Scientist & Inventor

Engin Dikici

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Research Interests:

- **Machine Learning**: Deep Neural Networks, Generative Adversarial Networks, Model Generalizability Prediction, Classic Approaches (e.g., Regression, Random Forest, Discriminant Analysis, etc.).
- **Applications of Machine Learning in Medical Imaging and e-health**: Subtle Formation Detection, Medical Data Synthesis, Medical Data Segmentation/Tracking/Classification.

Education:

- **Norwegian University of Science and Technology**, Trondheim, Norway.
  Ph.D. in Biomedical Engineering (Medical Technology). 10/2019 – 12/2012. GPA: 3.69/4.00
  Thesis title: Ultrasound Cardiac Modeling, Segmentation and Tracking
  Web link: https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/264841
- **University of Pennsylvania**, Philadelphia, PA, USA.
  M.S. in Computer and Information Science. 08/2004 – 08/2005. GPA: 3.53/4.00
- **Middle East Technical University**, Ankara, Turkey.
  B.S. in Computer Engineering, 09/1999 - 06/2003. GPA: 3.24/4.00

Employment:

- **The Ohio State University Wexner Medical Center**, Columbus, OH, USA.
  Research Scientist with Principal Investigator Status, 2019 – Current.
- **VOCA AS**, Kristiansand, Norway.
  Senior Computer Vision Engineer, 2013 – 2019.
- **Norwegian University of Science and Technology**, Trondheim, Norway.
  Research Fellow, 2009 – 2013.
- **University of Florida, College of Medicine**, Jacksonville, FL, USA.
  Research Scientist, 2007 – 2009.
- **Merrill Lynch & Co.**, Jacksonville, FL, USA.
  Senior Development Consultant, 2006 – 2007.
- **Siemens Corporate Research**, Princeton, NJ, USA.
  Student Researcher, 2004 – 2006.

Publications:

- **Engin Dikici**, Xuan V. Nguyen, Noah Takacs, Luciano M. Prevedello. Prediction of Model Generalizability for Unseen Data: Methodology and Case Study in Brain Metastases Detection in T1-Weighted Contrast-Enhanced 3D MRI. Under review, 2022.
  Web link: https://arxiv.org/abs/2212.08127

- **Engin Dikici**, Xuan V. Nguyen, Matthew Bigelow, Luciano M. Prevedello. Augmented Networks for Faster Brain Metastases Detection in T1-Weighted Contrast-Enhanced 3D MRI. Published at Computerized Medical Imaging and Graphics journal (by Elsevier), 2022.
  Web link: https://doi.org/10.1016/j.compmedimag.2022.102059

- **Engin Dikici**, Xuan V. Nguyen, Matthew Bigelow, Luciano M. Prevedello. Advancing Brain Metastases Detection in T1-Weighted Contrast-Enhanced 3D MRI using Noisy Student-based Training. Published at Diagnostics Journal (by MDPI), 2022.
  Web link: https://doi.org/10.3390/diagnostics12082023

- Xuan V. Nguyen, Devi D. Nelakurti, **Engin Dikici**, Sema Candemir, Daniel J. Boulter, Luciano M. Prevedello. Virtual CT Myelography: A Patch-Based Machine Learning Model to Improve Intraspinal Soft Tissue Visualization on Unenhanced Dual-Energy Lumbar Spine CT. Published at Information Journal (by MDPI), 2022.
  Web link: https://doi.org/10.3390/info13090412

- Xuan V. Nguyen, **Engin Dikici**, Sema Candemir, Robin L. Ball, Luciano M. Prevedello. Mortality Prediction Analysis among COVID-19 Inpatients Using Clinical Variables and Deep Learning Chest Radiography Imaging Features. Published at Tomography Journal (by MDPI), 2022.
  Web link: https://doi.org/10.3390/tomography8040151

- **Engin Dikici**, Matthew Bigelow, Richard D. White, Barbaros S. Erdal, Luciano M. Prevedello, Constrained generative adversarial network ensembles for sharable synthetic medical images. Published at SPIE Journal of Medical Imaging, 2021.
  Web link: https://doi.org/10.1117/1.jmi.8.2.024004

- Richard D. White, Barbaros S. Erdal, Mutlu Demirer, Vikash Gupta, Matthew Bigelow, **Engin Dikici**, Sema Candemir, Mauricio S. Galizia, Jessica L. Carpenter, Thomas O'Donnell, Abdul H Halabi, Luciano M Prevedello. Artificial Intelligence to Assist in Exclusion of Coronary Atherosclerosis during CCTA Evaluation of Chest-Pain in the Emergency Department: Preparing an Application for Real-World Use. Published at Journal of Digital Imaging, 2021.
  Web link: https://doi.org/10.1007/s10278-021-00441-6

