&SPR 2010)*, Cesme, Izmir, Turkey, Springer LNCS, Vol. 6218, pp. 139-148, August 2010.
14. Aykut Erdem and Sibel Tari, "Coarse-to-Fine Matching of Shapes Using Disconnected Skeletons by Learning Class-Specific Boundary Deformations", *7th IAPR -TC-15 Workshop on Graph-based Representations in Pattern Recognition (GbR 2009)*, Venice, Italy, Springer LNCS, Vol. 5534, pp. 21-30, May 2009.
15. Erkut Erdem, Aykut Erdem, and Sibel Tari, "Edge Strength Functions as Shape Priors in Image Segmentation", *5th International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR 2005)*, Florida, USA, Springer LNCS, Vol. 3757, pp. 490-502, November 2005.
16. Aykut Erdem, Erkut Erdem, and Sibel Tari, "Articulation Prior in an Axial Representation", *International Workshop on the Representation and Use of Prior Knowledge in Computer Vision – in conjunction with ECCV 2006*, Graz, Austria, pp. 1-14, May 2006.
17. Erkut Erdem, Aykut Erdem, Volkan Atalay, and A. Enis Cetin, "Computer Vision Based Unistroke Keyboard System and Mouse for the Handicapped", *IEEE International Conference on Multimedia and Expo 2003 (ICME 2003)*, Baltimore, USA, Volume 2, pp. 765-768, July 2003.
18. Aykut Erdem, Erkut Erdem, Volkan Atalay, and A. Enis Cetin, "Computer Vision Based Unistroke Keyboards", *7th International Symposium On Computer and Information Sciences (ISCIS 2002)*, Florida, USA, pp. 210-214, October 2002.

National Conference Publications

1. Mehmet Günel, Erkut Erdem, Aykut Erdem, "Kişi Görüntülerinin Nitelik Esaslı Üretilmesi (Generating Person Images Based on Attributes)", 26. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.
2. Ali Yunus Emre Özköse, Tarık Ayberk Yılıkoğlu, Levent Karacan, Aykut Erdem, "Derin Öğrenmeyle Bir Fotoğrafın Yerini Bulma (Finding Location of A Photograph with Deep Learning)", 26. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.

