

# Shivam Handa

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RESEARCH INTERESTS	Operating Systems, Distributed Systems, Programming Languages	
EDUCATION	<b>Indian Institute of Technology</b> , Delhi, India <i>B.Tech in Computer Science and Engineering</i> • Cumulative Grade Point Average: 9.183/10, ranked 4th in a class of 60. <b>June 2010 - May 2014</b>	
SCHOLASTIC ACHIEVEMENTS	<ul style="list-style-type: none"><li>• Won Silver Medal for India at <b>International Physics Olympiad (IPhO)</b> 2010, held at Zagreb, Croatia. Honoured by <b>Ministry of Science and Technology</b> and <b>Tata Institute of Fundamental Research</b> for the same.</li><li>• Awarded <b>Aditya Birla Scholarship</b> for 4 consecutive years. <b>1 among 11</b> scholars from Engineering students all over India.</li><li>• Secured <b>All India Rank 37</b> in IIT-JEE entrance examination, among 500,000 students.</li><li>• Awarded <b>AIEEE Merit Scholarship</b> for securing <b>All India Rank 9</b> in <b>AIEEE</b> entrance examination among 1,000,000 students.</li><li>• <b>Teaching Assistant</b> for Programming Languages course under Prof. Sanjiva Prasad.</li></ul>	
WORK EXPERIENCE AND INTERNSHIPS	<b>Microsoft Research India</b> , Bangalore, India <i>Research Fellow, Programming Languages and Tools Group</i> <b>June 2014- Present</b> <b>Adobe Advanced Technology Labs</b> , Delhi, India <i>Research Intern, Social team</i> <b>May 2013 - July 2013</b> <b>HBCSE, Tata Institute of Fundamental Research</b> , Mumbai, India <i>NIUS Researcher under Dr. Vijay Singh</i> <b>May 2012 - July 2012</b>	
RESEARCH WORK	<b>CScale: Distributed Steam Processing Engine</b> <i>Dr. Ganesan Ramalingam, Dr. Kapil Vaswani, Dr. Kaushik Rajan</i> <i>Microsoft Research</i> Current stream processing engines try to keep the state size low and their histories bounded to make current fault tolerant schemes viable. The aim of this project is to remove this restriction. Our tool <ul style="list-style-type: none"><li>• Maintains redundant secondaries, as recovery transmitting large state is not possible in sub second time.</li><li>• It currently uses replicated pipelines and uses re-computation to improve performance of replication and provide no-data-loss guarantees.</li></ul> We are successful in gaining throughput equal to line rate, while improving recovery times, even in case of large states with infinite histories. We are currently trying to solve some garbage issues, after which we plan to publish this work. <b>Remote Desktop using VM Record and Replay</b> <i>Dr. Sorav Bansal</i> <i>Undergraduate Thesis</i> The project aimed to optimize remote desktop tools to consume less network bandwidth <ul style="list-style-type: none"><li>• The tool utilizes VM record replay technique to record server's interrupts and streams then to client for replay. The size of interrupt log is extremely small as compared to the compressed video streams current tools use.</li></ul>	

- Record replay requires a coherent VM image to be present on server and client when the technique starts. The tool sends parts of the VM image On-Demand.
- Workloads which are disk read heavy, bloats the network traffic. The tool uses an adaptive technique to switch between Record Replay mode and traditional remote desktop mode, based on disk loads and network traffic.

### Content Ideation

*Mohit Garg, Dr. Sriram Revankar*

*Adobe Advanced Technology Labs*

Created a tool to help companies create engaging content for their social media followers, which

- Clusters fan base into demographic groups, creating interest and preference profiles.
- Analyzes groups previous activity calculating Optimum Time when the group is receptive.
- Predicts performance of Posts and provides suggestions on mode of content delivery.
- Provides popular trends online, which maybe interesting to a company's audience.

We created an interest comparison measure, and successfully filed a **patent** for it.

**Hierarchy Similarity Measure**, *Shukla, S.; Agarawal, V.; Bhargava, R.; Handa, S.*

<https://www.google.co.in/patents/US20150149468>

### Effective Mass theory for a 2-D Quantum Dot

*Dr. Praveen Pathak, Dr. Vijay Singh*

*HBCSE, Tata Institute of Fundamental Research*

The hypothesis we started on was that Ben Daniel-Duke (BDD) condition, which states that electron changes its effective mass in different potentials, would have much more effect on the energy levels rather than the magnitude of the magnetic field. I helped in deriving an approximate model for Quantum Dots in Magnetic Fields; considering BenDaniel-Duke (BDD) condition. Analyzed Results to state the importance of BDD effects over magnetic field effects.

### Automated Requirement Document Analysis

*Dr. K. K. Biswas*

*Mini Project*

Objective of this work was to create an automated tool to check **completeness and consistency of requirement specification**. We implemented a Semantic Network to quantify context and analyze ambiguities using Stanford NLP tools.

## OTHER PROJECTS

### Reimplementation of Concurrency Bug Detection Tool, CHES

*Course project : Advanced Topics in Software Systems*

The course work included reading recent trends in system research. Part of the course involved implementing the CHES tool. Included writing pthread library wrappers for mining non-determinacy and finding buggy schedules.

### Instructional Operating System, Pintos

*Course Project : Operating Systems*

Implemented system call interface, virtual memory (including Memory Mapped files) and filesystem.

### Real Time Rendering of Rain drops on car windshield

*Course Project : Computer Graphics*

The course work included finding a novel problem and working out a solution for it. I picked this problem as I had prior courses in physics and there was very less research work on this problem. Implemented a GLSL shader for rendering a reflection based model for raindrops with TIR on boundaries. Designed a fast method for lighting effects; Utilized Fresnel model for chromatic aberration effects.

RELEVANT COURSES Advanced Topics in Software Systems, Operating Systems, Programming Languages, Introduction to Logic.

## REFERENCES

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