- **Engin Dikici**, Matthew Bigelow, Luciano M. Prevedello, Richard D. White, Barbaros Selnur Erdal. Integrating AI into Radiology workflow: Levels of research, production, and feedback maturity. Published at SPIE Journal of Medical Imaging, 2020.
  Web link: https://doi.org/10.1117/1.jmi.7.1.016502

- **Engin Dikici**, John L. Ryu, Mutlu Demirer, Matt Bigelow, Richard D. White, Barbaros Selnur Erdal, Luciano Prevedello. Automated Brain Metastases Detection Framework for T1-Weighted Contrast-Enhanced 3D MRI. Published at IEEE Journal of Biomedical and Health Informatics, 2020.
  Web link: https://doi.org/10.1109/jbhi.2020.2982103

- **Engin Dikici**, Fredrik Orderud. Generalized Step Criterion Edge Detectors for Kalman Filter Based Left Ventricle Tracking in 3D+T Echocardiography. MICCAI workshop: Statistical Atlases and Computational Models of the Heart (STACOM), 2012. Nice, France.
  Web link: https://link.springer.com/chapter/10.1007/978-3-642-36961-2_30

- **Engin Dikici**, Fredrik Orderud, Gabriel Kiss, Anders Thorstensen, Hans Torp. Doo-Sabin Surface Models with Biomechanical Constraints for Kalman Filter Based Endocardial Wall Tracking in 3D+T Echocardiography. British Machine Vision Conference (BMVC), 2012. Guildford, UK.
  Web link: http://www.bmva.org/bmvc/2012/BMVC/paper033/

- **Engin Dikici**, Sten Roar Snare, Fredrik Orderud. Isoparametric Finite Element Analysis for Doo-Sabin Subdivision Models. Proceedings of Graphics Interface (GI), 2012. Toronto, CA.
  Web link: https://dl.acm.org/doi/abs/10.5555/2305276.2305281

- **Engin Dikici**, Fredrik Orderud, Bo Henry Lindqvist. Empirical Bayes Estimator for Endocardial Edge Detection in 3D+T Echocardiography. IEEE International Symposium on Biomedical Imaging (ISBI), 2012. Barcelona, Spain.
  Web link: https://ieeexplore.ieee.org/document/6235811

- **Engin Dikici**, Fredrik Orderud, Hans Torp. Best Linear Unbiased Estimator for Kalman Filter Based Left Ventricle Tracking in 3D+T Echocardiography. IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA), 2012. Breckenridge, Colorado, USA.
  Web link: https://ieeexplore.ieee.org/document/6164741

- **Engin Dikici**, Fredrik Orderud. Maximum Likelihood and James-Stein Edge Estimators for Left Ventricle Tracking in 3D Echocardiography. MICCAI workshop: Machine Learning in Medical Imaging (MLMI), 2011. Toronto, CA.
  Web link: https://link.springer.com/chapter/10.1007/978-3-642-24319-6_6

- **Engin Dikici**, Fredrik Orderud. Polynomial Regression Based Edge Filtering for Left Ventricle Tracking in 3D Echocardiography. MICCAI workshop: Statistical Atlases and Computational Models of the Heart (STACOM), 2011. Toronto, CA.
  Web link: https://link.springer.com/chapter/10.1007/978-3-642-28326-0_17

- Schaap, Michiel, Coert Metz, Theo van Walsum, Alina van der Giessen, Annick Weustink, Nico Mollet, Christian Bauer, Hrvoje Bogunovic, Carlos Castro, Xiang Deng, **Engin Dikici**, Thomas O'Donnell, et al., Standardized Evaluation Methodology and Reference Database for Evaluating Coronary Artery Centerline Extraction Algorithms, Medical Image Analysis 2009 Oct;13(5):701-14
  Web link: https://doi.org/10.1016/j.media.2009.06.003

- **Engin Dikici**, Thomas O'Donnell, Leo Grady, Richard D.White. Coronary Artery Centerline Tracking Using Axial Symmetries. IJ - 2008 MICCAI Workshop - Grand Challenge Coronary Artery Tracking, 2009. New York City, New York, USA.
  Web link: https://www.midasjournal.org/browse/publication/586

- Thomas O'Donnell, **Engin Dikici**, Randolph Setser, Richard D.White. Tracking and Analysis of Cine-Delayed Enhancement MR. Proceedings of Medial Image Computing and Computer Assisted Intervention (MICCAI), 2005. Palm Springs, California, USA.
  Web link: https://link.springer.com/chapter/10.1007/11566489_85

- **Engin Dikici**, Thomas O'Donnell, Randolph Setser, Richard D.White. Quantification of Delayed Enhancement MR Images. Proceedings of Medical Image Computing and Computer Assisted Intervention (MICCAI), 2004. Saint Malo, France.
  Web link: https://link.springer.com/chapter/10.1007/978-3-540-30135-6_31

Patents:

- **Engin Dikici**, Luciano Prevedello, Xuan V. Nguyen. System and Method for Prediction of Artificial Intelligence Model Generalizability. Application Number: 63/380,419; File Date: 10/21/22.
  Web link: Coming soon...

