

Innovative and Integrated Product Design Concepts

Applications in Medical mask refurbishing
equipment, joint-awareness music player,
art installation display.

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Approaches on Medical Mask
Refurbishing Equipment, Joint-awareness
Music Player, Art Installation Display

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Preface

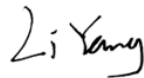
This book delves into the synergistic application of art design and engineering in projects, providing readers with detailed analysis of a series of typical design cases. From the earliest stages of a project, we look at problem identification and resolution and demonstrate the creative process by extrapolating diverse solutions. As the project progresses, the book details the importance of structural design and how to effectively set up functionality throughout the process. Through these examples, readers will gain a deep understanding of the synergistic operation of art design and engineering technology.

We dig deeper into the integrated application of art design and engineering technology in project development. We focus not only on problem identification, but also on the whole process of refining innovative solutions. From the initial viewpoint of the project, the book presents in detail the key steps in blending artistry and technology in the derivation of the solution.

In exploring the depth of the project, we highlight the key role of structural design throughout the process and provide insights into how to effectively set the functional requirements of the project. The aim of this book is to provide readers with a comprehensive perspective through in-depth case studies, enabling them to appreciate the unique value of synergistic innovation between artistic design and engineering in projects. Such insights will provide readers with strong support in making judgments and decisions in real projects.



Nankai Cheng



Li Yang



Puyuan Jiang

Table of Contents

An Integrated World	1
Mouthpiece Refurbishment Equipment	2
Allied Senses Sound Design	2
Installation Art	2
Sustainable Equipment for Masks	4
Background: Masks and Pollution	4
1. Contamination from Discarded Masks	4
2. Single-use Properties	6
3. The Future of Medical Mask Programs	7
Reuse of Masks	12
The Working Principle of Medical Masks	13
Why Masks Are Single-use?	15
Methods of Refurbishing Medical Masks	16
Summary of Methods for Refurbishing Medical Masks	18
Safety of UV Disinfection	21
Safety of the Dehumidification Function	21
Charge Function and Safety	22
Design Sketch	23
.....	24
Design Proposal	24
Base Structure	26
Blueprint	30
Neuron Standard Interface	33
Synthetic Design Practice: The Smell of Music	33
Introduction	33
Background	34
Research Significance and Innovation	35
The Nexus of Emotion and Design	36
Designing the Multisensory Music Experience	36
Ways to Vent Negative Emotions	38
Analysis of 4 Types of Music	40
Odor Analysis	46
Design Practice	49
Product Sketches and Structural Analysis	52
Conclusion	61
Neuron Standard Interface	62
Section of the Universe	67
Inspiration and Goal	67
.....	69
Structure and Operation of the Project	69
Expected Final Effect	71
References	73

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ISBN: 979-8-218-97139-7

An Integrated World

Art, design, and engineering, though separate in discipline, are intertwined and complementary in practical application. This synthesis is not only theoretically important, but also demonstrates the power of innovative and integrative thinking in practice.



In order to gain insight into the interplay between these three domains, we will illustrate how they converge with each other in specific projects through three main case studies.

The three case studies provide a clear demonstration of how art, design and engineering are interdependent and mutually reinforcing in real-world projects, working together to drive innovation and relevance. Through these interdisciplinary collaborations, we are able to see more diverse and integrated creative solutions.

Sustainable Equipment for Masks

Background: Masks and Pollution

Throughout human history, various viruses and bacteria have constantly posed threats to human health. Particularly during the COVID-19 pandemic, over 600 million people globally have been infected with the virus, with deaths exceeding 6 million. The pandemic has severely impacted the lives of people worldwide and inflicted substantial economic losses globally. In the face of this epidemic, most people have opted to wear masks as a protective measure. However, during the COVID-19 era, the extensive use and improper disposal of disposable masks have highlighted their environmental impact¹, necessitating an urgent need for design optimization².

