

Engin Dikici

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Overview:

Machine learning (ML) enthusiast with educational and professional experience in research, development, and delivery of ML-driven software solutions. My expertise lies in various theoretical aspects of ML, including deep neural networks, generative adversarial networks (GANs), AI generalizability, classic approaches (e.g., regression, random forest, discriminant analysis), and their applications in diverse domains (e.g., medical, energy, financial) for subtle formation/pattern detection, data synthesis, image segmentation/tracking/classification.

In addition to product development and R&D, I built project teams as PI, established/contributed to effective agile development practices, and drove systematic innovation/intellectual property portfolio development.

Specialties: Machine learning, product/project management, software engineering, computer vision, medical imaging, software development, grants, intellectual property.

Education:

- **Norwegian University of Science and Technology**, Trondheim, Norway.
Ph.D. in Biomedical Engineering. 10/2009 – 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

Work Experience:

- **The Ohio State University Wexner Medical Center**, Columbus, OH, USA.
Research Scientist with Principal Investigator Status, 2019 – Current.
 - Building project teams of medical doctors, statisticians, and engineers, then filing for private and public grants with these teams as PI or co-PI,
 - Research of state-of-the-art AI-based solutions for the detection & delineation of subtle formations in medical images (i.e., cancer tumors in MRI), and synthetic data generation (using GANs).
 - Development of these solutions using Python (utilizing TensorFlow, NumPy, SciPy, NumPy, Scikit-learn, and pandas libraries),
 - Deployment and maintenance of AI-based solution internally (via homegrown MLOps strategy integrating Radiology workflow) for their oncoming FDA evaluation/approval process,
 - Dissemination of the findings via high-impact journals,
 - Intellectual property management.

- **VOCA AS**, Kristiansand, Norway.
Senior Computer Vision Engineer, 2013 – 2019.
 - Took a critical role in an agile development environment utilizing DevOps methodology to implement CI/CD (via Azure) for offshore software solutions,
 - Involved in the development of Optilift, which enables safer and more effective offshore lifting and loading operations. Optilift acquires video & various sensor data and processes the acquired information in real-time using advanced computer vision algorithms (developed using OpenCV and C++),
 - Participated in the research, development, and delivery of (1) vessel and human-made structure detection and segmentation algorithms for regular and thermal camera image sequences, (2) automated camera algorithms including auto-focus, auto-iris, auto-exposure, and auto-gamma correction, and (3) 3D point cloud generation/processing and surface reconstruction algorithms for oil platforms, supply vessels, drilling ships, and floating production storage offloading units.
- **Norwegian University of Science and Technology**, Trondheim, Norway.
Research Fellow, 2009 – 2013.
 - Developed novel algorithms for the robust detection and real-time tracking of cardiac ultrasound images using statistical signal processing, Kalman filtering, and various other ML-based detection & tracking approaches during my Ph.D. studies,
 - Published the technical details of these algorithms and their experimental results in high-prestige Computer Vision and Medical Imaging Conferences (e.g., MICCAI, BMVC),
 - Contributed to the development of Real-Time Contour Tracking Library (developed using C++), utilized for heart tracking in 3D Ultrasound,
 - Introduced an iso-geometric finite element analysis approach and developed a biomechanical modeling tool (developed using MATLAB) for its utilization.
- **University of Florida, College of Medicine**, Jacksonville, FL, USA.
Research Scientist, 2007 – 2009.
 - Developed a semi-automated surface segmentation algorithm (in C++) for the extraction and visualization of blob-shaped organs and tumors,
 - Conducted research involving the utilization of Artificial Intelligence for the automated detection of Coronary Arteries and Veins; defined radial symmetry-based 3-D tubular object segmentation,
 - Proposed a novel imaging approach for assisting coronary revascularization, resynchronization, and lead placement procedures,
 - Involved in the UFCOM and SCR's joint effort of Early Breast Cancer Detection via Advanced Image Fusion; introduced a novel Tomosynthesis-Ultrasound registration technique,
 - Published the research findings and contributed to the intellectual property management procedures.
- **Merrill Lynch & Co.**, Jacksonville, FL, USA.
Senior Development Consultant, 2006 – 2007.
 - Involved in the requirement analysis, design, development (in C++ and C#), and final testing of financial software in a fully regulated CMMI-5 environment.
 - Supervised off-shore IT consultants about the development of SQL queries and C++ libraries.
- **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 Bogumovic, 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 Medical 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++, C#, Python, x86/64 assembly, SQL, MATLAB.
- **Programming libraries:** TensorFlow, Keras, SciPy, NumPy, Scikit-learn, pandas, OpenCV.
- **OSs:** Linux (Ubuntu), Windows.
- **Project Management:** DevOps (CI/CD), Scrum, Radiology-WF specific MLOps.
- **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>

Under review (as of Feb 2023):

- 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 10/2022.
- Project title: Detecting Low-Conspicuity Suspicious or Indeterminate Lesions on CT using a Deep Learning Approach, Role: Principal Investigator, Grant: Research Project Grant (R01) National Institutes of Health (NIH), Amount: \$1,171,815, Status: Application submitted in 02/2023.

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