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# PINAR DUYGULU ŞAHİN

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## **Research Interests**

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Computer vision, Pattern recognition, Multimedia data mining  
Specifically, learning from large scale multi-modal data; leveraging noisy web images and videos for semi-supervised learning; large scale object, scene and face recognition; semantic analysis and retrieval of large multimedia collections; historical document understanding; analysis of human and animal behaviour; analysis for health and elderly care.

## **Education**

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**Ph.D.** (1998-2003)

Middle East Technical University, Dep. of Computer Engineering, Turkey

- ◇ *Thesis title:* Translating images to words : A novel approach for object recognition
- ◇ *Supervisor:* Prof. Fatoş Yarman-Vural
- ◇ *Co-supervisor:* Prof. David Forsyth (now at University of Illinois at Urbana-Champaign)

**M.S.** (1996-1998)

Middle East Technical University, Dep. of Computer Engineering, Turkey

- ◇ *Thesis title:* Form Document Identification Based On Hierarchical Tree Representation
- ◇ *Supervisor:* Prof. Volkan Atalay

**B.S.** (1992-1996)

Middle East Technical University, Dep. of Computer Engineering, Turkey

- ◇ *Graduation Project:* Recognition of Cadastre Forms Using Form Description Languages
- ◇ *Supervisors:* Prof. Volkan Atalay and Prof. Halit Oğuztüzün

## Experience

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**Hacettepe University, Computer Engineering Department** Ankara, Turkey  
*Professor* (December 2016 - present )  
*Associate Professor* (May 2015 - December 2016 )

- ◇ Member of Computer Vision Group

**Carnegie Mellon University, Computer Science Department** Pittsburgh, PA, USA  
*Research Associate* (February 2014 - July 2015 )  
*Fulbright scholar* (August 2013 - January 2014)

- ◇ Member of Informedia Group

**Bilkent University, Dept. of Computer Engineering,** Ankara, Turkey  
*Assistant Professor* April 2004 - May 2015

- ◇ Co-founder of RETINA Vision and Learning research lab. (Web: <http://retina.cs.bilkent.edu.tr/>)

**Johns Hopkins University, Center for Language and Speech** Baltimore, MD, USA  
*Senior Researcher* (July 2004 - August 2004)

- ◇ Member of Joint Visual Text Modelling Team

**Carnegie Mellon University, Computer Science Department** Pittsburgh, PA, USA  
*Postdoctoral Researcher* (March 2003 - March 2004)

- ◇ Member of Informedia Digital Video Understanding and Caremedia Projects

**University of California at Berkeley, Computer Science Division** Berkeley, CA, USA  
*Visiting Scholar - Supervisor : Prof. David Forsyth* (February 2001 - May 2002)

- ◇ Member of Computer Vision Group and Digital Library Project.

**Middle East Technical University, Dep. of Computer Eng.** Ankara, Turkey  
*Research Assistant* (September 1996 - March 2003)

- ◇ Member of the Image Processing and Pattern Recognition Group.

**University of Rochester** Rochester, NY, USA  
*Visiting Researcher* (July 1999)

- ◇ Joint NSF-TUBITAK project with Prof. Murat Tekalp and Prof. Fatoş Yarman-Vural.

## Honors, Awards and Achievements

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- ◇ NVIDIA GPU Grant, 2016
- ◇ Science Academys Young Scientist Award (BAGEP), 2015
- ◇ Fulbright Scholarship, 08/2013-01/2014.
- ◇ Invited to Google EMEA Faculty Summit 2012 in London as being one of the 100+ selected academics.
- ◇ Received the rank of Associate Professor from the Inter-University Council (UAK) in April 2010.
- ◇ TÜBİTAK Career Award, 2005
- ◇ Best paper in Cognitive Vision award in European Conference on ComputerVision (ECCV 2002).
- ◇ TÜBİTAK NATO-PC (A-2) fellowship (February 2001 - July 2001)

## Academic Activities

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- ◇ Organizing Committee Member of Machine Learning Summer School "Bozkirda Yapay Ogrenme: Bilgisayarli Goru ve Robotik", August 2017
- ◇ Founding member of the EUROMM (European Chapter of the Special Interest Group on Multimedia - SIGMM), 2010 – Present
- ◇ Publicity co-chair in 20th International Conference on Pattern Recognition (ICPR 2010).
- ◇ Area Chair for IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2011, 2018).
- ◇ Vice Chair for International Association for Pattern Recognition (IAPR) Technical Committee 12 on Multimedia and Visual Information Systems, June 2009-August 2012
- ◇ Guest Editor, Neurocomputing Special Issue on Smart Computing for Large Scale Visual Data Sensing and Processing
- ◇ Program Committee member for
  - IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2004-2006, 2008-2010, 2012-2015, 2017
  - European Conference on Computer Vision (ECCV) 2006, 2008, 2010, 2012, 2014, 2016
  - International Conference on Computer Vision (ICCV) 2005, 2007, 2009, 2011, 2013, 2015, 2017
  - ACM International Conference on Multimedia (ACM MM) 2014-2016
  - ACM International Conference on Multimedia Retrieval (ICMR) 2011-2016
  - IEEE International Conference on Multimedia and Expo (ICME) 2016, 2017
  - ICCV Workshop on Web-scale Vision and Social Media (VSM) 2015
  - International Conference on Pattern Recognition (ICPR) 2008, 2010, 2012, 2014
  - International Workshop on Human Activity Understanding from 3D Data (HAU3D), 2011-2013
  - Workshop on Multimedia Data Mining(MDM), in conjunction with KDD, 2008, 2013
  - ECCV Workshop on Web-scale Vision and Social Media, 2012
  - ACM International Conference on Image and Video Retrieval (CIVR) 2007-2010
  - ACM SIGMM International Workshop on Multimedia Information Retrieval (MIR) 2006, 2007, 2010
  - International Workshop on Content Based Multimedia Indexing (CBMI) 2010
  - International Multimedia Modelling Conference (MMM) 2010
  - International Symposium on Computer and Information Sciences (ISCIS), 2007, 2010
  - International Conference on Machine Learning (ICML) 2009
  - Workshop on Cross-Media Information Access and Mining (CIAM), in conjunction with IJCAI, 2009
  - The Joint VCL-VISU workshop, in conjunction with CVPR 2009
  - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD) 2008