The primary issue lies in the main materials of masks, such as melt-blown fabrics and other plastics, which are difficult to degrade naturally, leading to significant environmental pollution. Under these circumstances, the flaws in mask design become increasingly evident. In recent years, global design communities have actively proposed plans and ideas for innovative mask designs, aiming to enhance the efficiency and eco-friendliness of masks. However, due to technical and cost constraints, these innovative designs face numerous challenges in practical application.

To address these issues, this study aims to conduct an in-depth analysis of the main problems in current mask usage and explore potential solutions. This includes, but is not limited to, researching more environmentally friendly materials, improving mask design to increase comfort and efficiency, and exploring more effective methods for the disposal and recycling of used masks. Additionally, the study will investigate strategies to better prepare for and manage similar crises in the future, aiming to protect public health while mitigating environmental impact.

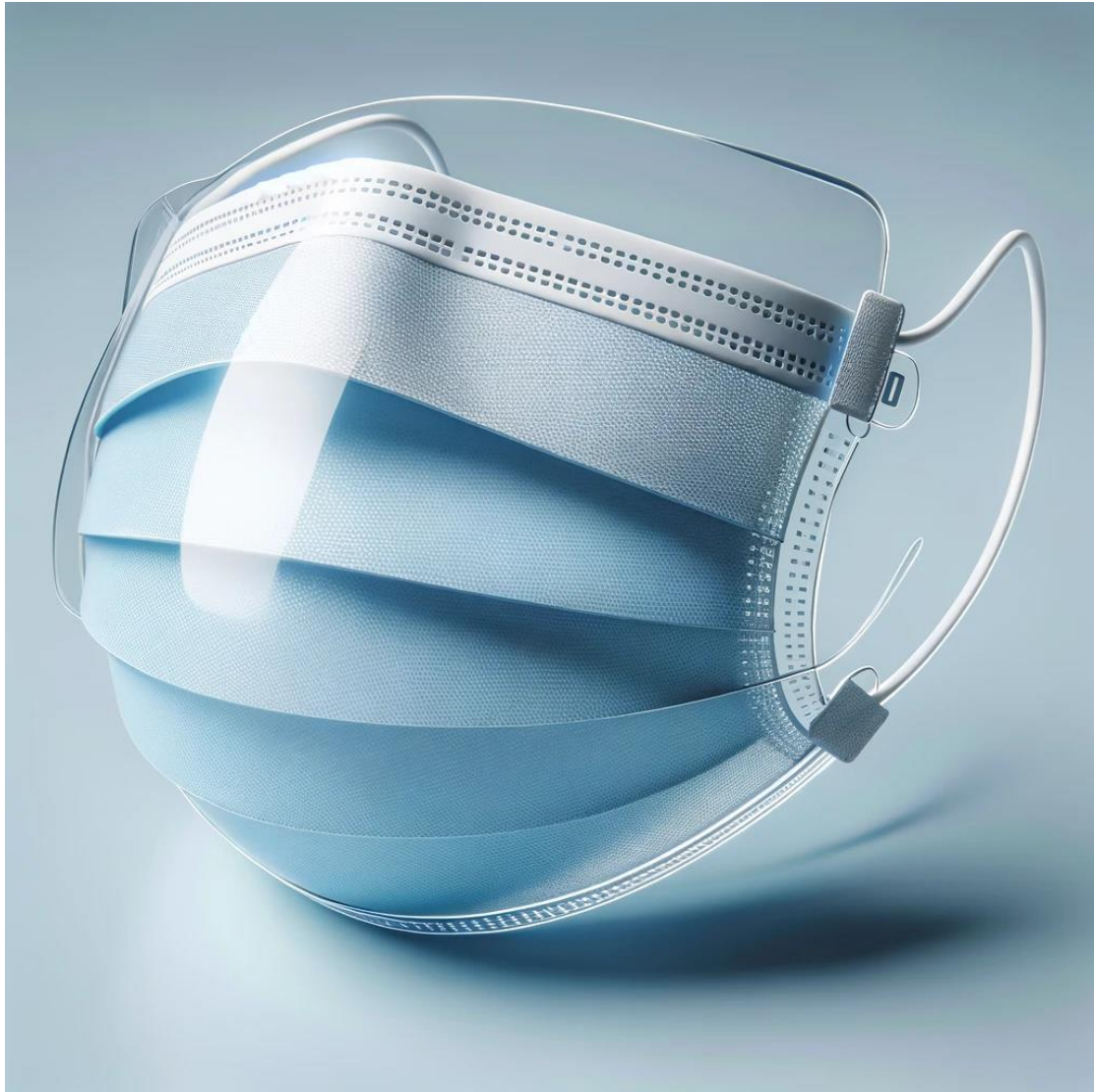
¹ Sullivan, G. L., Delgado-Gallardo, J., Watson, T. M., & Sarp, S. (2021). An investigation into the leaching of micro and nano particles and chemical pollutants from disposable face masks-linked to the COVID-19 pandemic. *Water research*, 196, 117033.

