Amith Kamath

PhD Researcher

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Broad Interests

Learning From Data, Medical Image Applications, Software Design.

Academic Background

2021 – present	**University of Bern**, Bern, Switzerland. Doctor of Philosophy - Biomedical Engineering Artificial Intelligence for Automated Quality Assurance in Radio Therapy
2016 – 2020	**Georgia Institute of Technology**, Part-Time, Online. Master of Science, Computer Science Coursework only; including Computer Vision, Software Architecture, Machine and Reinforcement Learning
2010 – 2012	**University of Minnesota Twin Cities**, Minneapolis, MN. Master of Science, Electrical Engineering Dissertation on: "A generalized CSA-ODF model for Fiber Orientation Mapping"
2006 – 2010	**National Institute of Technology Karnataka**, Surathkal, India. Bachelor of Technology, Electrical Engineering Dissertation on: "A Novel Device to Monitor the Mobilization of Fingers During Treatment for Stiffness of Tendons"

Professional Experience

The MathWorks, Natick, MA and Bangalore, India

July 2019 – October 2021 (2 years, 4 months)	**Product Manager - AI in Academia (Asia Pacific)**. + Created notebooks and exercises for Deep Learning, Machine Learning and Computer Vision in use in > 20 Undergraduate engineering programs. + Delivered talks and hands-on workshops in > 40 events and conferences across India.
November 2014 – June 2019 (4 years, 8 months)	**Software Engineer - Image Processing and Computer Vision**. + Improved performance of video reading to > 60fps using DXVA, color conversion functions by > 20x using TBB, morphological operators by 3x using IPP, and edge detection algorithms using openCV. + Built deep learning workflows for state-of-the-art real time object detectors for Automated Driving applications. + Designed a graphical image registration workflow in a MATLAB App. + Developed file I/O capabilities for NIfTI to enable complete neuroimage workflows in MATLAB.

February 2013 - October 2014 (1 year, 9 months)	**Trainee** - **Engineering Development**. + Improved numerical accuracy of perimeter measurement in images and tested Image Processing MATLAB Apps. + Mentored a summer intern on a month long software testing project and helped develop tooling for automating daily team activities.

Vital Images Inc. (now Canon Medical), Minnetonka, MN

October 2012 - February 2013 (5 months)	**Software Engineering Intern**. + On the Clinical Applications and Research Engineering team, working with Vitrea: the market leading 3D medical imaging software. + Added new features in a QT based GUI to overlay annotations and rulers in different fonts, colors and sizes on 3D volume visualizations.

Center for Magnetic Resonance Research, Minneapolis, MN

September 2011 - October 2012 (1 year, 6 months)	**Research Assistant**. + Research on image acquisition protocols for Diffusion MRI based on maximizing spatial information using Spherical Harmonics, multi-tensor models, and model-free methods. + Characterized white matter fiber distributions using simulation tools like Camino and MATLAB to better estimate fiber orientations.

Selected Research Output

MICCAI 2023 (Conference)	A.Kamath, J.Willmann, N.Andratschke, and M.Reyes, "Do we really need that skip connection? Understanding its' interplay with task complexity," in 2023, 28th Medical Image Computing and Computer Assisted Intervention (MICCAI).
EMBC 2023 (Conference Oral: 2nd Best Student Paper award)	A.Kamath, R.Poel, J.Willmann, E. Ermis, N.Andratschke, and M.Reyes, "ASTRA: Atomic Surface Transformations for Radiotherapy quality Assurance," in 2023, 45th IEEE Engineering in Medicine and Biology Conference (EMBC).
ISBI 2023 (Conference Poster)	A.Kamath, R.Poel, J.Willmann, N.Andratschke, and M.Reyes, "How sensitive are deep learning based radiotherapy dose prediction models to variability in organs at risk segmentation?," in 2023, 20th IEEE International Symposium on Biomedical Imaging (ISBI).
Medical Imaging Meets NeurIPS 2022 (Workshop)	Kamath, A., Suter, Y., You, S., Muller, M., Willmann, J., Andratschke, N., and Reyes, M. (2022, December). How do 3D image segmentation networks behave across the context versus foreground ratio trade-off?.

ISMRM 2013 (Abstract)	Kamath, A., Aganj, I., Xu, J., Yacoub, E., Ugurbil, K., Sapiro, G., and Lenglet, C. Optimal Acquisition Protocol for White Matter Fiber Orientation Mapping using Generalized CSA-ODF Reconstruction.
MICCAI CDMRI 2012 (Workshop Oral)	Kamath, A., Aganj, I., Xu, J., Yacoub, E., Ugurbil, K., Sapiro, G., and Lenglet, C. (2012, October). Generalized constant solid angle ODF and optimal acquisition protocol for fiber orientation mapping. In MICCAI Workshop on Computational Diffusion MRI.

Technical Expertise

Languages	python, MATLAB, C, C++, shell scripting, $\LaTeX\,2_\varepsilon$
Tools	VS Code, PyCharm, QT, cmake, git

Selected Awards

2023	2nd place in the Best Student Paper competition at EMBC 2023 - out of 15 finalists.
2023	Awarded CHF 4800 under the Young Researcher Promotion fund to organize a one-day Interpretable AI symposium
2022	Winner of the 2022 Center for AI in Medicine Research Award in the "Translation" category.
2022	Winner of the 2022 MICCAI Hackathon, on quantifying annotator/data uncertainty in brain lesion segmentation problems

External Links

GitHub	www.github.com/amithjkamath
Scholar	scholar.google.com/citations?user=clej42kAAAAJ
Stackoverflow	stackoverflow.com/users/1704995/akamath
Twitter	@amithjkamath