- International Conference on Semantic and Digital Media Technologies (SAMT) 2008
- International Workshop on Multimodal Information Retrieval, in conjunction with IJ-CAI 2007
- International RIAO Conference, 2007
- ◇ Reviewer for BMVC 2014, SIU 2014, BMVC2013, ICIP2013, SIU2013, BMVC2012, SIU 2012, ICIP 2011, ISCIS 2008, 3DTV-Con 2008, EUSIPCO 2005, ISCIS 2004, ICAPR 2003, ICIP 2002, CVPR 2001.
- ◇ Reviewer for  
IEEE Transactions on Pattern Analysis and Machine Intelligence,  
International Journal of Computer Vision,  
Computer Vision and Image Understanding,  
Image and Vision Computing,  
Machine Vision and Applications,  
IEEE Transactions on Multimedia,  
IEEE Multimedia,  
Multimedia Tools and Applications,  
Multimedia Systems,  
IEEE Transactions on Circuits and Systems for Video Technology,  
IEEE Transactions on Image Processing,  
Pattern Recognition,  
Pattern Recognition Letters,  
International Journal of Pattern Recognition and Artificial Intelligence,  
Signal Processing,  
Signal Processing: Image Communications,  
Signal, Image and Video Processing,  
Journal of Visual Communication and Image Representation,  
Journal of Electronic Imaging,  
Computational Intelligence,  
IEEE Transactions on Computational Intelligence and AI in Games,  
EURASIP Journal on Image and Video Processing,  
Journal on Computing and Cultural Heritage,  
Turkish Journal of Electrical Engineering and Computer Sciences.
- ◇ Reviewer both for project proposals submitted to and projects that are being supported by European Commission Framework Programs.
- ◇ Reviewer both for project proposals submitted to and for projects that are being supported by TÜBİTAK (Scientific and Technical Research Council of Turkey).

### **Administrative duties**

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- ◇ Chair, Informatics Institute, Hacettepe University  
(December 2016 - present)
- ◇ Vice Chair, department of Computer Engineering, Hacettepe University  
(October 2015 - December 2016)
- ◇ Member of Faculty Executive Board, Faculty of Engineering, Bilkent University  
(2009-2011)

## Invited Talks

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- ◇ "Sağlık için Yapay Zeka: Bilgisayarlı Görünün Sağlık Alanındaki Uygulamaları" (in Turkish), Hacettepe Üniversitesi Kok Hucre Bilimleri Anabilim Dalı Aylık Konferansları, July 6, 2017
- ◇ "Gormeyi Öğrenen Makineler: Akıllı Kameralardan Robotik Uygulamalara" (in Turkish), Hacettepe Üniversitesi Yerleskeler Buluuyor Konferans Dizisi, April 21, 2017
- ◇ "Buyuk Olcekli Resim ve Video Analizi" (in Turkish), Havelsan Akademi Gnlere, April 12, 2017
- ◇ "Data mining for large scale image and video analysis", TOBB-ETU, November 12, 2016
- ◇ "Buyuk olcekli video analizi" (in Turkish), Yapay öğrenme ve bilgi islemede yeni teknikler yazokulu, September 7, 2016
- ◇ "Words and Pictures and Beyond", European Natural Language Generation, September 11, 2015
- ◇ "A Keyword Search System for Historical Ottoman Documents", Workshop on Data-driven Research in the History of Southeast Europe and Turkey, Bochum, Germany, June 25, 2015 (presented by Damla Arifoglu)
- ◇ "Towards leveraging large data for video analysis", VASC seminar series, Carnegie Mellon University, January 13, 2014
- ◇ "Recognition as machine Translation: Labeling Objects and Faces Using large Image and Video Collections", International Object Recognition Workshop, Sicily, Italy, October 2004.
- ◇ "Linking Visual Features with Text for Multimedia Data Mining", IBM, NY, USA, March 2004.
- ◇ "Translating Images to Words: A Novel Approach for Object Recognition", Carnegie Mellon University, Pittsburgh, USA, March 2003.
- ◇ "Object Recognition as Machine Translation: Learning a Lexicon for a Fixed Image Vocabulary", Microsoft Research, Cambridge, October 7, 2002.

## Projects

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- ◇ **Summarization Approaches Towards Interpreting Big Visual Data**: Researcher. Funded by TÜBİTAK (Turkish Scientific and Technical Council) (No: 116E685). Funding: Duration: 2017-2020.
- ◇ **MUCKE : Multimedia and User Credibility Knowledge Extraction**, CHIST-ERA (European Coordinated Research on Long-term Challenges in Information and Communication Sciences & Technologies ERA-Net) project. Locally funded by TÜBİTAK (Turkish Scientific and Technical Council) (No: 112E174). Funding: 318.758 TL. Duration: October 2012-October 2015.
- ◇ **Visual and Textual Analysis and Retrieval of Ottoman Documents**: Principal Investigator. Funded by TÜBİTAK (Turkish Scientific and Technical Council) as a 1001 research project (No: 109E006). Funding: 191,000 TL ( 122,000 USD). Duration: September 2009 - September 2012.
- ◇ **Multimedia data mining : Integration of multi-modal data for a better retrieval and analysis**: Principal Investigator. Career project awarded by TÜBİTAK (Turkish Scientific and Technical Council) (No: 104E065). Funding: 157,000 TL ( 100,000 USD). Duration: April 2005 - April 2010.

