Roya Shams-Zadeh-Amiri

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Education

University of Toronto, St. George Toronto, ON (H.B.Sc) Computer Science Specialist
(2015-Present)

Relevant Coursework

- Introduction to Visual Computing
- Computer Graphics
- Operating Systems
- Software Design
- Software Tools and Systems Programming
- Web Development
- Design of Interactive Computational Media
- Introduction to Databases
- Algorithm Design, Analysis, and Complexity

Skills

- **Languages:** Python, Java, C, C++, SQL, HTML, CSS, JavaScript, Verilog
- **Frameworks and Libraries:** p5.js, JQuery, Ajax, OpenCV, Django, NumPy, OpenGL
- **Git and Version Control** for collaborative work, 3 years of experience
- **OSX and Linux** based desktop platforms, 3 years of experience
- Additional knowledge of **Graphic Design with Adobe Creative Suite**

Experience

- Alpha Coach for Hatch Canada (Current)
  - » **Classroom instructor** for afterschool program towards students aged 7-17, assists students with **python projects**
  - » Patience explaining programming concepts at accommodating levels.
  - » Adapts to each student's needs and experience, their interests and motivation
  - » Generates enthusiasm for programming, building, and creation within younger students
- Toronto ACM SIGGRAPH Chapter Executive Member (Current)
  - » Publicizes upcoming events, resources, and developments in the field of computer graphics, emphasis within Toronto.
  - » **Coordinates** on a weekly basis with chapter using **conference calls** or **in person meetings** to keep track of any updates that need to be reflected in public material

Projects

- Personal Site: www.royashams.com (HTML, CSS, and JavaScript) (Jul. 2017)
  - » **Designed all graphic components using Adobe Photoshop.**
  - » Navigation diamond created using an **iterative design process** tested on multiple users to observe intuitiveness of use.
  - » Steps in this process include **prototyping, testing, observing user feedback** to improve user interface and experience.
  - » Key refinements made through **observation of user interaction** include adding flashing arrow buttons, and implementing visual cues using hover capabilities over the diamond.
- Snackerman: royashams.pythonanywhere.com (Django/Python)(Dec. 2017)
  - » **Web app** allowing users to find, bookmark, and review food places on the University of Toronto Campus, directed towards students and faculty
  - » **Collaborated** with 3 students, using and extending the cobalt.qas.im API
  - » Implemented **back-end HTTP routing methods** to our **RESTful API**, and created django.db databases for storing, updating, and deleting messages and reviews to the server

Course Projects in Computer Graphics

* Note: These projects were completed while taking courses at the University of Toronto, and I am unable to provide a link to my projects. I am able to demo these projects, if requested.

2D Computer Graphics

- Visual Computing or Image Processing (All completed in **NumPy and OpenCv**)
- Triangulation Matting ("Blue Screen Matting", Smith & Blinn, 1996)
  - Computes alpha and color values of a foreground object from 2 sets of images containing a foreground object and a background, and images with the removed foreground object.
  - Achieved values by implementing Theorem 4 Described in the paper, and can **composite final images** given foreground and a new background.
- Image Inpainting ("Exemplar-Based Image Inpainting", Criminisi et al. 2004)
  - Removes large gaps from digital images using background patches and **similar edge detection.** Fills the remaining area using this information.
  - Computed **gradients, curve normals, and confidence values** given an image patch.
- PatchMatch ("PatchMatch: A Randomized Correspondence…" Barnes et al. 2009)
  - **Reconstructs a target image** from a source image by iteratively improving a Nearest-Neighbor Field, using either adjacent or random pixel offsets.
  - Implemented propagation and random search methods described in Section 3.2 of the paper, by taking offset pixels that have a minimum difference in intensity from the source and target images.

3D Computer Graphics

- Shaders in **OpenGL**
  - Implemented ambient, diffuse, and specular components of Phong and Gouraud **photorealistic shading models**, as vertex or fragment shaders
  - Modified these models to obtain **stylistic results**, such as cel shading, halftone shading, and shading that shows translucency ("x-ray shading")
- Ray tracing in **C++**
  - **Collaboration** with a partner on implementing a basic ray tracer that can compute intersections and render spheres and planes
  - Computes shadows and **recursively** bounce rays off of objects to produce reflections
  - Additionally implemented **anti-aliasing** using normal sampling, simulated **depth of field** following the thin-lens model.

Extracurricular

- **Vice President** of University of Toronto Computer Graphics club (UTCG) (Current)
- **SIGGRAPH 2017** Student Volunteer in Los Angeles (Aug. 2017)
- **Computer Science Student Union** Office Operations (Current)
- Hart House Singers – Choir Member (2016-2017)
- Independent **photographer, musician, designer, sculptor, and crafter**.

Additional links and Portfolios

All portfolio content can be found on my personal website: https://royashams.github.io/portfolio.html