- Xuan V. Nguyen, Luciano Prevedello, **Engin Dikici**. Virtual CT myelography: A patch-based machine learning model to improve intraspinal soft tissue visualization on un-enhanced dual-energy lumbar spine CT. Application Number: 63/401,402; File Date: 08/26/22.
  Web link: Coming soon...

- **Engin Dikici**, Luciano Prevedello, Matthew Bigelow. Methods for Creating Privacy-Protecting Synthetic Data Leveraging Constrained Generative Ensemble Model. Application Number: 17/401,543; File Date: 08/13/21; Publication Date: 02/17/22; Publication number: 20220051060.
  Web link: https://patents.justia.com/patent/20220051060

- **Engin Dikici**, Luciano Prevedello, Matthew Bigelow. Systems for Automated Lesion Detection and Related Methods. Application Number: 17/401,536; File Date: 08/13/21; Publication Date: 02/17/22; Publication number: 20220051402.
  Web link: https://patents.justia.com/patent/20220051402

- Torbørn Engedal, **Engin Dikici**, Harald Nøkland. Cargo Detection and Tracking. Application Number: 16/965,839; File Date: 02/01/19; Publication Date: 02/25/21; Publication number: 20210056497.
  Web link: https://patents.justia.com/patent/20210056497

- **Engin Dikici**, Richard D.White. Sample Point-Based, Blob-Like, Closed-Surface Delineation Approach. Application Number: 13/576,008; File Date: 02/04/11; Date of Patent: 11/03/15; Patent number: 9177373; Patent Publication Number: 20130195334.
  Web link: https://patents.justia.com/patent/20130195334

- **Engin Dikici**, Thomas O'Donnell, Leo Grady, Randolph Setser, Richard D.White. System and Method for 3D Vessel Segmentation with Minimal Cuts. Application Number: 12/391,501; File Date: 02/24/09; Date of Patent: 02/28/12; Patent number: 8126232; Patent Publication Number: 20090279758.
  Web link: https://patents.justia.com/patent/20090279758

- Thomas O'Donnell, **Engin Dikici**, Randolph Setser, Richard D.White. System and Method for Tracking and Classifying the Left Ventricle of the Heart Using Cine-Delayed Enhancement Magnetic Resonance. Application Number: 11/372,783; File Date: 03/10/06; Date of Patent: 02/23/10; Patent number: 7668354; Patent Publication Number: 20060253017.
  Web link: https://patents.justia.com/patent/20060253017

- Thomas O'Donnell, **Engin Dikici**, Randolph Setser, Richard D.White. System and Method for Semi-Automatic Quantification of Delayed Enhancement Images. Application Number: 11/070,349; File Date: 03/02/05; Date of Patent: 12/02/08; Patent Number: 7460699; Patent Publication Number: 20050196027.
  Web link: https://patents.justia.com/patent/20050196027

Relevant Skills:

- **Programming languages:** C, C++, Python, x86/64 assembly, SQL, MATLAB.
- **Programming libraries:** TensorFlow, Keras, SciPy, NumPy, Scikit-learn, pandas, OpenCV.
- **OSs:** Linux (Ubuntu), Windows.
- **Technical writing:** Academic papers, patents, grants, IRB applications.

Grants:

- Project title: Automated Intracranial Metastasis Detection Algorithm, Role: Co-Principal Investigator, Grant Name/Grantor: Accelerator Award funding from the OSU Keenan Center for Entrepreneurship, Amount: $100,000, Status: Awarded in Dec 2021.
  Web link: https://keenan.osu.edu/story/nine-projects-accelerator-awards-fy21

- Project title: Artificial Intelligence-Based Early Detection of Small Tumors in Multiple Organ Systems, Role: Principal Investigator, Grant: Exploratory/Developmental Research Grant (R21) from National Institutes of Health (NIH), Amount: $433,125, Status: Application submitted in Oct 2022.

Awards/Honors:

- Best Student Paper in Image Segmentation and Processing Category at MICCAI 2004, with the paper titled "Quantification of Delayed Enhancement MR images"
  Web link: http://www.ia.unc.edu/MICCAI2005/MICCAI2005awards.html

- Co-editor for MDPI-Diagnostics journal's special issue titled "Artificial Intelligence in Radiology 2.0, 2022
  Web link: https://www.mdpi.com/journal/diagnostics/special_issues/AI_radiology