

Vinay Bettadapura

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Research Interests

Computer Vision, Machine Learning and Ubiquitous Computing

Education

- **Georgia Institute of Technology**, Atlanta, USA
Ph.D., Computer Science (August 2010 - December 2015)
Computational Perception Laboratory, College of Computing. **GPA: 4.0 / 4.0**
Thesis: Leveraging contextual cues for dynamic scene understanding
Advisor: Prof. Irfan Essa
 - **Columbia University**, New York, USA
Master of Science, Computer Science (January 2009 – May 2010)
The Fu Foundation School of Engineering and Applied Science. **GPA: 3.89 / 4.0**
 - **Visvesvaraya Technological University**, Belgaum, India
Bachelor of Engineering in Electronics and Communications (June 2002 – June 2006)
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Work Experience

1. **Google**, Mountain View, USA
Senior Software Engineer (January 2016 - Present)

Working with the AI Perception group (under Research and Machine Intelligence) on activity and event understanding from video, audio, and other sensor data.
2. **Google**, Mountain View / Atlanta, USA
Software Engineering Intern (May 2013 – December 2015)

Worked with the AI Perception group on event understanding from videos and with the Google Geo (Earth and Maps) team on improving the quality of satellite imagery.
3. **Google**, Mountain View, USA
Software Engineering Intern (May 2012 – August 2012)

Worked with AI Perception group's Video Content Analysis team in developing algorithms and building systems for object detection and categorization in YouTube videos.
4. **Subex Limited**, Bangalore, India
Software Engineer (June 2006 – December 2008)

Design and development of telecommunication fraud protection and anomaly detection systems. Worked on modeling user behavior, data mining for anomalies, and the design and development of the back-end, database and web-based front-end systems.

Research Experience

1. **Research Assistant**, Georgia Tech (August 2010 - December 2015)

Advisor: Prof. Irfan Essa

- Long-term activity recognition, skill assessment and functional categorization from videos and other time-series data.
- *PerSEAS (Persistent Stare Exploitation and Analysis System)*: DARPA project on surveillance and activity recognition from aerial image sequences of vehicles and people.
- Surgical skill assessment and skill categorization from surgery videos.
- *ADAMS (Anomaly Detection at Multiple Scales)*: DARPA project on characterizing and detecting anomalies in massive data-sets to detect insider threats against a background of normal everyday activities.

2. **Research Assistant**, Columbia University (January 2010 – May 2010)

Advisor: Prof. Peter Belhumeur

- *Visual Attributes for Face Verification*: Face verification in the wild, with uncontrolled settings and with non-cooperative subjects.
- *Leaf Snap: An Electronic field Guide*: Simplifying the process of plant species identification from photographs of their leaves, using mobile devices like the iPhone and the iPad.

Publications

1. A. Zia, Y. Sharma, **V. Bettadapura**, E. Sarin, I. Essa, "Video and Accelerometer-Based Motion Analysis for Automated Surgical Skills Assessment", *International Journal of Computer Assisted Radiology and Surgery (IJCARS)*, January 2018.
2. A. Zia, Y. Sharma, **V. Bettadapura**, E. Sarin, I. Essa, "Video and Accelerometer-Based Motion Analysis for Automated Surgical Skills Assessment", *Proc. Information Processing in Computer-Assisted Interventions (IPCAI 2017)*, Barcelona, Spain, June 2017.
3. **V. Bettadapura**, C. Pantofaru, I. Essa, "Leveraging Contextual Cues for Generating Basketball Highlights", *Proc. ACM Multimedia (ACM MM 2016)*, Amsterdam, Netherlands, October 2016 [**Oral**].
4. A. Zia, Y. Sharma, **V. Bettadapura**, E. Sarin, T. Ploetz, M. Clements, I. Essa, "Automated Video-Based Assessment of Surgical Skills for Training and Evaluation in Medical Schools", *International Journal of Computer Assisted Radiology and Surgery (IJCARS)*, 11(9), pp. 1623-1636, 2016.
5. **V. Bettadapura**, D. Castro, I. Essa, "Discovering Picturesque Highlights From Egocentric Vacation Videos", *Proc. IEEE Winter Conference on Applications of Computer Vision (WACV 2016)*, Lake Placid, USA, March 2016.
6. A. Zia, Y. Sharma, **V. Bettadapura**, E. Sarin, M. Clements, I. Essa, "Automated Assessment of Surgical Skills Using Frequency Analysis", *Proc. 18th International Conference on Medical Image Computing and Computer Assisted Interventions (MICCAI 2015)*, Munich, Germany, October 2015.
7. D. Castro, S. Hickson, **V. Bettadapura**, E. Thomaz, G. Abowd, H. Christensen, I. Essa, "Predicting Daily Activities From Egocentric Images Using Deep Learning", *Proc. 19th International Symposium on Wearable Computing (ISWC 2015)*, Osaka, Japan, September 2015.
8. **V. Bettadapura**, I. Essa, C. Pantofaru, "Egocentric Field-of-View Localization Using First-Person Point-of-View Devices", *Proc. IEEE Winter Conf. on Applications of Computer Vision (WACV 2015)*, Hawaii, USA, January 2015. **We won the best paper award.**