- ◇ **Semantic Multimodal Analysis of Digital Media:** Co-Principal Investigator. European Commission COST 292 action. Locally it is funded by TÜBİTAK (Turkish Scientific and Technical Council) (No: 104E077). Funding: 102,060 TL ( 65,000 USD). Duration: October 2004 - October 2008.
- ◇ **MUSCLE - Multimedia Understanding Through Semantics, Computation and Learning** : Researcher. European Commission FP6 Network of Excellence project. Duration: 2004 - 2008.
- ◇ **IST-TURKEY: New Information Society Technologies for Turkey** : Researcher. Funded by TÜBİTAK (Turkish Scientific and Technical Council) as a 1001 research project (No: 105E065). Duration: December 2005 - December 2008.
- ◇ **E-DEVLET İçin Bilgisayar Destekli Görsel Dokümantasyon, Arşiv ve Yönetim Sistemi Gerçekleştirilmesi (in Turkish):** Researcher. Funded by Turkish State Planning Organization. Duration: 2004 - December 2005.

## Citations

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- ◇ According to ISI Web of Science (ISI): 1072 citations, h-index = 8.
- ◇ According to Google Scholar (G): 6108 citations, h-index = 25, i10-index = 48.

## Publication Summary

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- ◇ 16 published journal articles
- ◇ 50 papers in refereed international conferences and workshops (8 of them are in Lecture Notes in Computer Science)
- ◇ 30 papers in refereed national conferences
- ◇ 4 book chapters
- ◇ 9 invited or non-refereed papers

## Publications

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110. Hicsonmez, S., Samet, N., Sener, F., Duygulu, P., "DRAW: Deep Networks for Recognizing Styles of Artists Who Illustrate Children's Books", ACM International Conference on Multimedia Retrieval (ICMR), 2017.
109. Yalcinkaya, O., Duygulu, P., "Action Recognition with Prototypes", 25th Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2017.
108. Samet, N., Hicsonmez, S., Duygulu, P., Akbas, E., "Could We Create A Training Set For Image Captioning Using Automatic Translation?", 25th Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2017.

107. Ozturk, B., Duygulu, P., Akbas, E., "Recognition of Tennis Actions Using a Depth Camera", 25th Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2017.
106. Arifoglu, D., Duygulu, P., Kalpakli, P., "Cross-document word-matching for segmentation and retrieval of Ottoman divans", **Pattern Analysis and Applications**, Volume 19, Issue 3, 647–663, August 2016.
105. Baysal, S., Duygulu, P., "Sentioscope: A Soccer Player Tracking System using Model Field Particles", **IEEE Transactions on Circuits and Systems for Video Technology**, Volume 26, Issue 7, 1350 - 1362, July 2016. [Citations: 2(G)]
104. Yalcinkaya, O., Atvar, A., Duygulu, P., "Turkish Sign Language Recognition Application Using Motion History Image", 24th Signal Processing and Communications Applications Conference (SIU), Zonguldak, Turkey, 2016.
103. Tekeli, N., Ogul, B.B., Duygulu, P., "Rock-Paper-Scissors Game against Computer", 24th Signal Processing and Communications Applications Conference (SIU), Zonguldak, Turkey, 2016.
102. Zhang, L., Duygulu, P., Zuo, W.-M., Shan, S.-G., Hauptmann, A., "Smart computing for large scale visual data sensing and processing", **Neurocomputing**, editorial, Volume 178, Special Issue, 1- 2, February 2016.
101. Golge, E., Duygulu, P., "FAME: Face Association through Model Evolution", CVPR Workshop on Analysis and Modeling of Faces and Gestures, Boston, USA, 2015.
100. Bozkurt, A., Duygulu, P., Cetin, E., "Classifying Fonts and Calligraphy Styles Based on Complex Wavelet Transform", **Signal, Image and Video Processing**, Volume 9, Supplement 1, pp 225-234, December 2015.
99. Sarac, I., Iscen, A., Golge, E., Duygulu, P., "ConceptFusion: A Flexible Scene Classification Framework", European Conference on Information Retrieval (ECIR), Vienna, Austria, 2015.
98. Arifoglu, D., Sahin, E., Adiguzel, H., Duygulu, P., Kalpakli, P., "Matching Islamic Patterns in Kufic Images", **Pattern Analysis and Applications**, , Volume 18, Issue 3, pp 601-617, August 2015. [Citations: 1(G)]
97. Sarac, I., Duygulu, P., "Bilkent-RETINA at Retrieving Diverse Social Images Task of MediaEval 2014", MediaEval Workshop, Barcelona, Spain, October, 2014. [Citations: 2(G)]
96. Iscen, A., Wang, Y. , Duygulu , P., Hauptmann, A., "Snippet Histograms for Assistive Technologies", Workshop on Assistive Computer Vision and Robotics, in conjunction with ECCV, Zurich, 2014. [Citations: 1(G)]

95. Golge, E., Duygulu, P., "ConceptMap: Mining noisy web data for concept learning", European Conf. on Computer Vision (ECCV), Zurich, 2014. [Citations: 2(ISI), 8(G)]
94. Iscen, A., Armagan, A., Duygulu, P., "What is usual in unusual videos? Trajectory snippet histograms for discovering unusualness", 2nd Workshop on Web-scale Vision and Social Media, in conjunction with CVPR, Columbus, Ohio, USA, 2014. [Citations: 1(G)]
93. Baysal, S., Duygulu, P., "A Line Based Pose Representation For Human Action Recognition", **Signal Processing: Image Communication**, Volume 28, Issue 5, Pages 458-471, May 2013. [Citations: 5(ISI), 3(S), 8(G)]
92. Can, E.F., Can, F., Duygulu, P., Kalpakli, M., "Automatic Categorization of Ottoman Poems", **Glottology: International Journal of Theoretical Linguistics**, Volume 2/2013, 2013.
91. Iscen, A., Duygulu, P., "Knives are picked before slices are cut: recognition through activity sequence analysis", 5th International Workshop on Multimedia for Cooking and Eating Activities (CEA), Barcelona, Spain, 2013. [Citations: 4(G)]
90. Armagan, A., Popescu, A., Duygulu, P., "MUCKE Participation at Retrieving Diverse Social Images Task of MediaEval 2013", MediaEval 2013 Multimedia Benchmark Workshop, Barcelona, Spain, 2013. [Citations: 3(G)]
89. Iscen, A., Golge, E., Armagan, A., Duygulu, P., "Scene classification with random forests and object and color distributions", 21st Signal Processing and Communications Applications Conference (SIU), Cyprus, 2013.
88. Sener, F., Samet, N., Duygulu, P., Ikizler-Cinbis, N., "Recognizing human actions from noisy videos via multiple instance learning", 21st Signal Processing and Communications Applications Conference (SIU), Cyprus, 2013.
87. Sener, E., Yucel, U.C., Aksoy, S., Buyukgebiz, I., Duygulu, P., "Labeling of faces in personal photo albums", 21st Signal Processing and Communications Applications Conference (SIU), Cyprus, 2013.
86. Adiguzel, H., Erdem, H., Fertahosmanoglu, H., Duygulu, P., "Action recognition in a high-dimensional feature space", 21st Signal Processing and Communications Applications Conference (SIU), Cyprus, 2013.
85. Adiguzel, H., Sahin, E., Duygulu, P., "A hybrid approach for line segmentation in handwritten documents", 13th International Conference on Frontiers in Handwriting Recognition (ICFHR), Bari, Italy, 2012. [Citations: 9(G)] [Citations: 3(G)]
84. Sener, F., Samet, N., Duygulu, P., "Identification of Illustrators", VISART: 1st Workshop on Computer Vision for Art Analysis, in conjunction with ECCV, Firenze, Italy, 2012.



