

**FIT4005/FIT5125/FIT5143
Research Methods in IT**

**Week 12 Assessment – Impact Declaration
Assessment Template**

Student Name: Ziqi Pei
Student Number: 33429472
Tutor Name: Pranita Shrestha

RESEARCH PROJECT TITLE

"Nebula: Revolutionizing Virtual Reality with Olfactory Integration"

SUMMARY / BACKGROUND

Human perception thrives on multisensory experiences, yet the olfactory sense has remained largely untapped in virtual reality (VR). Nebula, our groundbreaking project, is on the cusp of redefining XR by incorporating smell into the virtual world. This article explores the potential of Nebula to enhance sensory immersion in AR/VR/MR/XR technologies.

WHAT IS THE PROBLEM BEING TACKLED? (max 50 words)

The problem is the underutilization of olfaction in XR technologies. While visuals and sounds dominate the virtual realm, smell remains an uncharted territory. Nebula seeks to solve this problem by introducing an affordable and open-source olfactory display for VR headsets.

WHAT IS THE POTENTIAL SOLUTION / APPLICATION FOR A PARTNER? (max 50 words)

Nebula offers a comprehensive solution to the problem by providing an open-source and cost-effective olfactory display. The device's design and functionality make it an ideal candidate for enhancing VR experiences. It can be seamlessly integrated with both PC VR and autonomous head-mounted displays, offering portability and ease of use. Nebula is a valuable tool for partners in the VR industry looking to provide users with more immersive and engaging experiences.

WHAT IS THE IMPACT/HOW DOES IT MAKE THE INDUSTRY PARTNER SUCCESSFUL (max 50 words)

The impact is two-fold. Firstly, Nebula introduces a new dimension of sensory engagement in XR, elevating the user experience and driving higher user satisfaction. This aligns with partners' ROI goals, as satisfied users are more likely to engage with XR products. Secondly, by adopting Nebula, partners can stay ahead of technology trends, potentially increasing sales and achieving their KPIs.

WHAT IS THE TECHNOLOGY BEING USED? (max 50 words)

Nebula utilizes advanced olfaction engineering to make smell experiences possible in XR. This technology involves the analysis of specific scents at a molecular level, replicating human reactions to

different molecular combinations. Nebula diffuses scents in real-time, synchronizing with XR experiences to create immersive multisensory encounters.

Olfaction engineering plays a pivotal role in making smell experiences possible in XR. This technology involves the analysis of specific scents on a molecular level, recreating human reactions to various molecular combinations. Devices like the ION, Vaqso, Feelreal, and Aroma Shooter utilize these principles, diffusing scents in real-time, in coordination with XR experiences.

IS THERE POTENTIAL TO PATENT THIS WORK? (max 50 words)

Yes, there is potential to patent specific aspects of olfaction engineering in XR devices like Nebula, such as innovative scent delivery methods, scent cartridges, and integration mechanisms. Patenting can protect these innovative solutions, ensuring a competitive edge.

POTENTIAL CONFLICTS WITH EXISTING PRIOR ART? (max 50 words inc. links to prior)

Nebula addresses the challenge of limited availability and reproducibility of olfactory displays. It does not directly conflict with existing prior art but rather aims to complement and expand the capabilities in the field of VR. Nebula and similar XR devices build upon previous attempts to incorporate scent into virtual experiences. They do not conflict with existing prior art but rather expand and enhance the use of olfaction in XR.

WHAT IS THE COMMERCIAL POTENTIAL OF THIS RESEARCH? (max 50 words)

The commercial potential is significant. Partners across industries, such as entertainment, gaming, therapy, and retail, can benefit from integrating Nebula into XR devices. This opens new market opportunities and positions them as technology leaders, catering to users seeking comprehensive sensory immersion.

WHICH INDUSTRIES CAN BENEFIT FROM THIS RESEARCH, WHY? (max 50 words)

Industries such as entertainment, gaming, and therapy can benefit the most. By providing users with multisensory experiences, they can enhance user engagement and satisfaction. Additionally, retail applications that use scent marketing can create unique and immersive customer experiences, increasing sales and customer loyalty.