# AREA Research Project on Best Practices of Merging IoT +AI+AR

Background

AREA members are increasingly managing real time data streaming from connected objects and spaces (aka IoT) and seek to reduce delays and errors, and increase key performance indicators by bringing those data into view in context for users to consider when taking actions in the real world.

For example, in the connected operating room there are medical devices continually capturing observations (data). These data could be sent to/received by an AI-based system and, based on data type and values and the stage in a procedure, the system determines what information is critical to the surgeon and/or other OR staff at the present time. The critical data would/can then be presented to the relevant healthcare professional via AR.

A plant floor is another environment in which data from multiple connected devices can be centralized and more manageably acquired (say, via a SCADA interface) and then used, via AI and AR, to guide service professionals or send a plant floor operator or manager to a specific instrument in need of attention.
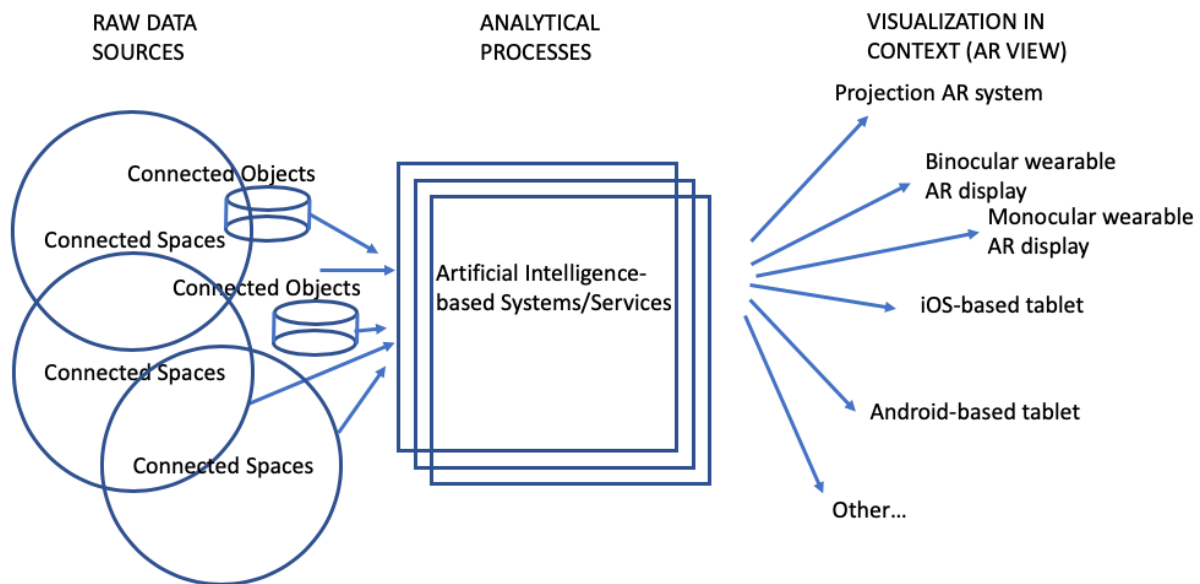
This research project seeks to increase dialog between stakeholders in enterprises and suppliers of IoT, AI and AR technologies and to propose potential courses of action to address (lower the impacts of) at least the following two challenges facing enterprises who seek to combine IoT, AI and AR in the workplace:

- Low ability to plan (in order to secure resources and adapt procedures) for how, where and when to expose real time data streaming from diverse (controlled, third party, unsecure) connected objects and spaces (aka IoT) to be visualized for use in the workplace/workflow context due to low visibility on the evolution of the converging technologies.
- Lack of guidance, requirements and best practices for choosing and deploying IoT and Artificial Intelligence-based solutions to receive/analyze (in real time) the data streams produced by IoT/connected objects, and to have AI-based solutions automatically identify what (which data, raw or post-processed?) a specific user (considering the user's roles/responsibilities and certifications) needs to visualize selected data streams in AR view and to format or present the data without manual interventions or special effort on behalf of the user or IT manager.

Scope of Research

The AREA research project will perform analysis of current IoT, AI and AR technology trends in order to answer at least the following question for members.

1. Capture current state of the art
   a. How have these three technologies been integrated and who is doing it?
   b. What industries are integrating these technologies today?
   c. What are the use cases in which these technologies are being combined/integrated best (or at all)?
   d. What are the maturity levels (Low, Medium, High) of the components in these technology segments?
2. What characteristics in an enterprise, or in a particular block of technologies will make integration of IoT, AI and AR more or less viable?
3. What are - the order of importance - key enablers needed to integrate technologies to maximize the value proposition of AR?

4. What issues will companies looking to integrate these three capabilities need to consider? For example,
   a. Business objectives and alignment
   b. Network security and accessibility requirements and other deployment challenges associated with AI in cloud-based architectures
   c. Data requirements
   d. Analytics requirements
   e. Augmented Reality requirements
   f. Technology requirements
   g. Ownership of delivering solutions (IT, Operations, R&D)
5. What requirements (technologies, partners, etc), on top of those required when implementing the individual technologies, emerge when integrating these capabilities?
6. Similarly, what new capabilities will companies need to develop / acquire to successfully integrate IoT, AI and AR
7. What are some ideal future states (scenarios) towards which enterprises and providers should be planning?

Deliverables

This AREA research project will produce three deliverables:

- A written report containing the results of research and analysis with recommendations and a bibliography of sources and appendix with list of experts who contributed to the research
- An interactive evaluation framework or decision support matrix using the research findings (delivered in the form of a spreadsheet)
- A 2500-3000 word case study which can be published on the AREA Web site

Timeline

This AREA research project will begin upon signature of a binding contract with the AREA and continue for 75 days, or until the project deliverables are accepted. The research supplier will include as part of the proposal a detailed timeline with milestones.

Fees

The full fee for the AREA research project is $15,000 and will be dispersed in two equal amounts in accordance with terms and conditions stipulated in the AREA standard contractor agreement: at project initiation and upon delivery of the final deliverables