83. Sandikci, S., Duygulu, P., Ozguler, B., "HMM Based Behavior Recognition of Laboratory Animals", Workshop on Visual observation and analysis of animal and insect behavior (VAIB), in conjunction with ICPR, Japan, 2012.
82. Caliskan, Y., Duygulu, P., Sahin, E., "Affordance prediction of hand tools using interactive perception", 20th IEEE Signal Processing and Communications Applications Conference (SIU), Mugla, Turkey, 2012.
81. Baysal S., Duygulu, P., Kayalar, C., "A discussion on homography between stationary multi-camera systems and the soccer field model", 20th IEEE Signal Processing and Communications Applications Conference (SIU), Mugla, Turkey, 2012.
80. Adiguzel, H., Duygulu, P., Kalpakli, M., "Line segmentation of Ottoman documents", 20th IEEE Signal Processing and Communications Applications Conference (SIU), Mugla, Turkey, 2012.
79. Sener, F., Ikizler, N., Duygulu, P., "Multiple instance learning for re-ranking of web image search results", 20th IEEE Signal Processing and Communications Applications Conference (SIU), Mugla, Turkey, 2012.
78. Can, F, Duygulu, P., "A line-based representation for matching words in historical manuscripts" , **Pattern Recognition Letters**, volume 32, number 8, pages 1081-1222, June 2011. [Citations: 5(ISI), 4(S), 9(G)]
77. Pehlivan, S., Duygulu, P., "A new pose-based representation for recognizing actions from multiple cameras", **Computer Vision and Image Understanding**, volume 115, number 2, pages 140-151, February 2011. [Citations: 11(ISI), 16(S), 29(G)]
76. Duygulu, P., Bastan, M., "Multimedia translation for linking visual data to semantics in videos", **Machine Vision and Applications**, volume 22, number 1, pages 99-115, 2011. [Citations: 1(ISI), 1(S), 4(G)]
75. Can, E. F., Can, F., Duygulu, P., Kalpakli, M., "Automatic Categorization of Ottoman Literary Texts By Poet and Time Period", In 26th International Symposium on Computer and Information Sciences (ISCIS ), London, UK, 2011. [Citations: 3(G)]
74. Arifoglu, D., Duygulu, P., "Word retrieval in Ottoman documents", IEEE 19. Signal Processing and Communications Applications Conference (SIU), Antalya Turkey, 2011 [Citations: 1(G)]
73. Ozkan, D., Duygulu, P., "Interesting Faces: A Graph Based Approach for Finding People in News", **Pattern Recognition**, volume 43, number 5, pages 1717-1735, May 2010. [Citations: 11(ISI), 14(S), 25(G)]
72. Sevil, S. G., Kucuktunc, O. , Duygulu, P. , Can, F., "Automatic Tag Expansion using Visual Similarity for Photo Sharing Websites", **Multimedia Tools and Applications**, volume 49, number 1, pages 81-99, August 2010. [Citations: 5(ISI), 13(S), 22(G)]

71. Can, E. F., Duygulu, P., Can F., Kalpakli, M., "Redif Extraction in Handwritten Ottoman Literary Texts", 20th International Conference on Pattern Recognition (ICPR), Istanbul, Turkey, 2010. [Citations: 2(G)]
70. Baysal, S., Kurt, M.C., Duygulu, P., "Recognizing Human Actions Using Key Poses", 20th International Conference on Pattern Recognition (ICPR), Istanbul, Turkey, 2010. [Citations: 11(S), 33(G)]
69. Soysal, T., Adiguzel, H., Oktem, A., Haman, A., Can, E. F., Duygulu, P., Kalpakli, M., "Processing the manuscripts of Ataturk", IEEE 18. Signal Processing and Communications Applications Conference (SIU), Diyarbakir, Turkey, 2010.
68. Ikizler, N. ve Duygulu P., "Histogram of Oriented Rectangles: A New Pose descriptor for Human Action Recognition", **Image and Vision Computing**, volume 27, Issue 10, pages 1515-1526, September 2009. [Citations: 51(ISI), 59(S), 108(G)]
67. Yucel, Z., Sara, Y., Duygulu, P. Onur, R., Esen, E., Ozguler, B., "Automated Discrimination of Psychotropic Drugs in Mice via Computer Vision-Based Analysis", **Journal of Neuroscience Methods**, volume 180, number 2, pages 234-242, June 2009. [Citations: 1(ISI), 1(S), 2(G)]
66. Pehlivan, S., Duygulu, P., "3D Human Pose Search using Oriented Cylinders", IEEE Workshop on Search in 3D and Video (S3DV), in conjunction with ICCV, Kyoto, Japan, 2009 [Citations: 1(S), 5(G)]
65. Zitouni, H., Bulut, M. F., Duygulu, P., "Recognizing faces in news photographs on the web", 24th International Symposium on Computer and Information Sciences (ISCIS), 2009. [Citations: 1(S), 2(G)]
64. Bulut, F. Duygulu, P., "Naming of faces on photographs by using the relationship between people", IEEE 17. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2009.
63. Torun, B., Yurdakul, M., Duygulu, P., "Finding similar faces", IEEE 17. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2009.
62. Sandikci, S., Duygulu, P., Ozguler, B., "Vision Based Behavior Analysis of Laboratory Animals: A 3D Gradient Based Approach", IEEE 17. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2009.
61. Kurt, M. C., Baysal, S., Damci, P., Aydogdu, G., Telmen, I., Duygulu, P., "Content-based image retrieval in store catalogs", IEEE 17. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2009.
60. Kucuktunc, O., Sevil, S. G., Tosun, A. B., Zitouni, H., Duygulu, P., Can, F., "Tag Suggest: Automatic Photo Tag Expansion using Visual Information for Photo Sharing Websites", Proc. 3rd International Conference on Semantic and Digital Media Technologies, (SAMT), Koblenz, Germany, 2008. [Citations: 3(ISI), 2(S), 20(G)]

