HE, Qihao

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Education

Hong Kong University of Science and Technology September 2019 – June 2023 (Expected)

B. Sc. in Data Science and Technology & Computer Science (Double-Major)

- **CGA** (Cumulative Grade Average)**:** *3.662*
- **Dean's list (TGA >= *3.7*):**
  Year 1 Fall: 3.738 *Year 3 Fall: 4.053* *Year 3 Spring: 3.780*

Internship Experience

Capmi Technology, Ltd. June 2022 – August 2022

Software Developer Intern Sha Tin, HKSAR

- Implemented a versatile version of Inertial Measurement Unit (IMU) Sensor-to-Body Calibration Method, which relies on rotations based on quaternion to align the sensor and body frames to model their orientations. Our technique enabled the user to wear the sensor at any arbitrary orientation unlike the original calibration method.
- Developed a Foot Rooted Kinematic Model (FRKM) to support model translation on level ground, using acceleration data from the sensors. This method reconstructed global translations in the 3D space and helped avoid any instability.
- Designed and incorporated a feature to our working FRKM based on *Kalman* Filter that estimates body global translation velocity to enable Pedestrian Dead-Reckoning (PDR) when both feet are off-ground, *i.e.,* when jumping, running, *etc.*, are detected.

Research Experience

Undergraduate Research Opportunity Project June 2021 – December 2021

A Machine Learning Approach to study the relationship between urban morphology and urban heat island

- Adopted Feedforward Neural Network (FNN) and Random Forest Regressor (RFR) to estimate the Land Surface Temperature (LST) spatial distribution (annual average) in Hong Kong Island based on quantitative Urban Morphologic Features (UMF).

Project Experience

Game Project – *Pixel Fantasy* February 2022 – May 2022

- Developed a complete Game Project, featuring a 3D ARPG with 2D Sprites. Most features are implemented from scratch based on OpenGL with no dependency on game engines.
- Achieved efficiency in collision detection using Bounding-Volume-Hierarchy (BVH) and indexing of the standing position of the character controlled by the player to reduce the search time for meshes during collisions.
- Set up a standard OpenGL rendering pipeline and programmed more advanced graphical effects including pixelation of our characters, shadow mapping, and Depth of Field.
- Incorporated a finite-state-machine AI with a variety of skills to fuel the fighting.

Graphics Projects (UG) February 2022 – May 2022

Completed the following projects using **C++** *with* **FLTK** *for GUI:*

- **Impressionist:** An interactive program for image processing where stylized output images could be automatically generated given an input, with sharpening, blurring, edge-detection, and alpha-blending.
- **Modeler:** An interactive program showing a 3D hierarchical model.
- **Ray Tracer:** A Ray Tracer with *Phong* illumination model and *Whitted*-style ray-tracing.
- **Animator:** An animation program with spline animation and particle system.

Graphics Projects (PG) September 2022 – December 2022

- **Geometry:** Implemented explicit and implicit Laplacian smoothing methods, and Laplacian mesh editing technique to deform mesh surface properly considering mesh geometry and topology.
- **Rendering:** Implemented rendering of volumetric cloud using fractal noise and Ray Marching technique.

Skills

Programming Languages: C/C++, Java, JavaScript, Python, SQL.

Tech Skills: OpenGL, WebGL, TensorFlow, Linux, MySQL, Oracle, Three.js, React.