² Babaahmadi, V., Amid, H., Naeimirad, M., & Ramakrishna, S. (2021). Biodegradable and multifunctional surgical face masks: A brief review on demands during COVID-19 pandemic, recent developments, and future perspectives. *Science of the Total Environment*, 798, 149233.



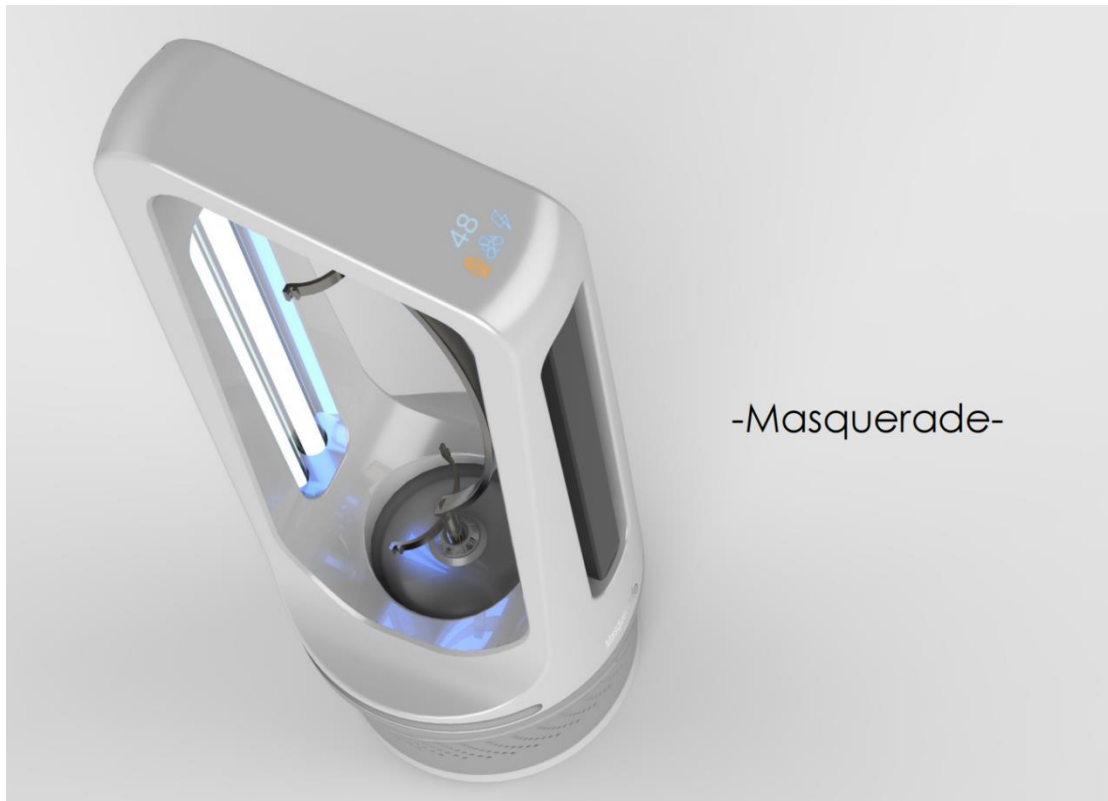
3. The Future of Medical Mask Programs

People have continuously strived to innovate in the design of medical masks. We have compiled and analyzed a variety of new medical mask design schemes that have emerged in recent years. These novel mask designs appear very advanced visually, featuring attractive shapes, exquisite craftsmanship, and comfortable colors and materials. However, these designs often remain mere aspirations for the future of masks. If the design of masks does not fundamentally change the mechanism for filtering viruses and bacteria (still relying on the physical barrier and electrostatic adsorption of melt blown fabric for filtration) and lacks breakthroughs in material innovation, then achieving a comprehensive renovation of medical masks will be quite challenging. Furthermore, such innovative designs could lead to a significant increase in the production cost of masks, which contradicts the original intention of solving the environmental pollution issue of masks. It is evident that most of these new designs cannot provide distinct advantages or solve practical problems in the current context.









Neuron Standard Interface

Synesthetic Design Practice: The Smell of Music

Introduction

In this rapidly advancing world, people are compelled to confront significant pressures stemming from work, interpersonal relationships, and life transitions. Amidst this tumult, music therapy emerges as a tranquil oasis, akin to a serene ocean, serving as a refuge for many seeking peace. The current study delves deeply into the potency of music therapy, not only in alleviating psychological stress but also in cultivating self-confidence and a positive mindset. It explores the potential of music as an intrinsic force capable of healing the modern psyche.

The focus shifts towards a demographic often entangled in stress and anxiety: the modern individual. Within this research, an intricate user profile is meticulously crafted, dissecting the unique lifestyles and challenges faced by those immersed in high-stress environments such as corporate workers and students. The need to identify innovative approaches to seamlessly integrate stress management into their daily lives becomes apparent³.