59. Zitouni, H., Sevil, S.G., Ozkan, D., Duygulu, P., "Re-ranking of image search results using a graph algorithm", Proc. 19th International Conference on Pattern Recognition (ICPR), Tampa, Florida, USA, 2008. [Citations: 5(S), 30(G)]
58. Ikizler, N., Cinbis, R. G., Duygulu, P., "Human action recognition with line and flow histograms", Proc. 19th International Conference on Pattern Recognition (ICPR), Tampa, Florida, USA, 2008. [Citations: 8(S), 62(G)]
57. Ikizler, N., Cinbis, R. G., Pehlivan, S., Duygulu, P., "Recognizing actions from still images", Proc. 19th International Conference on Pattern Recognition (ICPR), Tampa, Florida, USA, 2008. [Citations: 4(S), 63(G)]
56. Hatun, K., Duygulu, P., "Pose sentences: A new representation for action recognition using sequence of pose words", Proc. 19th International Conference on Pattern Recognition (ICPR), Tampa, Florida, USA, 2008.[Citations: 1(S), 20(G)]
55. Sevil, S. G., Zitouni, H., Ikizler, N., Ozkan, D., Duygulu, P., "Re-ranking of image search results using a graph algorithm", IEEE 16. Signal Processing and Communications Applications Conference (SIU), Didim, Turkey, 2008. [Citations: 33(G)]
54. Can, E. F., Duygulu, P., "Word spotting in historical documents", IEEE 16. Signal Processing and Communications Applications Conference (SIU), Didim, Turkey, 2008.
53. Duygulu, P., Bastan, M., Ozkan, D., "Linking image and text for semantic labeling of images and videos", Machine Learning Techniques for Multimedia, ed. M. Cord, P. Cunningham, Springer-Verlag, 2008. [Citations: 1(G)]
52. Ikizler, N. Duygulu, P. "Human Action Recognition Using Distribution of Oriented Rectangular Patches", Proc. 2nd Workshop on Human Motion: Understanding, Modeling, Capture and Animation, In conjunction with ICCV, Rio de Janeiro, Brazil, 2007 (Lecture Notes in Computer Science, Volume 4814/2007). [Citations: 38 (ISI), 35(S), 107(G)]
51. Can, T., Duygulu, P., "Searching for Repeated Video Sequences", Proc. 9th ACM SIGMM International Workshop on Multimedia Information Retrieval (MIR), In conjunction with ACM Multimedia, University of Augsburg, Germany, 2007. [Citations: 1(S), 10(G)]
50. Ataer, E., Duygulu, P., "Matching Ottoman Words: An Image Retrieval Approach to Historical Document Indexing", Proc. ACM International Conference on Image and Video Retrieval (CIVR) , Amsterdam, The Netherlands, 2007. [Citations: 14(S), 38(G)]
49. Aksoy, S., Duygulu, P., Aksoy, C., Aydin, E., Gunaydin, D., Hadimli, K., Koc, L., Olgun, Y., Orhan, C., Yakin, G., "Bilkent University at TRECVID 2007", Proc. TREC Video Retrieval Evaluation (TRECVID), Gaithersburg, MD, November 5-6, 2007.
48. Can, T., Duygulu, P., "Detection and tracking of TV commercials", IEEE 15. Signal Processing and Communications Applications Conference (SIU), Eskisehir, Turkey, 2007.

