

# Karan Ahuja

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## FIELDS OF INTEREST

My interests include Computer Vision, Applied Machine Learning, Ubiquitous Computing, and Sensing.

## EDUCATION

### **Carnegie Mellon University | PITTSBURGH, USA**

2017 - Present | PhD | Human-Computer Interaction

Advisors: Chris Harrison and Mayank Goel

### **Indian Institute of Information Technology | GUWAHATI, INDIA**

2013 - 2017 | B.Tech. | Computer Science and Engineering

**GPA: 4/4** | Department Rank 1

## PROFESSIONAL EXPERIENCE

### **IBM India Research Lab | RESEARCH INTERN**

May 2016 – Jul 2016 | May 2015 – Dec 2015 | New Delhi, India

Mentor: Kuntal Dey. I worked on perceptual computing on the topics of eye tracking and gaze estimation.

## ACHIEVEMENTS

- Winner of **President's Gold Medal** India - 2017.

## PUBLICATIONS

An additional **five** papers are currently in the review cycle.

10. **K Ahuja**\*, R Khurana\*, Z Yu, C Harrison and M Goel. "GymCam: Using a Camera to Detect, Recognize and Track Multiple Repetitive Exercises Simultaneously" Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies. UbiComp '19. \*Equal contribution
9. **K Ahuja**, R Islam, V Parashar, K Dey, C Harrison, and M Goel. "EyeSpyVR: Interactive Eye Sensing Using Off-the-Shelf, Smartphone-Based VR Headsets" Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies. UbiComp '18.
8. G Laput, **K Ahuja**, M Goel and C Harrison. "Ubicoustics: Plug-and-Play Acoustic Activity Recognition" To appear In Proceedings of the ACM symposium on user interface software and technology 2018. UIST '18.
7. A Nayyar, U Dwivedi, **K Ahuja**, N Rajput, S Nagar, K Dey, "OptiDwell: Intelligent Adjustment of Dwell Click Time", In Proceedings of the ACM International Conference on Intelligent User Interfaces 2017. IUI '17.
6. U Dwivedi, **K Ahuja**, R Islam, F Barbhuiya, S Nagar, K Dey, "EyamKayo – Interactive Gaze and Facial Expression Captcha", In Proceedings of the ACM International Conference on Intelligent User Interfaces Companion 2017. IUI '17.
5. **K Ahuja**, A Pandey, F Barbhuiya, S Nagar, and K Dey. "SmallStore: A region-of-interest based adaptive system for compressing human face videos" In IEEE Region 10 Conference 2017. TENCON '17.
4. **K Ahuja**, R Islam, F Barbhuiya and K Dey. "A Preliminary Study of CNNs for Iris and Periocular Verification in the View Spectrum" In IEEE International Conference on Pattern Recognition 2016. ICPR '16.
3. **K Ahuja**, R Islam, F Barbhuiya and K Dey. "CNNs for Ocular Smartphone-Based Biometrics" In Pattern Recognition Letters 2016. PRL '16.
2. **K Ahuja**, R Banerjee, S Nagar, K Dey, and F Barbhuiya. "Eye center localization and detection using radial mapping" In IEEE International Conference on Image Processing 2016. ICIP '16.
1. **K Ahuja**, A Bose, S Nagar, K Dey, and F Barbhuiya. "ISURE: User authentication in mobile devices using ocular biometrics in visible spectrum" In IEEE International Conference on Image Processing 2016. ICIP '16.

## PATENTS

15. K Ahuja, R Banerjee, K Dey, SKV Sesha, S Nagar. System and method for creating shoppers gaze, implicit interest, identity and social network based information disbursement system and combo deals. US Patent App. 15/430,603 filed Feb 2017.
14. K Ahuja, H Bansal, K Dey, S Nagar. Pre-Cooling and Pre-Heating Transportation Vehicles Using Predictive Crowd Estimation Techniques. US Patent App. 15/407,816 filed Jan 2017.
13. K Ahuja, H Bansal, K Dey, S Nagar, R Vaculin. Regulating environmental conditions within an event venue. US Patent App. 15/836,802 filed Jan 2017.
12. K Ahuja, K Dey, U Dwivedi, S Nagar, R Vaculin. System, method and computer program product for stateful instruction-based dynamic man-machine interactions for humanness validation. US Patent App. 15/400,458 filed Jan 2017.
11. K Ahuja, K Dey, S Nagar, R Vaculin. Analyzing team game play interactions using gaze data. US Patent App. 9,999,805.  
**Patent granted**
10. K Ahuja, K Dey, S Nagar, R Vaculin. System, Method and Recording medium for tracking gaze with respect to a moving plane with a camera with respect to a moving plane. US Patent 9,874,934. **Patent granted**
9. K Ahuja, K Dey, S Nagar, R Vaculin. System, method, and recording medium for tracking gaze using only a monocular camera from a moving screen. US Patent 9,996,744. **Patent granted**
8. K Ahuja, K Dey, S Nagar, R Vaculin. Determining Player Performance Statistics Using Gaze Data. US Patent App. 15/184,229 filed June 2016.
7. K Ahuja, K Dey, S Nagar, R Vaculin. Analyzing and Interpreting a Referee's Actions Using Gaze Data. US Patent App. 15/184,239 filed June 2016.
6. K Ahuja, K Dey, S Nagar, R Vaculin. System, method, and recording medium for advertisement remarketing. US Patent App. 15/180,260 filed June 2016.
5. K Ahuja, K Dey, S Nagar, R Vaculin. System, method, and recording medium for location-based advertisement. US Patent App. 15/180,256 filed June 2016.
4. K Ahuja, R Banerjee, K Dey, S Nagar. Gaze Point Detection Using Dynamic Facial Reference Points Under Varying Lighting Conditions. US Patent App. 10,082,866. **Patent granted**
3. K Ahuja, R Banerjee, K Dey, S Nagar. Managing power, lighting, and advertising using gaze behavior data. US Patent App. 15/002,746 filed Jan 2016.
2. K Ahuja, U Dwivedi, K Dey, S Nagar, R Vaculin. Gaze based classroom notes generator. Under filing process.
1. K Ahuja, K Dey, S Nagar, R Vaculin. Method and System for Creating a User Specific 3D Head Model and using Dynamic Facial Landmarks for Head Pose and Gaze Estimation. Under filing process.

## SELECTED PRESS COVERAGE

- Engadget, Speculative gadgets at the Future Interfaces Group (2018)
- The Register (UK), Alexa heard what you did last summer- AI Recognizes Activities from Sound (2018)
- Science Daily, Sound, Vibration Recognition Boost Context-Aware Computing (2018)
- Futurity, Sound and Vibrations Let Smart Devices Know Where They Are (2018)

## REFERENCES

### Chris Harrison

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Future Interfaces Group  
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### Mayank Goel

Assistant Professor  
SMASH Lab  
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### Kuntal Dey

IBM Master Inventor  
Senior Software Engineer (Research)  
IBM India Research Lab  
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