

# Advances in High Performance/Low Latency Simultaneous 3D Mapping, Localization and Tracking Technologies

An abstract geometric pattern consisting of numerous thin, light gray lines connecting small black dots of varying sizes. The dots are scattered across the white background, and the lines form a complex, interconnected web. Some lines are thicker than others, and some dots are larger, creating a sense of depth and structure. The overall effect is reminiscent of a network diagram or a stylized molecular structure.

Category: Software

# Problems this Research Would Address

- It is difficult to track many recent advancements in the field of 3D mapping, localization and tracking that are emerging from research and could be maturing sufficiently to improve AR experience delivery
- Shortage of detailed knowledge of these developments prevents customers and technology providers from making informed decisions.
  - Without foundations about these new capabilities, opportunities to use them in projects, products or services may be overlooked.
  - Investments in 3D mapping hardware may not be fully leveraged if they are rapidly out of date, inappropriate to target use cases or environments, by comparison with the emerging technologies

# Whose problem would be addressed?

- Enterprise decision makers will be better able to make informed choices about use of limited resources for internal AR projects and deployments
- Providers of AR software or services will be able to have better/productive discussions with technology partners, based on current and up-to-date information and to prioritize feature developments and have a roadmap for leveraging advances in simultaneous 3D mapping, localization and tracking

# How would this research be conducted?

1. Perform desk research to document latest advances in simultaneous 3D mapping, localization and tracking for AR and related fields
2. Perform analyses on research findings to identify trends, top categories of opportunity and risk, and document these in a report
3. Compile samples (videos and running code in public GitHub repositories) and instructions for their use (including any hardware) that members can follow to test and evaluate new algorithms
4. Develop a decision support tool for members to assess if/where there are suitable options for simultaneous 3D mapping, localization and tracking technologies emerging from research for use in enterprise AR deployments or products and services

# Project Deliverables

- Report of research findings describing current state of the art and future trends in clearly defined categories/segments of AR pipeline and ecosystem, including but not limited to latest research publications and centers, emerging companies/businesses, tech giants
- Sample content and open libraries with instructions for their use to test and evaluate emerging new algorithms
- Decision support tool for members to use when identifying the most suitable options for introducing advanced simultaneous 3D mapping, localization and tracking technologies in existing or new projects
- Executive summary of findings for public release and member exclusive webinar

# Benefits to AREA Members

- Increased knowledge, awareness and insights into the latest simultaneous 3D mapping, localization and tracking technologies, trends to watch and how to use these will permit better informed decisions and investments
- Through identification of use case and requirements, use of a tool will narrow down the different technologies to those best suited to meet the enterprise AR conditions
- Identification of potential technology partners that will differentiate future products and services by way of high performance/low latency 3D mapping, localization and tracking