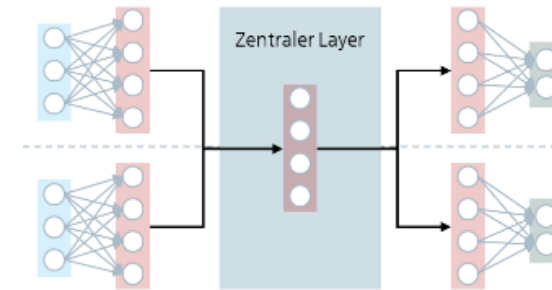


Untersuchung von Kompensationsmechanismen im Verteilten Maschinellen Lernen: Interviewstudie und Literaturanalyse

Motivation

Die zunehmende Verfügbarkeit **strukturierter Daten** eröffnet Unternehmen neue Möglichkeiten zur Entwicklung **strategischer Entscheidungsunterstützungssysteme** auf Basis von maschinellen Lernmodellen. Anstatt auf unternehmensinterne Modelle zu setzen, arbeiten Firmen zunehmend zusammen, um Modelle mit **komplementären Daten** für **gemeinsame Ziele** zu trainieren. Insbesondere **verteilttes maschinelles Lernen** wie **föderiertes** oder **Split-Learning** zeigt hier großes Potenzial, da es den Austausch von Rohdaten vermeidet und **Datenschutzbedenken** reduziert. Allerdings profitieren Unternehmen, die **viele hochwertige Daten** bereitstellen, möglicherweise weniger vom **globalen Modell**, was zu wahrgenommener **Ungerechtigkeit** und einer ablehnenden Haltung gegenüber gemeinschaftlichen Ansätzen führen kann. Um sicherzustellen, dass Beiträge **fair entlohnt** werden, stellt sich die Frage nach geeigneten **Kompensationsmechanismen**. Diese Fragestellung soll in der **Abschlussarbeit** mithilfe von **Experteninterviews** und einer **Triangulation mit wissenschaftlicher Literatur** untersucht werden.



Fragestellung

1. Welche Fairness-orientierten Kompensationsmechanismen existieren, um ungleiche Modellbeiträge in verteilten maschinellen Lernumgebungen auszugleichen?
2. Mit welchen Vor- und Nachteilen gehen diese jeweils aus der praktischen Perspektive einher?

Literatur

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Erfolgsfaktoren und Handlungsempfehlungen für den Aufbau digitaler Plattformen in etablierten Unternehmen: Erkenntnisse aus der Praxis

Motivation

In einer Wirtschaft, die zunehmend von **digitalen Plattformen** geprägt ist, streben immer mehr **etablierte Unternehmen** mit traditionellen, produktzentrierten Geschäftsmodellen danach, digitale Plattformen in ihre **Betriebsabläufe** zu integrieren. Die aktuelle Forschung beleuchtet theoretisch verschiedene **Erfolgsfaktoren** digitaler Plattforminitiativen. Trotz steigender wissenschaftlicher Aufmerksamkeit bleibt jedoch weitgehend unklar, welche konkreten **Handlungsoptionen** Unternehmen nutzen können, um die **Erfolgschancen** beim Aufbau solcher Plattformen zu steigern. Ebenso fehlen **praxisnahe Ansätze** zur Bewertung der Ausgangssituation von Unternehmen entlang verschiedener Dimensionen. Ziel dieser Abschlussarbeit ist es, durch eine **Literaturrecherche** und gezielte **Experteninterviews** wertvolle **Einblicke** in diese Fragestellungen zu gewinnen.

Handelsblatt

DIGITALE TRANSFORMATION

Plattformgeschäfte als Innovationsmotor

Plattformen gelten als Heilsbringer der digitalen Transformation. Skalierbarkeit, Rentabilität und Agilität zeichnen sie aus. Kein anderes Geschäftsmodell wuchs in den letzten 20 Jahren so rasant.

Fragestellung

1. Welche Handlungsalternativen ergeben sich für Unternehmen, um ihre Erfolgswahrscheinlichkeiten für den Aufbau digitaler Plattformen zu erhöhen?
2. Wie lassen sich die in Arnold et al. (2024) beschriebenen Erfolgsfaktoren für digitale Plattformen aus praktischer und akademischer Sicht messen?

