Zahra Forootaninia

Git: https://bitbucket.org/Zahrafn
Home page: https://zahraforootaninia.github.io/

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WORK EXPERIENCE

Summer Intern/ Radar Section Jet Propulsion Laboratory, May - August 2020
Updating DopplerScatt onboard processing - I transferred the most expensive part of the Python processing code to C++ and bind it to the rest of the original code using Pybind 11 to get some speed up. As well as, adding new visualization to the existing GUI.
Summer Intern/ Radar Section Jet Propulsion Laboratory, May - October 2019
W-Band landing radar raw data simulation - I wrote the simulator in Julia. Different modules had been implemented and tested to construct the simulator. The code runs on a distributed system.
R&D FX and Simulation Intern DreamWorks Animation, May - December 2018
Resolving contact problem in the hair simulation - I was working on a problem that was in the in-house hair simulator in which the hair elements pass through obstacles causing problem for the hair animators.
Software developer Intern Infinite Campus, Inc, une - December 2015
Software improvement - I transferred a piece of code from Ruby to Groovy to match with the rest of pipeline.

RESEARCH

Physics based animation: University of Minnesota, June 2016 - present
Numerical optimization techniques for physics-based animation. I had worked on crowd simulation based on collision avoidance approach for multi-agent navigation and planning. We assumed the acceleration of the agents gradually increases with decreasing of time to collision and proposed two uncertainty models for collision avoidance. In my latest work, I used the frequency domain to guide smoke to fallow low-resolution velocity field. I addressed the problem of getting different dynamics of the smoke due to the resolution uprising after the design stage at low resolution(**C++, Python**)

Radio luminosity function and galaxy evolution: University of Minnesota, Spring 2012 - 2014
Using the Very Large Array (VLA) radio telescope to acquire data for a large cluster of galaxies (Abell 2256). Using this data I created images and a catalog of galaxies and performed statistical analysis on the data in order to determine the dynamical properties of the cluster. (**Python, Numpy, CASA**)

PUBLICATIONS

Forootaninia, Zahra, and Rahul Narain. "Frequency-domain smoke guiding." ACM Transactions on Graphics (TOG) 39.6 (2020): 1-10.

Forootaninia, Zahra, Ioannis Karamouzas, and Rahul Narain. "Uncertainty Models for TTC-Based Collision-Avoidance." Robotics: Science and Systems. Vol. 7. 2017.

Srinivasan Karthik, Majurec Ninoslav, Ahmed Razi, Prager Samuel, Forootaninia Zahra, Mao Peter, Joshil Shashank Srinivas, Tope Michael. "Terminal Descent Radar System Testbed for Future Planetary Landers." IEEE Aerospace Conference March 2021.

SKILLS

Technical: Fluid simulation, Crowd simulation, Quaternion based system, Geometric algebra, Physics Based Rendering Techniques (PBRT), SPH simulation, Ray casting, Image processing, Statistical analysis , Mathematical modeling.
High Level Languages: C++, Python, Julia, MATLAB
Operating System: Unix/Linux, Mac OS X, Windows

TEACHING EXPERIENCE

Algorithms and data Structure (CSci 4041), University of Minnesota –Teaching discussion sections, grading assignments and exams.
Elementary Computational Linear Algebra (CSci 2033), University of Minnesota –Teaching discussion sections, grading assignments and exams.
Introduction to Astronomy Labs (AST 1001), University of Minnesota –Teaching six labs, grading student projects, exams and lab reports.

EDUCATION

PhD Computer Science 2016 - May 2022(expected), University of Minnesota, Minneapolis, MN
M.Sc. Astrophysics 2012-2015, University of Minnesota, Minneapolis, MN
B.Sc. Physics, Solid State Physics 2007 - 2010, Yasouj University, Yasouj, Iran

RELATED COURSES

Advanced Algorithm and Data Structure (CSCI 5421)
Computation Aspect of Matrix Theory (CSCI 5304)
Physics Based Animation (CSCI 8980)
Statistical Analysis (STAT 5021)
Fundamentals of Computer Graphics I / II (CSCI 5607 / CSCI 5608)
Computer Vision (CSCI 5561)
Astrophysical Radiative Processes (AST 8001)
Astrophysical Fluid Dynamics (AST 8031)

Class projects: Smooth Particle Hydrodynamics (SPH) solver, Ray-Tracing Engine, quaternion-based skeletal animation, shape detection

AWARDS

GAANN Fellowship Graduate Assistance in Areas of National Need. University of Minnesota 2017-2018.