9. **V. Bettadapura**, E. Thomaz, A. Parnami, G. Abowd, I. Essa, "Leveraging Context to Support Automated Food Recognition in Restaurants", *Proc. IEEE Winter Conf. on Applications of Computer Vision (WACV 2015)*, Hawaii, USA, January 2015.
 10. Y. Sharma, **V. Bettadapura**, et al., "Video Based Assessment of OSATS Using Sequential Motion Textures", *Proc. MICCAI Workshop on Modelling and Monitoring of Computer-Assisted Intervention (M2CAI 2014)*, Boston, USA, September 2014. **Our paper received an honorable mention (2nd place)**.
 11. T. E. Senator, et al., "Detecting Insider Threats in a Real Corporate Database of Computer Usage Activity", *Proc. 19th ACM SIGKDD Conf. on Knowledge Discovery and Data Mining (KDD 2013)*, Chicago, USA, August 2013.
 12. **V. Bettadapura**, G. Schindler, T. Ploetz, I. Essa, "Augmenting Bag-of-Words: Data-Driven Discovery of Temporal and Structural Information for Activity Recognition", *Proc. 26th IEEE Conf. on Computer Vision and Pattern Recognition (CVPR 2013)*, Portland, USA, June 2013.
 13. E. Thomaz, **V. Bettadapura**, G. Reyes, M. Sandesh, G. Schindler, T. Ploetz, G. Abowd, I. Essa, "Recognizing Water-Based Activities in the Home Through Infrastructure-Mediated Sensing", *Proc. 14th ACM Conf. on Ubiquitous Computing (UbiComp 2012)*, Pittsburgh, USA, September 2012.
 14. **V. Bettadapura**, "Face Expression Recognition and Analysis: The State of the Art", *Tech Report, arXiv:1203.6722*, April 2012.
 15. **V. Bettadapura**, D. R. Sai Sharan, "Pattern Recognition with Localized Gabor Wavelet Grids", *Proc. IEEE Int. Conf. on Computational Intelligence and Multimedia Applications*, vol. 2, pp. 517-521, Sivakasi, India, December 2007.
 16. **V. Bettadapura**, B. S. Shreyas, C. N. S. Ganesh Murthy, "A Back Propagation Based Face Recognition Model, Using 2D Symmetric Gabor Features", *Proc. IEEE Int. Conf. Signal Processing, Communication and Networking*, pp. 433-437, Chennai, India, February 2007.
 17. **V. Bettadapura**, B. S. Shreyas, "Face Recognition Using Gabor Wavelets", *Proc. 40th IEEE Asilomar Conference on Signals, Systems and Computers*, pp. 593-597, Pacific Grove, California, October 2006.
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Patents

1. C. Pantofaru, V. Bettadapura, K. Bharat, I. Essa, "Systems and methods for attention localization using a first-person point-of-view device", *United States Patent 9600723*.
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Awards

2. Won the **best paper award at WACV** (IEEE Winter Conference on Applications of Computer Vision), Hawaii, USA (January 2015)
 3. Our paper received an **honorable mention (2nd place) at M2CAI** (Modeling and Monitoring of Computer Assisted Interventions), Boston, USA (September 2014)
 4. **2nd prize** in the *International IEEE Myron Zucker Undergraduate Student Design* contest, Tampa, USA (October 2006)
 5. Awarded the undergraduate **Rolling Trophy** for securing the **1st Rank** with the highest aggregate percentage for the 2006 engineering class, Bangalore, India (June 2006)
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Technical Skills

1. *Areas of expertise:* Computer Vision and Machine Learning, real-time systems, video understanding,
 2. *Technical skills / languages:* **C++**, **Ruby**, **OpenCV**
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Professional Activities

Reviewer / Program Committee member for:

- **Conferences:**
 - Eurographics, 2017
 - International Symposium on Wearable Computing (**ISWC**), 2016
 - ACM International Conference on Ubiquitous Computing (**UbiComp**), 2016
 - IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2016
 - IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2016
 - International Symposium on Wearable Computing (**ISWC**), 2015
 - ACM International Conference on Ubiquitous Computing (**UbiComp**), 2015
 - Machine Vision of Animals and Their Behaviors (**MVAB**), 2015
 - IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2015
 - IEEE European Conference on Computer Vision (**ECCV**), 2014
 - IEEE International Conference on Computer Vision (**ICCV**), 2013
 - IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2012

 - **Journals:**
 - Elsevier Computer Vision and Image Understanding (**CVIU**)
 - Springer Multimedia Systems
 - IEEE Intelligent Systems
 - IEEE Transactions on Multimedia
 - SciTechnol Journal of Computer Engineering and Information Technology (**JCEIT**)
 - Elsevier Journal of Visual Communication and Image Representation (**JVCI**)
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