# Moneish Kumar

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## Research Objective

To work as researcher in the field for Computer Vision and Machine Learning. Create solutions that would have a lasting impact on the lives of people.

## Education

**International Institute of Information Technology, Hyderabad**      Hyderabad, India
*B.Tech. and MS by Research in Electronics and Communication Engineering, **GPA: 8.33/10***      July 2013 - Dec. 2018
Advisor : Dr Vineet Gandhi
Thesis : Computational Video Editing and Re-editing

## Relevant Courses

- Data Structures
- OS and Algorithms
- Computer System Organisation
- Optimization Methods
- Digital Image Processing
- Computer Vision
- Machine Learning
- Statistical Methods in AI

## Publications and Patents

- KL Bhanu Moorthy, **Moneish Kumar**, Ramanathan Subramanian, and Vineet Gandhi. **"GAZED–Gaze-guided Cinematic Editing of Wide-Angle Monocular Video Recordings."** In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, pp. 1-11. 2020.

- **Moneish Kumar**, Kranthi Kumar Rachavarapu, Vineet Gandhi, and Ramanathan Subramanian. **"Watch to edit: Video retargeting using gaze."** In Computer Graphics Forum, vol. 37, no. 2, pp. 205-215. 2018.

- **Moneish Kumar**, Vineet Gandhi, Remi Ronfard, and Michael Gleicher. **"Zooming on all actors: Automatic focus+ context split screen video generation."** In Computer Graphics Forum, vol. 36, no. 2, pp. 455-465. 2017.

- Vineet Gandhi, **Moneish Kumar**, Remi Pierre Ronfard, and Michael Lee Gleicher. **"System and method for automatically generating split screen for a video of a dynamic scene."** U.S. Patent 10,084,970, issued September 25, 2018.

## Honors and Awards

**Samsung Effithon (Hackathon) runner-up**      Sept. 2019
*Ranked $2^{nd}$ amongst 130 teams, Samsung Research Institute-Banglore (SRI-B)*

**Professional Software Competency (SWC) Test**      Dec. 2018
*Cleared SWC for working professionals (one among the only 10% in SRI-B)*

**ACM-India and IARCS Travel grant**      March 2018
*Fully funded for presenting at Eurographics 18 conference*

**Research Award**      April 2017
*Published a good quality paper while being an undergraduate student, IIIT-H*

**Deans Merit List**      2014 & 2015
*Awarded for excellence in studies and being in the top 5% during that year, IIIT-H*

## Work Experience

**Research Engineer**                                                July 2018 – Present
*Samsung Research Institute - Banglore, India*                  *C++, Python, PyTorch, Java*

- Responsible for building on-device ML and Deep Learning solutions and development of native and Android code.

- Developed an extremely fast and accurate object detection and classification framework using MobileNet-Single Shot Detector (SSD) and an Inception-v3 based classifier. Overall pipeline required only 30ms to be run on device.

- Framework was selected for commercialization in Samsung's S10 galaxy and has been deployed in all flagships as part of Bixby Vision ever since. It has a total of 70 million users.

- Developed a novel Neural Network Architecture capable of attaching modules part-wise which allows for easier and lesser overhead during model updates in mobile phones.

**Research Intern**                                                July 2017 – Sept. 2017
*Inria Grenoble - Rhône-Alpes, France*                                   *Keras, python*

- Worked on Person Re-Identification in videos. Developed a modular pipeline that incorporated the traditional person detector with spatial and temporal constraints in an convex optimisation framework to produce more accurate person tracks.

- The pipeline was integrated as a module in an open-source compositor (Natron) to showcase its efficacy.

**Teaching Assistant**                                                July 2015 – Dec 2016
*International Institute of Information Technology, Hyderabad*                   *Hyderabad, India*

- Teaching Assistant for three courses - *Mathematics I, Basic Electronics Circuits* and *Electrical Science 2*

- Responsibilities included to conducting tutorial sessions, making assignments, and grading tests for classes with over 100 students.

## Academic Projects

**Video re-targeting using gaze** | *Python, OpenCv, Matlab, Docker*           July 2017 – March 2018

- Developed a novel video re-targeting algorithm by posing the problem two parts 1) detection of timestamps where new cut can be introduced, 2) optimisation of the camera tracks to look more natural.

- The method was robust to any type of input video and **40 times** faster that the previous SOTA.

**Split Screen Composition** | *Matlab, OpenCv*                          Sept 2016 – March 2017

- Designed a dynamic Split Screen Composition for stated performances. It changed its layout depending on the relative position of performers on stage.

- Detection of layout for each frame was posed as an Dynamic programming problem and the generation of smooth tracks was an convex optimisation problem.

**Sports video analysis** | *Python, OpenCV*                             Jan. 2016 – March 2016

- Developed a application that took as input a soccer video and provided various statistics for the same.

- Used various Computer Vision techniques such as, background subtraction, Hough transform, template matching temporal analysis.

- The method could successfully track the ball, tracks multiple players, determine ball possession by each player, detection of off-size, detection of fouls, goals scored.

**Locating cyclone shelter** | *Matlab*                                 July 2015 – Dec. 2015

- Created a framework which identified the potential location of a cyclone shelter within a geographical map by, taking into account the topographic maps, flood maps, road maps and population density.

- Tested the framework for many cities in southern part of India.

## Technical Skills

**Languages**: Python, C/C++, MATLAB, JavaScript, HTML/CSS
**Frameworks**: PyTorch, caffe, TensorFlow
**Developer Tools**: Git, Docker, VS Code, Visual Studio, IntelliJ, Eclipse
**Libraries**: NumPy, Matplotlib,pandas