KALPIT THAKKAR

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EDUCATION

International Institute of Information Technology HYDERABAD, TELANGANA
B. Tech (Hons.) in Computer Science and Engineering *2012 – 2016 (expected)*

- Undergraduate Honors in Computer Graphics at Center for Visual Information and Technology, under the guidance of Prof. P.J. Narayanan. **CGPA : 7.6/10**

Rosary High School VADODARA, GUJARAT
Higher Secondary School Certificate **(82%)** *2010 – 2012*

Rosary High School VADODARA, GUJARAT
Secondary School Certificate **(93%)** *1999 – 2010*

WORK EXPERIENCE

Centre for Visual Information and Technology *(Research Honors)* May '14 – present

- Focus on components of raytracing algorithms – specifically, acceleration structures and Hair/Fur rendering. Aspire to work on High Performace Graphics.

Google Summer of Code *(Open Source Contributor)* May '15 – Sept '15

- Contributed to BRL-CAD, a U.S. Army Research Laboratory initiative, particularly used for ballistic vulnerability and lethality.
- Developed an API for analyzing properties like Volume, Centroid and Surface Area of complex constructive solid geometry using raytracing, focusing on accuracy and complexity of the solution.

Undergraduate Teaching Assistant for Operating Systems and Graphics Aug '14 – Apr '15

- Contributed to the delivery of teaching and tutorials and provided personal academic support and mentoring for groups of students.

MAJOR PROJECTS

Hair & Fur Rendering Aug '15 – present
Advisor: Dr. P.J. Narayanan *Graphics, C++, PBRT-v3*

- Developed a path tracer with Bounded Volume Heirarchy as it's acceleration structure, which uses Surface Area Heuristic to calculate the best object split and is capable of handling sufficiently complex geometry consisting of the order of 1M triangles.
- Presently, based on Intel's paper in HPG '14, research is going on for checking feasibility, and possibly improvement, of a proposed change in the paper about the algorithm for Hair/Fur rendering.

Object Oriented C++ Geometry API Apr '15 – Sep '15
Project Advisors: Daniel Rossberg & Christopher Sean Morrison *C/C++, Raytracing*

- Designed the geometry API functions necessary for realizing the generic approach for finding Surface Area, Volume and Centroid for primitives which don't have specific mathematical approaches, having raytracing at it's centrepiece. Implemented their respective caller functions in the C++ interface for geometry analysis.
- Another approach based on spherical quasi random sampling is being researched for implementation.

Decaf Compiler Aug '15 – Nov '15
Instructor: Dr. Suresh Purini *Bison, Flex, Visitor Design Pattern, LLVM*

- Developed a Compiler which uses Bison / Flex as frontend and LLVM as backend. While parsing, an abstract syntax tree is built which generates the LLVM Bitcode upon traversal. The LLVM interpretor generates assembly code from the Bitcode, which is then compiled using g++/gcc/clang/clang++ to generate the executable binary.

Virtualization Orchestrator Aug '15 – Nov '15
Instructor: Dr. Vasudev Verma *C++, Poco, libvirt*

- Built a RESTful API for provisioning of resources to VMs by coordinating with multiple type-2 hypervisors running across multiple physical servers. Service APIs include scheduling, creation, deletion and querying the VMs.

CAPTCHA cracker Aug '14 – Dec '14
Instructor: Dr. Anoop Namboodri *Machine Learning, MATLAB*

- Developed a program that segments a reasonably complex CAPTCHA image with adversarial clutter to extract the letters and then applies basic Optical Character Recognition to recognize the characters, using a random forest trained on a sufficiently large dataset of characters.

Cue guiding for 8-ball pool Aug '14 – Dec '14
Instructor: Dr. Jayanthi Sivaswamy (Dean Academics, IIIT-H) *Image Processing, Physics, MATLAB*

- Developed a program that, given a top-down pool table image with random cue, finds the position of pockets and balls using binarization & template matching and visualizes the post-impact vectors to predict the possible shots.

TECHNICAL SKILLS

Graphics Softwares: PBRT, Blender, Appleseed

Programming Languages: C/C++, Java, Python

Libraries: OpenCV, OpenGL, libvirt

Build tools: CMake, GNU make

Version Control: Git, Subversion

Web technologies: web2py, HTML/CSS, javascript(basic)

ACHIEVEMENTS, HONORS & EXTRA-CURRICULARS

- **IIT-JEE AIR : 5381** & **AIEEE AIR : 1302**
- **Awarded the first place *(among 500 teams)*** in IBM BlueMix '14 for developing a dedicated and peer-review based classical music learning and streaming webapp named Swaara.
- Elected **as the Head Boy** at school twice; once in VII grade and second in XI grade.
- Elected **as Sports Captain**, IIIT Hyderabad, 2014 & also **as Cultural Representative**, IIIT Hyderabad, 2013.
- Awarded **Best Footballer Of The Year 2014 - 2015** for excellence in football at IIIT Hyderabad.
- **The only player** to get selected for All India Football Federation (AIFF) National Football Camp from Gujarat held at Kolkata in the **under-14 category**, 2008.
- **Represented Gujarat** in the state football team **four times**; once as the **captain of the team**.