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WORK EXPERIENCE

DriveCast — September 2021 — Present

Computer Vision RnD Engineer

- Conducted a study on bolide positioning in aggressive and high-speed movements. The work was done with ORB-SLAM3, OpenVINS, BASALT, DSO.
- A number of small additional tweaks were added to ORB-SLAM3, ORB-SLAM2, BASALT and DSO to meet our needs. Only mono/stereo visual information was used at this stage. Thanks to that I obtained a strong knowledge of the bundle adjustment methods.
- Performed GPS/INS/Visual loosely coupled fusion with OpenVINS. The INS/Visual result was fed to the optimization algorithm from Ceres to merge with GPS data.
- Studied in deep details loosely/tightly coupled fusion methods of GPS data with Kalman Filter. Designed a system to merge GPS data using internal OpenVINS KF in a loosely and tightly coupled manner. Now I'm working on implementing it.
- Well familiar with the extensions of KF: EKF, UKF. Familiar with the designs of the systems which fuse LiDAR, ultrasonic, multiple visual, GPS and V2X sensors. Familiarity with each of the mentioned sensors, where the noise comes from and the strategies to overcome it.
- Performed AR and 3D visualizations using the localization result. First I was using Pangolin library, then I moved to ROS Rviz system.
- For the AR tasks performed IMU & Visual calibrations, coordinates alignment, and time sensors time synchronization. I was setting up intrinsic parameters, and extrinsic parameters: transformations IMU2Camera, cam2cam1 etc.
- Conducted a study on POV rotating camera angle estimation, ORB-SLAM3 was used.
- Developed systems transmitting frame sequences by media protocols: NDI, GStreamer. The processed dat a (translation and rotation) were transmitted by UDP.
- Performed cross-platform development: Tweaked ORB-SLAM3 to build with VS2019 Windows.
- Designed and implemented solution for parallel computing problems with OpenMP in Fortran and C++

From Education:

- For diploma project I've implemented an approach which adapts ORB-SLAM3 and DSO for the Augmented Reality problem. I extract the pose of the camera in real time, and send it to the drawing, and I have a demo which draws AR objects from online camera pose.

QUALIFICATIONS

- Fortran/C/C++/Python. Modern C++11, C++14. Learning C++17. Skills with MTP and C++ Concurrency
- Classic algorithms and data structures
- C++ Libs: STL, DBoW2, g2o, Pangolin, Ceres Solver, Eigen3, OpenCV, LAPACK, OpenMP, CUDA.
- Linear & Numerical Linear Algebra, Projective geometry (quaternions, projective matrices, transformation: rot & trans matrices), Geometric algebra(a better approach to projective geometry), Theory of Graphs, Calculus

- Linux architecture & Bash, operating systems, computer architecture.
- Proficiency with ROS and CMake. Familiarity with Make and Ninja
- Feature-based and photometrical SLAMs. Familiarity with the new direction of SLAM using event-based cameras.
- IMU calibration, Mono/Stereo camera calibration, Sensor fusion, Pose Graph Optimization, Place recognition, Loop Closure.
- CNN, GAN, RNN. Familiar with Tensorflow and Pytorch. Image processing, classification. Performed camera plate recognition with YOLOv3 in Hackathon.
- Proficiency in English: IELTS is 7.0

EDUCATION

Bachelor, Mathematics and Computer Science — September 2018 — June 2022

People's Friendship University of Russia

- One of the best students at PFUR university. 75%+ are excellent grades.
- Winner of the "Digital Breakthrough" hackathon https://leadersofdigital.ru/ in 2021 competition
- Have been published in Russian journal "RINC" https://elibrary.ru/project_risc.asp? with our "Survey on Local Features" in Computer Vision
- Have attended the ITTMM conference from People's Friendship University of Russia with my diploma
- Diploma name: "Online camera localization from an image sequence or video"

Elective courses:

- Stanford university course on AI for Robotics: https://learn.udacity.com/courses/cs373
- Machine Learning by Andrew Ng
- Introduction to Deep Learning

Master, Mathematics and Computer Science — September 2022 — Present

People's Friendship University of Russia

Work on Geometric algebra methods for projective geometry to be performed ...

Erasmus Exchange Programme, Computer Science — October 2021 — March 2022

Hellenic Mediterranean University

Erasmus+ mobility program for 5 months in Greece, Crete.
Wrote the thesis on SLAM topic and got a maximum grade. All of the other subjects are also excellent.

REFERENCES

Eugene Liznev, CEO of DriveCast.
Mikhail Khachumov, assistant at IT department, People's Friendship University of Russia
Prof. Kostas Karampidis at Hellenic Mediterranean University, Crete, Greece
Prof. Papadourakis Georgios at Hellenic Mediterranean University, Crete, Greece
Gareth Owens, associate professor at Hellenic Mediterranean University, Crete, Greece