Literatur

- Teece, D., Pundziene, A., Heaton, S., and Vadi, M. 2022. "Managing Multi-Sided Platforms: Platform Origins and Go-to-Market Strategy," CALIFORNIA MANAGEMENT REVIEW (64:4), 48pp. 5-19. (<https://doi.org/10.1177/00081256221109961>)
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Twin Transforming Sports - Identifikation datengetriebener Lösungen für die Dekarbonisierung in der Sportbranche

Motivation

Nachhaltigkeit und Dekarbonisierung gewinnen in der Sportbranche zunehmend an Bedeutung. Sportveranstaltungen, Stadien und Prozesse verursachen hohen Energieverbrauch und Umweltbelastungen, bieten aber auch großes Potenzial zur CO₂-Reduktion und Verbesserung der ökologischen Bilanz - etwa durch effizientere Ressourcennutzung, erneuerbare Energien oder nachhaltigere Veranstaltungsgestaltung.

Datengetriebene Ansätze und Optimierungsmethoden können dabei helfen, Energieeffizienz zu steigern und Umweltbelastungen zu minimieren. Technologien wie intelligentes Gebäudemanagement, IoT-Systeme und KI-Modelle ermöglichen präzise Analysen, Prognosen und optimierte Ressourceneinsätze, um Sportorganisationen auf dem Weg zur Klimaneutralität zu unterstützen. Ziel dieser Arbeit ist die Entwicklung eines Konzepts, wie datengetriebene Lösungen effektiv zur Nachhaltigkeitsstrategie der Sportbranche beitragen können - von der Identifikation relevanter Einsatzbereiche bis zur Übertragung bewährter Ansätze aus anderen Branchen.

Fragestellungen

1. Welche datengetriebenen Ansätze existieren bereits zur Reduktion von CO₂-Emissionen im Sport, und wie können diese weiterentwickelt werden?
2. Wie lassen sich Nachhaltigkeitsziele und ökologische Kennzahlen in bestehende Optimierungsalgorithmen integrieren?

Literatur

- Cury, R., Kennelly, M., & Howes, M. (2022). Environmental sustainability in sport: a systematic literature review. *European Sport Management Quarterly*, 23(1), 13-37. <https://doi.org/10.1080/16184742.2022.2126511>
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Digitale Zwillinge und ihre nachhaltigen Potenziale im Sport

Motivation

Die Sportbranche steht angesichts des Klimawandels und zunehmender gesellschaftlicher Erwartungen unter dem Druck, ihre ökologischen Auswirkungen zu reduzieren. Gleichzeitig eröffnet die fortschreitende Digitalisierung neue Möglichkeiten zur Effizienzsteigerung und Ressourcenschonung. Eine besonders vielversprechende Technologie ist der Digitale Zwilling (Digital Twin) - ein virtuelles Abbild realer Systeme, das Daten in Echtzeit sammelt, simuliert und zur Optimierung nutzt.

Während Digital Twins in der Industrie und im städtischen Kontext bereits gezielt zur Unterstützung von Nachhaltigkeitszielen eingesetzt werden (z. B. Energieeffizienz, Emissionsreduktion), ist ihr Einsatz im Sportbereich bislang kaum systematisch erforscht. Erste Anwendungen - etwa zur Steuerung des Stadionbetriebs oder zur Planung nachhaltiger Events - sind erkennbar, eine umfassende wissenschaftliche Analyse fehlt jedoch. Zudem werfen Aspekte wie Kosten, technologische Infrastruktur und Fachkompetenz im Sport spezifische Fragen zur Umsetzbarkeit auf. Ziel der Arbeit ist es, das Konzept des Digital Twins im Sportkontext grundlegend darzustellen und seine ökologischen Potenziale sowie Umsetzungshürden kritisch zu untersuchen

Fragestellungen

1. Wie und in welchen Anwendungsfeldern lassen sich Digital Twins zur Förderung von ökologischer Nachhaltigkeit im Sport integrieren?
2. Welche Herausforderungen stellen sich bei der Implementierung digitaler Zwillinge im Sport?