3. Menekşe Kuyu, Aykut Erdem, Erkut Erdem, "Altsözcük Öğeleri ile Türkçe Görüntü Altyazılama (Image Captioning in Turkish using Subword Units)", 26. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.
4. Levent Karacan, Aykut Erdem, Erkut Erdem, "Çekismeli Üretici Ağlar Kullanarak Dış Mekan Görüntülerinin Geçici Niteliklerini Düzenleme (Adjusting Transient Attributes of Outdoor Images using Generative Adversarial Networks)", 25. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2017)*, Antalya, Mayıs 2017.
5. Cem Gungor, Fatih Baltacı, Aykut Erdem, Erkut Erdem, "Türk Sofrası: Yemek Tanıma için Türk Yemekleri Barındıran Bir Denektaşı Veri Kümesi (Turkish Cuisine: A Benchmark Dataset with Turkish Meals for Food Recognition)", 25. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2017)*, Antalya, Mayıs 2017.
6. Çağdas Bak, Aykut Erdem, Erkut Erdem, "Baskın Kümeler ile Hareket Yörüngelerinin Öbeklenmesi (Clustering Motion Trajectories via Dominant Sets)", 24. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
7. Burçak Asal, Aykut Erdem, Erkut Erdem, "İnsan Kalabalıklarının Baskın Kümeler Tabanlı Analizi (Dominant Sets Based Analysis of Human Crowds)", 24. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
8. Goksu Erdogan, Bora Celikkale, Aykut Erdem, Erkut Erdem, "Kişisel Görüntü Kümelerinin İçsel Özellikler Kullanılarak Özetlenmesi (Summarizing Personal Image Collections with Intrinsic Properties)", 24. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
9. Mesut Erhan Ünal, Begüm Çıtamak, Semih Yağcıoğlu, Aykut Erdem, Erkut Erdem, Nazlı İkizler Cinbiş, Ruket Çakıcı, "TasvirEt: Görüntülerden Otomatik Türkçe Açıklama Oluşturma İçin Bir Denektaşı Veri Kümesi (TasvirEt: A Benchmark Dataset for Automatic Turkish Description Generation from Images)", 24. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
10. Mehmet Günel, Levent Karacan, Aykut Erdem, Erkut Erdem, "Sık Eşleme Yoluyla Görüntü Renklendirme (Image Colorization via Dense Correspondences)", 22. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
11. Mert Kılıçkaya, Erkut Erdem, Aykut Erdem, Nazlı İkizler Cinbiş, Ruket Çakıcı, "Meta-sınıf Tabanlı Getirme ile Veriye Dayalı İmge Altyazılama (Data-driven Image Captioning with Meta-class Based Retrieval)", 22. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
12. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem, Erkut Erdem, "YDA Görüntüler İçin Gölgeleme Giderme Algoritmalarının Karşılaştırılması (Evaluating Deghosting Algorithms for HDR Images)", 22. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
13. Kübra Mammadova, Erkut Erdem, Aykut Erdem, "Görsel Belirginlik Güdümlü Pozlandırma Birleştirimi (Visual Saliency Guided Exposure Fusion)", 22. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
14. Hasan Tuğrul Erdoğan, Erkut Erdem, Aykut Erdem, "Alan Kovaryansları İçin Grup Seyrekliğine Dayalı Seyrek Kodlama (Group Sparsity Based Sparse Coding for Region Covariances)", 21. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2013)*, Girne, KKTC, Nisan 2013.
15. Osman Akın, Aykut Erdem, Erkut Erdem, "MILIS Çoklu Örnekle Öğrenme Algoritmasının Farklı Bir Örnek Seçme Yöntemiyle Yeniden İncelenmesi (Revisiting MILIS Multiple Instance Learning Algorithm

- with A Different Instance Selection Mechanism)", 20. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2012)*, Ölüdeniz, Fethiye, Muğla, Nisan 2012.
16. M. Erkut Erdem, I. Aykut Erdem, U. Yılmaz, V. Atalay, "Üç Boyutlu Katı Nesnelerin Yansıtma Özelliklerinin Görüntülerden Çıkarılması", 12. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2004)*, pp. 245-248, Kuşadası, Nisan 2004.
 17. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalay, A. Enis Cetin, "Engelliler İçin Bilgisayarlı Görmeye Dayalı Klavye ve Fare Sistemi", 11. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2003)*, pp. 196-199, İstanbul, Haziran 2003.
 18. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalay, A. Enis Cetin, "Kağıt Klavye: Bilgisayarlı Görmeye Dayalı Klavye", 10. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2002)*, Pamukkale, Haziran 2002.
 19. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalay, A. Enis Cetin, "Bilgisayarlı Görmeye Dayalı Fare Sistemi", 10. *IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2002)*, Pamukkale, Haziran 2002.

Conference Presentations (Abstract only)