47. Ataer, E., Duygulu, P., "Matching Ottoman words", IEEE 15. Signal Processing and Communications Applications Conference (SIU), Eskisehir, Turkey, 2007. [Citations: 1(G)]
46. Acar, C., Atlas, A., Cevik, K., Olmez, I., Unlu, M., Ozkan, D., Duygulu, P., "Systematic evaluation of face detection algorithms on news videos", IEEE 15. Signal Processing and Communications Applications Conference (SIU), Eskisehir, Turkey, 2007.
45. Pan, J.-Y., Yang, H.-Y., Faloutsos, C., Duygulu, P., "Cross-modal Correlation Mining using Graph Algorithms", Knowledge Discovery and Data Mining: Challenges and Realities with Real World Data, ed. X. Zhu, I. Davidson, Idea Group Reference, 2007.
44. Duygulu, P., Bastan M., Forsyth, D., "Translating images to words for recognizing objects in large image and video collections", Towards Category-Level Object Recognition, ed. J. Ponce, M. Hebert, C. Schmid, A. Zisserman, Lecture Notes in Computer Science Series, Vol. 4170, Springer Verlag, 2006. [Citations: 1(ISI), 1(G)]
43. Ataer, E., Duygulu, P., "Retrieval of Ottoman Documents", Proc. 8th ACM SIGMM International Workshop on Multimedia Information Retrieval (MIR 2006), In conjunction with ACM Multimedia, Santa Barbara, CA, USA, 2006. [Citations: 5(S), 40(G)]
42. Ozkan, D., Duygulu, P., "Finding People Frequently Appearing in News", Proc. International Conference on Image and Video Retrieval (CIVR), Tempe, AZ, USA, 2006, (Lecture Notes in Computer Science, Volume 4071/2006). [Citations: 5(ISI), 6(S), 24(G)]
41. Bastan, M., Duygulu, P., "Recognizing Objects and Scenes in News Videos", Proc. International Conference on Image and Video Retrieval (CIVR), Tempe, AZ, USA, 2006, (Lecture Notes in Computer Science, Volume 4071/2006). [Citations: 1(S), 4(G)]
40. Ozkan, D., Duygulu, P., "A Graph Based Approach for Naming Faces in News Photos", Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), New York, NY, 2006. [Citations: 30(S), 81(G)]
39. Duygulu, P. "El Yazisi Tanimi (in Turkish)", Bilisim Ansiklopedisi, Papatya Yayıncılık, 2006
38. Aksoy, S., Duygulu, P., Akcay, G., Ataer, E., Bastan, M., Can, T., Cavus, O., Dogrusoz, E., Gokalp, D., Akaydin, A., Akoglu, L., Angin, P., Cinbis, G., Gur, T., Unlu, M., "Bilkent University at TRECVID 2006", Proc. TREC Video Retrieval Evaluation (TRECVID), Gaithersburg, MD, November, 2006.
37. Ozkan, D., Duygulu, P., "Finding faces in news photos using both face and name information", IEEE 14. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2006.
36. Bastan, M., Duygulu, P., "Object recognition and auto-annotation in news videos", IEEE 14. Signal Processing and Communications Applications Conference (SIU), Antalya, Turkey, 2006.

35. Iyengar, G., Duygulu, P., Feng, S., Ircing, P., Khudanpur, S., Klakow, D., Krause, M., Manmatha, R., Nock, H., Petkova, D., Pytlik, B., Virga, P., "Joint Visual-Text Modeling for Automatic Retrieval of Multimedia Documents", 13th ACM Multimedia Conference, Singapore, 2005. [Citations: 17(S), 46(G)]
34. Ikizler, N., Duygulu, P., "Person Search Made Easy", Proc. 4th International Conference on Image and Video Retrieval (CIVR), Singapore, 2005, (Lecture Notes in Computer Science, Volume 3568/2005). [Citations:1(ISI), 1(S), 16(G)]
33. Virga, P., Duygulu, P., "Systematic Evaluation of Machine Translation Methods for Image and Video Annotation", Proc. The Fourth International Conference on Image and Video Retrieval (CIVR), Singapore, 2005, (Lecture Notes in Computer Science, Volume 3568/2005). [Citations: 1(ISI), 1(S), 18(G)]
32. Ikizler, N., Duygulu, P., "Improvement of face detection algorithms for news videos", IEEE 13. Signal Processing and Communications Applications Conference (SIU), Kayseri, Turkey, 2005.
31. Aksoy, S., Avci, A., Balcik, E., Cavus, O., Duygulu, P., Karaman, Z., Kavak, P., Kaynak, C., Kucukayvaz, E., Ocalan, C., Yildiz, P., "Bilkent University at TRECVID 2005", Proc. TREC Video Retrieval Evaluation (TRECVID), Gaithersburg, MD, 2005.
30. Duygulu, P., Pan, J.-Y., Forsyth, D., "Towards Auto-Documentary: Tracking the evolution of news on time", Proc. ACM Multimedia Conference, New York, NY, 2004. [Citations: 32(S), 83(G)]
29. Pan, J.-Y., Yang, H.-J., Faloutsos, C., Duygulu, P., "Automatic Multimedia Crossmodal Correlation Discovery", Proc. 10th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining(KDD2004), Seattle, WA, 2004. [Citations: 130(S), 396(G)]
28. Duygulu, P., Hauptmann, A., "What's news, what's not? Associating News videos with words", Proc. 3rd International Conference on Image and Video Retrieval (CIVR), Ireland, July 21-23, 2004, (Lecture Notes in Computer Science, Volume 3115/2004, pp. 132-140). [Citations: 2(ISI), 1(S), 15(G)]
27. Pan, J.-Y., Yang, H.-J., Faloutsos, C., Duygulu, P., "GCap: Graph-based Automatic Image Captioning", Proc. 4th International Workshop on Multimedia Data and Document Engineering (MDDE), in conjunction with CVPR, Washington DC, July 2nd 2004. [Citations: 107(G)]
26. Duygulu, P., Chen, M.-Y., Hauptmann, A., "Comparison and combination of two novel commercial detection methods", IEEE International Conference on Multimedia and Expo (ICME), Taipei, Taiwan, 2004. [Citations: 19(S), 86(G)]
25. Pan, J.-Y., Yang, H.-J., Duygulu, P., Faloutsos, C., "Automatic Image Captioning", Proc. IEEE International Conference on Multimedia and Expo (ICME), Taipei, Taiwan, 2004. [Citations : 22(S), 90(G)]