Literatur

- Hliš, T., Fister, I., Fister, I. (2024) Digital twins in sport: Concepts, taxonomies, challenges and practical potentials. Expert Systems with Applications, 258, <https://doi.org/10.1016/j.eswa.2024.125104>
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Barriers to the Scaling and Sustained Adoption of Collaborative Distributed Machine Learning (CDML) in Healthcare

Motivation

Artificial intelligence is becoming increasingly relevant in healthcare, for example in diagnostic support, risk detection, and clinical decision-making. At the same time, effective machine learning models require large and diverse datasets, which in healthcare are often distributed across multiple organizations and cannot easily be centrally pooled due to privacy, regulatory, and data sovereignty concerns. In this context, Collaborative Distributed Machine Learning (CDML), including federated learning, split learning, and hybrid variants, is increasingly seen as a promising approach because it enables cross-organizational model training without requiring the exchange of sensitive raw data. Despite this potential, sustained implementation in practice remains limited. Many CDML initiatives still remain at the stage of pilots, prototypes, or isolated collaborations. A possible topic in this area is the investigation of barriers that hinder the implementation, scale-up, and long-term sustainability of CDML in healthcare. The focus lies less on technical model performance and more on the organizational, regulatory, and interorganizational conditions that shape adoption in real-world settings.

Methodologically, such a thesis could be designed as a qualitative study. Semi-structured expert interviews with stakeholders from hospitals, IT and data infrastructure, management, technology providers, regulatory bodies, and related organizations could be used to explore key challenges and compare different perspectives. For a bachelor's thesis, approximately 12 to 15 interviews would be appropriate; for a master's thesis, approximately 15 to 25.

Fragestellung

1. What barriers hinder the implementation, scale-up, and sustained adoption of Collaborative and Distributed Machine Learning in healthcare?
2. How do different stakeholder groups perceive the organizational, regulatory, and technical challenges of implementing CDML in healthcare?

Literatur

- Jin, D., Kannengießer, N., Rank, S., & Sunyaev, A. (2024). *Collaborative Distributed Machine Learning*. *ACM Computing Surveys*, 57(4), Article 3704807. <https://doi.org/10.1145/3704807>
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Collaborative Distributed Machine Learning in Professional Sports: Conceptual Foundations and Adoption Conditions

Motivation

Artificial intelligence is becoming increasingly relevant in professional sports, for example in player performance and injury prediction, tactical analytics, fan engagement and personalization, as well as scouting and talent identification. At the same time, many of these use cases require large, diverse, and longitudinal datasets that are typically distributed across clubs, leagues, federations, and technology providers. Since single-club datasets are often too limited in size, scope, or representativeness, cross-organizational collaboration may be necessary. However, such collaboration is difficult because sports organizations remain competitors and may be reluctant to share strategically sensitive or player-related data. Collaborative Distributed Machine Learning (CDML), including federated learning and related approaches, therefore represents a promising alternative, as it enables collaborative model development without centrally pooling sensitive raw data.

A thesis in this area can be structured in two complementary parts, which may be addressed either separately or jointly. The first part focuses on the conceptual foundations of CDML in professional sports. It examines which interorganizational use cases are plausible, which actors and roles would be involved, and how such initiatives could be governed. This part is particularly suitable for a structured literature review and document analysis. The second part focuses on organizational adoption conditions, including barriers, enablers, and participation requirements for leagues, federations, or comparable organizations. This part is particularly suitable for a qualitative expert interview study informed by an established technology adoption framework.

Fragestellung

1. How can collaborative distributed machine learning initiatives in professional sports be conceptually structured?
2. Which factors influence the adoption of collaborative distributed machine learning initiatives in professional sports organizations?