1. Mert Kilickaya, Aykut Erdem, Nazli İkizler-Cinbis, and Erkut Erdem, "Re-evaluating Automatic Metrics for Image Captioning", *ICCV17 Second Workshop on Closing the Loop Between Vision and Language (CLVL)*, Venice, Italy, October 2017.
2. Cagdas Bak, Aysun Kocak, Aykut Erdem and Erkut Erdem, "Spatio-Temporal Saliency Networks for Dynamic Saliency Prediction", *ICCV International Workshop on 'Mutual Benefits of Cognitive and Computer Vision (MBCC)*, Venice, Italy, October 2017.
3. Sibel Tari, Cagri Aslan, Emre Baseski and Aykut Erdem, "Shape Scale: Representing Shapes at Their Absolute Scales", *SIAM Annual Meeting 2006*, Boston, USA, July 2006.
4. M. Iskar, Erku Erdem, A. Erdem, S. Akman, A. Dickerman, V. Atalay and R. Cetin-Atalay, "CAPRIS: A Database for Cancer Gene Promoter Related Motif Search", *FEBS Journal*, Vol. 273, pp. 248, June 2006.
5. Erkut Erdem, Aykut Erdem and Volkan Atalay, "Image-based Extraction of Material Reflectance Properties of a 3D Rigid Object", *Eurographics 2003*, Poster Session, Granada, Spain, September 2003.
6. Aykut Erdem, Erkut Erdem, Volkan Atalay and A. Enis Cetin, "Computer based text entry for Wearable Computing", *6th IEEE International Symposium on Wearable Computers (ISWC 2002)*, Demonstrations, Seattle, USA, October 2002.
7. Aykut Erdem, Erkut Erdem, Yasemin Yardimci, Volkan Atalay and A. Enis Cetin, "Computer Vision Based Mouse", *IEEE International Conference on Acoustics, Speech, and Signal Processing 2002 (ICASSP 2002)*, Student Forum Session, Florida, USA, May 2002.

Technical Reports

1. Aykut Erdem and Andrea Torsello, "A Game Theoretic Approach To Jointly Learn Shape Categories and Contextual Similarities", Dipartimento di Informatica, Università Ca' Foscari di Venezia, CS-2009-8, July 2009.
2. Aykut Erdem, "A dynamic procedure for forming shape categories from skeletal shape trees", Department of Computer Engineering, Middle East Technical University, METU-CENG-TR-2007-04, July 2007.

Theses

- Aykut Erdem, “Category Knowledge, Skeleton Based Shape Matching and Shape Classification”, *PhD Thesis*, Middle East Technical University, Turkey, October 2008.
- Aykut Erdem, “Vision-Based Human-Computer Interaction Using Laser Pointer”, *MSc Thesis*, Middle East Technical University, Turkey, July 2003.

Theses Supervised

PhD Theses Supervised

1. Yasin Kavak, “Learning Visual Saliency for Static and Dynamic Scenes, *PhD Thesis*, Hacettepe University, September 2017.
2. Osman Akin, “Part-Based Object Tracking with Correlation Filters, *PhD Thesis*, Hacettepe University, August 2016.

MSc Theses Supervised

1. Burcak Asal, “A Robust Method To Identify Overlapping Crowd Motion Patterns’, *MSc Thesis*, Hacettepe University, January 2017
2. Cagdas Bak, “Deep Learning Based Saliency Prediction In Videos”, *MSc Thesis*, Hacettepe University, July 2016.
3. Mert Kilickaya (supervised with Nazli Ikizler Cinbis), “Visual Importance: Modeling With Applications To Vision And Language”, *MSc Thesis*, Hacettepe University, July 2016.
4. Hasan Tugrul Erdogan (co-supervised with Erkut Erdem), “Sparsity-based Discriminative Tracking With Adaptive Cue Integration”, *MSc Thesis*, Hacettepe University, August 2015.
5. Levent Karacan (co-supervised with Erkut Erdem), “Image Smoothing By Using First And Second Order Region Statistics”, *MSc Thesis*, Hacettepe University, January 2014.

Research Grants

As Principal Investigator

- **Summarization Approaches Towards Interpreting Big Visual Data**
The aim of the proposed project is to interpret big and noisy visual data, which has been recorded in diversified environments with no predefined constraints. To this end, the goal is to develop and apply original data mining methods towards extracting important knowledge and increase the accessibility of such archives. Particularly, we aim to focus on summarization approaches, so that the big visual data is more effectively structured and enriched with additional semantic information. The summarization approaches that make use of the multi-modal nature of the data will focus on three main problems: 1) To learn semantic concepts and spatio-temporal attributes from big visual data; 2) organization of large photograph collections; 3) summarization of videos in large web archives. In all these

Project Duration: 3 years
(15/09/2017-15/09/2020)

The Scientific and Technological Research Council of Turkey (TUBITAK) Primary Subjects R&D Funding Program (Award# 116E685)

problems, big visual data and the additional information referred as metadata will be handled together.