Music therapy stands out as a beacon of hope in this landscape, promising not just an escape but a transformation of the emotional experience⁴. This study is dedicated to harnessing the full power of music, expanding the therapeutic experience to a multisensory realm, encompassing sight, touch, and even scent⁵. It aims to provide a comprehensive sensory encounter tailored for stress relief and emotional well-being. By outlining the daily scenarios of our target users—from serene moments at home to the daily commute—the goal is to formulate a music therapy strategy that is both supportive and unintrusive. This user-centric approach not only seeks to mitigate the adverse effects of stress and anxiety but also resonates deeply with the needs and preferences of the individual, offering a pathway to emotional harmony and sensory balance.

³ Jakupčević, K. K., Ercegovac, I. R., & Dobrota, S. (2021). Music as a tool for mood regulation: the role of absorption vs. Mindfulness. *Primenjena psihologija*, 14(2), 229-248.

⁴ Velasco, C., Balboa, D., Marmolejo-Ramos, F., & Spence, C. (2014). Crossmodal effect of music and odor pleasantness on olfactory quality perception. *Frontiers in psychology*, 5, 1352.

⁵ Morrin, M., Chebat, J. C., & Gelinias-Chebat, C. (2011). The impact of scent and music on consumer perceptions of time duration. In *Sensory Marketing* (pp. 123-134). Routledge.



Innovative and Integrated Product Design Concepts

This insightful and comprehensive book explores the interrelationships between art, design, and engineering, revealing their synergies and creative potential in real-world projects. We illustrate how the creativity of art, the practicality of design, and the technicality of engineering intertwine to drive project innovation and successful implementation. Several case studies highlight the significance of this integrated approach, emphasizing the indispensable nature of interdisciplinary collaboration. For readers interested in interdisciplinary collaboration, the book offers insightful perspectives, inspiring them to contemplate the application of this comprehensive mindset in their respective fields. Overall, it is a thought-provoking work that provides readers with insights into the boundless possibilities when navigating the intersections of art, design, and engineering.

Publisher: Sigma Xplore, LLC
Website: www.sigmaxplore.com
Email: pub@sigmaxplore.com

ISBN 979-8-218-97139-7



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