SANG HYUN SON

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Seoul, South Korea (+82)-10-6403-8286

EDUCATION

Seoul National University, South Korea *Mar 2019 - Present*
Master Student in Computer Science and Engineering

Seoul National University, South Korea *Mar 2012 - Feb 2019*
Bachelor of Arts in Archaeology *Summa cum laude*
Bachelor of Science in Computer Science and Engineering

INTERESTS

Computer Graphics, Geometric Processing, Machine Learning, AR/VR, Computer Vision, Game Engine, etc.

TECHNICAL SKILLS

Programming: Proficient in C, C++ / Conversant with Python, C#
Software & Tools: **Graphics:** OpenGL, WebGL
GPU Programming: CUDA, OpenCL
Game : Unity Engine, Unreal Engine
Web : Django, React

BACHELOR THESIS

Sang-Hyun Son, *Analysis of Hunter-Gatherer Subsistence Strategy with Computer Simulation*, 2018 (Korean)
Sang-Hyun Son, *Bisector Surface Construction for Two Bicubic Bezier Surfaces*, 2018 (Korean)

PUBLICATIONS

Youngjin Park, **Sang-Hyun Son**, Myung-Soo Kim, Gershon Elber, *Surface-Surface-Intersection Computation Using a Bounding Volume Hierarchy with Osculating Toroidal Patches in the Leaf Nodes*, Solid and Physical Modeling (Computer Aided Design 2020)
Sang-Hyun Son, Seung-Hyun Yoon, Myung-Soo Kim, Gershon Elber, *Efficient Minimum Distance Computation for Solids of Revolution*, Eurogrphics & Eurovis (Computer Graphics Forum 2020)
Sang-Hyun Son, Seung-Hyun Yoon, Myung-Soo Kim, *Computing minimum distance between surfaces of revolution using spherical shell tree*, KCGS, 2019 (Korean) **Best Paper Award**

RESEARCH EXPERIENCE

SNU : 3D Modeling and Processing Lab **Seoul, Korea**
Supervised by Myung-Soo Kim *Mar 2019 - Present*
- Developing an algorithm to compute Hausdorff distance for freeform surfaces
- Developed an algorithm to solve parameter inversion problem for freeform surfaces and volumes
- Developed an algorithm to bound freeform surfaces tightly with Rectangle-Swept Spheres(RSS) and contributed to surface-surface intersection algorithm's acceleration.
- Developed an algorithm to conduct 3D shape retrieval using spherical bounding volume hierarchies as a term project for a course.
- Developed a novel algorithm to find minimum distance between toroidal patches and accelerated minimum distance computation between solids of revolution.
- Developed an algorithm to bound surface of revolution with spherical shells and accelerated minimum distance computation between surfaces of revolution.
- Developed a GPU algorithm to compute medial axis, or bisector, of two bicubic Bezier surfaces in interactive time.

INDUSTRY EXPERIENCE

Smilegate **Pangyo, Korea**
Game Engine Programmer (Intern) *July 2018 - Sep 2018*
- Developed an algorithm to accelerate geometric computations used in massive full 3D online game environment with octree and bounding volume hierarchy(BVH)

TEACHING EXPERIENCE

Teaching Assistant, SNU **Seoul, Korea**
4190.667 Geometric Modeling *Sep 2019 - Dec 2019*
Teaching Assistant, SNU **Seoul, Korea**
4190.313 Linear and Non-linear Computation Models *Mar 2019 - June 2019*

PROJECTS (ALL AVAILABLE ON GITHUB)

MinuteTorus
C++ library that supports basic math operations related to torus : Computing Osculating Toroidal Patch, Computing Binormal Lines between Toroidal Patches, Computing Gaussmaps of Toroidal patches, etc.
MinuteEngine
C++ framework using modern OpenGL that supports basic rendering functions and provides graphics programming environment : Scene graph, Geometry, Lighting, Shading, Texturing, Shadow, etc.
MinuteFreeform
C++ library that supports basic geometric operations related to non-rational freeform geometric entities : Bezier / Bspline Curves, Surfaces, and Volumes
MinuteUtils
C++ library that supports basic math operations related to computer graphics and geometric modeling : Vector, Matrix, Domain arithmetic, Translation and Rotation (Quaternion), etc.
Course Project : Machine Learning and Optimization for 3D data
In this project, I studied and implemented several important topics related to machine learning and optimization for 3D Data : Projection and Camera, Optimization techniques, 3D registration(ICP), 3D Reconstruction, Discrete Differential Geometry, Deep Learning on Point Clouds, Graph CNN, 3D GAN, etc. Specifically, this project aims to do *shape retrieval with spherical bounding volume hierarchy(BVH).*
Course Project : Advanced Animation
In this project, I studied and implemented several important topics related to computer animation : Affine Geometry, Transforms, Solving Linear Systems, Kinematics, Inverse Kinematics, Rotation and Orientation(Quaternion), Orientation Interpolation, Motion Editing and Blending, Motion Graph, etc.
Course Project : Graphics Programming
In this project, I studied and implemented several important topics related to rendering : Triangle Mesh Processing, Textures, Lights(Point, Area), Shadow, Ambient Occlusion, Deferred Rendering, etc.

AWARDS

Lecture & Research Scholarship	2020
Best Paper Award (Korean Computer Graphics Society, KCGS)	2019
Brain Korea 21 Plus	2019
Samsung Convergence Software Course Scholarship	2017
Eminence Scholarship	2017
National Humanities and Social Sciences and Undergraduate Scholarship	2016