- **Towards A Unified Framework For Finding What Is Interesting In Videos**

The goal of this project is to develop and apply effective computer vision techniques that can automatically detect "what is interesting" in such videos. Here, what is meant by interesting may refer to different notions such as where people look in videos, salient objects, interesting motion patterns or moments in videos. All these topics listed above form the subject matter of the proposed project. It is important to note that each notion of interestingness involves different computational problems that need to be solved. This project, unlike the previous work, will investigate all these interrelated concepts within a unified framework and this will allow us to detect different levels of interestingness in a more accurate way. Although the aforementioned problems are closely related to each other, most of the existing literature treats them separately – as mentioned above. In this project, we bridge this gap by developing various techniques and methodologies for solving each task, which take advantage of simultaneously using additional information from other sources of interestingness.

Project Duration: 3 years
(01/04/2014-01/04/2017)

The Scientific and Technological Research Council of Turkey (TUBITAK) Career Development Program (Award# 113E497)

As Co-Investigator

- **Understanding Images and Visualizing Text: Semantic Inference and Retrieval by Integrating Computer Vision and Natural Language Processing**

This project will explore the connection between vision and language from different directions in which we will integrate computer vision and natural language processing methods. By using these two fields together, automatic systems that transcribe the visual content of images with vivid descriptions which are very alike to human language will be obtained. Similarly, in the context of this project, retrieval systems that describe the sentence or paragraph-based textual queries visually via related images or image sets will be constructed.

Project Duration: 3 years
(01/10/2013-01/10/2016)

The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 113E116) and European Union under European Cooperation in Science and Technology (COST) Programme (ICT COST IC1037 Action)

- **The Use of Multiple Cues and Contextual Knowledge in Computer Vision**

This project will explore the influences of visual context and multiple cues on a number of computer vision problems. First, a novel visual saliency or attention model will be developed towards a direction that combines information coming from multiple cues with the contextual knowledge. The goal is to come up with a model that can effectively predict where people look in an image. In the second part of the project, we will investigate the problem of image filtering with a focus on devising appropriate ways of extracting high-level contextual knowledge for filtering and using them to guide the ongoing image smoothing process. The third part of the project will be about developing adaptive approaches to image segmentation that integrates information obtained from multi cues. A novel and

Project Duration: 3 years
(01/10/2012-01/10/2015)

The Scientific and Technological Research Council of Turkey (TUBITAK) Career Development Program (Award# 112E146)

effective segmentation algorithm will be developed that adaptively combines high-level prior knowledge with the information obtained from different visual cues at different scales.

Professional Activities

Reviewer for Journals

- Elsevier Computers & Graphics
- Elsevier Computer Vision and Image Understanding
- Elsevier Pattern Recognition
- IEEE Computer Graphics and Applications
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IET Computer Vision
- International Journal of Pattern Recognition and Artificial Intelligence Pattern Recognition

Program Committee

- 6th Workshop on Vision and Language (VL'17)
- 5th Workshop on Vision and Language (VL'16)
- 3rd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2015)
- 2nd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2013)

Reviewer for Conferences

- Asian Conference on Computer Vision (ACCV), 2016
- European Conference on Computer Vision (ECCV), 2016
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2017, 2016, 2015, 2014
- IEEE International Conference on Computer Vision (ICCV), 2017, 2015, 2009
- IEEE International Conference on Robotics and Automation (ICRA), 2013
- IEEE Winter Conference on Applications of Computer Vision (WACV) 2016, 2015, 2014, 2013
- International Conference on Pattern Recognition (ICPR), 2016, 2010

Memberships

- 2015 – present The Association for Computational Linguistics
- 2013 – present The Computer Vision Foundation