24. Aksoy, S., Bircan, K., Ciraci, S., Duygulu, P., Karaca, E., Kasirga, S., Sevilmiş, T., Sener, M., "Bilkent University at TRECVID 2004", Proc. TREC Video Retrieval Evaluation (TRECVID), Gaithersburg, MD, 2004.
23. Iyengar, G., Duygulu, P., Feng, S., Ircing, P., Khudanpur, S., Klakow, D., Krause, M., Manmatha, R., Nock, H.J., Petkova, D., Pytlik, B., Virga, P., "Joint Visual-text Modeling for Multimedia Retrieval", Technical Report, CLSP Workshop, November 24, 2004.
22. Barnard, K., Duygulu, P., Forsyth, D., de Freitas, N., Blei, D., Jordan, M., "Matching Words and Pictures", **Journal of Machine Learning Research (JMLR)**, Special Issue on Machine Learning Methods for Text and Images, volume 3, pages 1107-1135, 2003. [Citations: 611 (ISI), 869(S), 1600(G)]
21. Xu, Y., Duygulu, P., Saber, E., Tekalp, M., Yarman Vural, F., "Object Based Image labeling through Learning-by-Example and Multi-level Segmentation", **Pattern Recognition**, volume 36, number 6, pages 1407-1423, 2003. [Citations: 7(ISI), 12(S), 22(G)]
20. Duygulu, P., Ozcanli, O. C., Papernick, N., "Comparison of Feature Sets using Multimedia Translation", Eighteenth International Symposium on Computer and Information Sciences (ISCIS), Antalya, Turkey, 2003 (Lecture Notes in Computer Science, Volume 2869/2003, pp. 513-520). [Citations: 2(G)]
19. Duygulu, P., Wactlar, H., "Associating video frames with text", Proc. Multimedia Information Retrieval Workshop, in conjunction with ACM SIGIR, Toronto, Canada, 2003. [Citations : 20(G)]
18. Barnard, K., Duygulu, P., Guru, R., Gabbur, P., Forsyth, D., "The effects of segmentation and feature choice in a translation model of object recognition", Proc. Computer Vision and Pattern Recognition (CVPR), Madison, Wisconsin, 2003. [Citations : 3(ISI), 23(S), 80(G)]
17. Hauptmann, A., Ng, D., Baron, R., Chen, M-Y., Christel, M., Duygulu, P., Huang, C., Lin, W-H., Wactlar, H., Moraveji, N., Papernick, N., Snoek, C.G.M., Tzanetakis, G., Yang, J., Yan, R., Jin, R., "Informedia at TRECVID 2003: Analyzing and Searching Broadcast News Video", TRECVID 2003, Gaithersburg, MD, 2003.
16. Duygulu, P., Wactlar, H., Papernick, N., Ng, D., "Linking Visual and Textual Data on Video", Workshop on Multimedia Contents in Digital Libraries , Crete, Greece, 2003. [Citations: 8(G)]
15. Barnard, K., Duygulu, P., Forsyth, D., "Recognition as translating images into text", Internet Imaging IV, Electronic Imaging, 2003. [Citations: 3(ISI), 2(S), 19(G)]
14. Ozcanli, O. C., Duygulu, P., Yarman Vural, F., "Aciklamali Goruntu Veritabanlari Kullanarak Nesne Tanima ve Erisimi (in Turkish)", IEEE 11. Signal Processing and Communications Applications Conference (SIU), Istanbul, Turkey, 2003.

13. Duygulu, P., Barnard, K., de Freitas, N., Forsyth, D., "Object Recognition as Machine Translation: Learning a lexicon for a fixed image vocabulary", Proc. European Conference on Computer Vision (ECCV2002), Copenhagen, Denmark, May 27 - June 2, 2002 (Lecture Notes in computer Science, Volume 2353/2002, pp.97). [Citations : 185(ISI), 1683(G)] **Best paper in Cognitive Vision award**
12. Barnard, K., Duygulu, P., Forsyth, D., "Modeling the statistics of image features and associated text", SPIE Electronic Imaging 2002, Document Recognition and Retrieval IX, San Jose, California, USA, 2002.[Citations: 14(G)]
11. de Freitas, N., Barnard, K., Duygulu, P., Forsyth, D., "Bayesian Models for Massive Multimedia Databases: a new frontier", Proc. 7th Valencia International Meeting on Bayesian Statistics, Spain, June 2-6, 2002. [Citations: 7(G)]
10. Duygulu, P., Atalay, V., "A Hierarchical Representation of Form Documents for Identification and Retrieval", **International Journal on Document Analysis and Recognition (IJ DAR)**, volume 5, number 1, pages 17-27, 2002. [Citations: 20(S), 37(G)]
9. Barnard, K., Duygulu, P., Forsyth, D., "Clustering Art", Proc. Computer Vision and Pattern Recognition (CVPR 2001), Hawaii, 2001. [Citations: 18(ISI), 69(S), 185(G)]
8. Duygulu, P., Yarman Vural, F., "Multi-Level Image Segmentation and Object Representation for Content Based Image Retrieval", Proc. SPIE Electronic Imaging 2001, Storage and Retrieval for Media Databases, San Jose, CA, 2001. [Citations: 2(ISI), 3(S), 11(G)]
7. Xu, Y., Duygulu, P., Saber, E., Tekalp, M., Yarman Vural, F., "Object Based Image Retrieval Based On Multi-level Segmentation", Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP2000), Istanbul, Turkey, June 5-9, 2000. [Citations : 4(S), 13(G)]
6. Duygulu, P., Carkacioglu, A., Yarman Vural, F., "Multi-level Object Description:Color or Texture", Proc. 1st IEEE Balkan Conference on Signal Processing, Communications, Circuits, and Systems, Istanbul, Turkey, 2000. [Citations: 4(S), 13(G)]
5. Duygulu, P., Atalay, V., "A Hierarchical Representation of Form Documents for Identification and Retrieval", Proc. SPIE Electronic Imaging, Document Recognition and Retrieval, 2000.[Citations : 3(ISI), 6(G) ]
4. Duygulu, P., Leblebicioglu, K., Atalay, V., Isler, V., "Iki Boyutlu Goruntulerden uc Boyutlu Nesne Olusturulmasina Eniyileme Yaklasimi (in Turkish)", Signal Processing and Communications Applications Conference (SIU), Ankara, Turkey, 1999.
3. Duygulu, P., Atalay, V., Dincel, E., "A Heuristic Algorithm For Hierarchical Representation of Form Documents", Proc. 14th Int'l Conf. Pattern Recognition (ICPR), Brisbane, Australia, 1998. [Citations : 7(G)]
2. Duygulu, P., Atalay, V., Dincel, E., "Form Document Representation and Identification (in Turkish)", The Seventh Turkish Symposium on Artificial Intelligence and Neural Networks, Ankara, Turkey, 1998.

1. Dincel, E., Atalay, V., Duygulu, P., "A Form Document Image Parser ", The Seventh Turkish Symposium on Artificial Intelligence and Neural Networks, Ankara, Turkey, 1998. [Citations: 3(G)]

## **Thesis supervised**

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- ◇ Nazli Ikizler, "Understanding human motion: Recognition and retrieval of human activities", Ph.D. thesis, Bilkent University, 2008 (Co-supervisor: Prof. David Forsyth). Nazli is now a faculty member in Hacettepe University after working as a post-doctoral fellow at Boston University, USA with Prof. Stan Sclarof.
- ◇ Zeynep Yucel, "Computer Vision based behavior analysis", Ph.D. thesis, Bilkent University, 2009 (Co-supervisor: Prof. Bulent Ozguler). She is now working as a post-doctoral fellow ATR IRC, Japan.
- ◇ Selen Pehlivan, "Multiple view human activity recognition". Ph.D. thesis, Bilkent University, 2012 (Co-supervisor: Prof. David Forsyth). Selen is now a faculty member in TED University after working as a post-doctoral fellow at University of Central Florida with Prof. Mubarak Shah.
- ◇ Derya Ozkan, "A graph based approach for finding people in news", M.Sc. thesis, Bilkent University, 2007. Derya is now at Google after finishing her PhD at University of Southern California, USA.
- ◇ Esra Ataer, "A new representation for matching words", M.Sc. thesis, Bilkent University, 2007. Esra is now pursuing her PhD at Northeastern University, USA.
- ◇ Tolga Can, "Detection and Tracking of Repeated Video Sequences", M.Sc. thesis, Bilkent University, 2007. Tolga is now at Microsoft Seattle,
- ◇ Kardelen Hatun, "Pose Sentences: A New Representation for Understanding Human Actions", M.Sc. thesis, Bilkent University, 2008. Kardelen is now pursuing her PhD at University of Twente, The Netherlands.
- ◇ Selcuk Sandikci, "Vision based behaviour recognition of laboratory animals for drug analysis and testing", M.Sc. thesis, Bilkent University, 2009 (Co-supervisor: Prof. Bulent Ozguler).
- ◇ Ethem Fatih Can, "A line based representation for matching words", M.Sc. thesis, Bilkent University, 2009. Ethem is now pursuing his Ph.D. study at University of Massachusetts Amherst, USA.
- ◇ Sare Gul Sevil, "Tag expansion methods for photo-sharing websites", M.Sc. Thesis, Bilkent University, 2010.
- ◇ Hilal Zitouni, "Naming Faces on the web", M.Sc. Thesis, Bilkent University, 2010.
- ◇ Sermetcan Baysal, "A Line-Based Pose Representation for Human Action recognition". M.Sc. Thesis, Bilkent University, 2011.
- ◇ Damla Arifoglu, "Historical Document Analysis based on Word Matching ". M.Sc. Thesis, Bilkent University, 2011. Damla is now pursuing her PhD at Sabanci University, Turkey.
- ◇ Mehmet Can Kurt, "A Key-Pose Based representation for Human Action Recognition". He is now pursuing his Ph.D. study at Ohio State University.



- ◇ Yigit Caliskan, "Robot Motion Understanding". M.Sc. Thesis, Bilkent University, 2013.
- ◇ Hande Adiguzel, "Segmentation of Ottoman Documents". M.Sc. Thesis, Bilkent University, 2013. She is now at Microsoft Seattle.
- ◇ Fadime Sener, "Web Image search", M.Sc. Thesis, Bilkent University, 2013.
- ◇ Eren Golge, "Mining Web Images for Concept Learning", M.Sc. Thesis, Bilkent University, 2014.
- ◇ Ahmet Iscen, "Activity Analysis for Assistive Systems", M.Sc. Thesis, Bilkent University, 2014. He is pursuing his PhD studies at INRIA under the supervision of Herve Jegou.
- ◇ Anil Armagan, "Leveraging Large Scale Data for Video Retrieval", M.Sc. Thesis, Bilkent University, 2014. He is pursuing his PhD studies at EPFL under the supervision of Vincent Lepetit.
- ◇ Sermetcan Baysal, "Model Field Particles with appearance learning for sports player tracking", Ph.D. Thesis, June 2016.
- ◇ Ozge Yalcinkaya, "Prototypes: Exemplar based video representation", M.Sc. Thesis, June 2016.

## **Teaching**

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### **Courses being taught at Hacettepe University:**

- ◇ **Graduate Courses**
- ◇ CMP 719 Computer Vision (Fall 2015, Fall 2016)
- ◇ **Undergraduate Courses**
- ◇ BBM405 Fundamentals of Artificial Intelligence (Spring2016, Spring2017)

### **Courses taught at Bilkent University:**

- ◇ **Graduate Courses**
- ◇ CS 554 Computer Vision (Spring2004, Fall2004, Spring2006, Fall2006, Fall2007, Fall2008, Fall2009, Fall2010, Spring2012, Spring2013)
- ◇ CS590-690 (coordinator in Spring 2012)
- ◇ **Undergraduate Courses**
- ◇ CS461 Artificial Intelligence (Spring2007, Spring2008, Spring2009, Spring2010, Spring2011)
- ◇ CS315 Programming Languages (Fall2004, Fall2006, Fall2007, Fall2008, Fall2009, Fall2010, Fall2011, Spring2012, Fall2012)
- ◇ CS476 Formal Languages and Automata Theory (Spring2008)
- ◇ CS111 Introduction to Computing in Engineering and Science (Spring 2007)
- ◇ CS491-492 Senior Design Project (supervisor of 13 projects: 1 project in 2004, 1 project in 2005, 1 project in 2006, 3 projects in 2007, 1 project in 2008, 2 projects in 2010, 2 projects in 2011, 2 projects in 2012)
- ◇ **Independent studies supervised**

- ◇ Fatih Bulut, "Naming multi-face images", Fall2008.
- ◇ Can Tuzla, "Near Duplicate Video Detection", Spring2012.

## **Membership**

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- ◇ Member of Association for Computing Machinery (ACM) 2017 - Present
- ◇ Member of Institute of Electrical and Electronics Engineers (IEEE) 2003 - Present
- ◇ Member of Turkish Society for Image Analysis and Pattern Recognition 2004 - Present

## **References**

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References are available upon request.