Literatur

- Jin, D., Kannengießer, N., Rank, S., & Sunyaev, A. (2024). Collaborative Distributed Machine Learning. *ACM Computing Surveys*, 57(4), Article 3704807. <https://doi.org/10.1145/3704807>
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From 2D Screens to Virtual Offices: Exploring Immersive Work Environments

Motivation

Work environments have evolved from primarily stationary work to mobile and virtual work (Messenger & Gschwind, 2016), offering well-documented benefits such as lower real estate costs, increased employee commitment, and higher productivity levels (Adamovic et al., 2022). However, virtual work also introduces challenges: spatial decoupling demands additional communication and team management skills (Akkirman & Harris, 2005; Cascio, 2000), while disruptive audiovisual factors in suboptimal work environments can negatively impact productivity (Moskaliuk et al., 2017). Immersive virtual 3D work environments powered by VR are proposed as a promising solution to these challenges (Grubert et al., 2018; Hofma et al., 2017). VR enables the creation of customized, realistic virtual environments largely independent of actual time and space (Akpan & Shanker, 2017), and has already demonstrated its potential in fields such as manufacturing, healthcare, and customer engagement (Jiang & Benbasat, 2004; Nah et al., 2011; Peukert et al., 2019). However, despite these findings, its effects in the context of traditional office work remain insufficiently studied (Akpan & Brooks, 2014). In particular, it remains unclear whether immersive 3D virtual work environments offer meaningful added value over conventional 2D monitors for both employers and employees.

The thesis is methodologically open and may employ either a qualitative or a quantitative research design to examine immersive virtual 3D work environments in comparison to conventional 2D work environments. Depending on the research focus, the study may be based on qualitative methods (e.g., semi-structured interviews) or quantitative methods (e.g., standardized surveys or experiments). The chosen methodology must be theoretically grounded and appropriately justified.

Fragestellung

1. How can immersive virtual 3D work environments be compared to conventional 2D work environments in terms of productivity and employee well-being?
2. Which factors influence the adoption and acceptance of immersive virtual work environments in organizational contexts?

Literatur

- Adamovic, M., Gahan, P., Olsen, J., Gulyas, A., Shallcross, D., & Mendoza, A. (2022). Exploring the adoption of virtual work: the role of virtual work self-efficacy and virtual work climate. *The International Journal of Human Resource Management*, 33(17), 3492-3525. <https://doi.org/10.1080/09585192.2021.1913623>.
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- Hofma, C. C., Avital, M., & Jensen, T. B. (2017). Liquid Workplaces: The Potential Implications of Virtual Reality on the Workplace, 9(8) (Selected Papers of the IRIS).

Who Am I? Designing Inclusive Avatars for Identity, Embodiment, and Self-Expression in Virtual Environments

Motivation

Virtual environments are increasingly becoming spaces for social, professional, and recreational interaction, in which avatars serve as the primary medium of self-representation, enabling users to express identity, embody presence, and engage with others in immersive ways. Unlike traditional online representations, avatars in virtual environments allow for multidimensional self-expression through appearance, movement, and behavior. Prior research suggests that avatars can function both as representations of the self and as distinct digital identities, enabling users to explore stable as well as alternative possible selves, and may foster psychological outcomes such as autonomy, empathy, and enhanced presence, even when visual similarity between user and avatar is low (Bujčić et al., 2025). At the same time, current VR platforms often provide limited and non-inclusive customization options, implicitly privileging certain bodies, genders, ethnicities, and abilities, thereby restricting identification, representation, and inclusivity in virtual environments (Yang et al., 2025). There is therefore a need to better understand how avatar design, embodiment, and self-presentation norms shape identity construction, social interaction, and inclusion.

Building on existing conceptual frameworks and user-centered insights, this thesis should adopt a Design Science Research (DSR) approach to develop technology-diagnostic meta-requirements and design principles for inclusive avatar systems (Sonnenberg & Vom Brocke, 2012), intended to support VR designers and organizations in creating more flexible, inclusive, and identity-affirming virtual environments.

Fragestellung

1. How can inclusive avatar design principles be conceptualized to support identity expression, embodiment, and diversity in virtual environments?
2. Which meta-requirements and design principles enable VR platforms to provide flexible, inclusive, and identity-affirming avatar systems?

Literatur

- Bujčić, M., Macey, A. L., Kerous, B., Buruk, O., & Hamari, J. (2025). Virtually better: Multi user experiment on avatar self-representation, self-discrepancies, avatar style and self perceptions in a VR collaboration. *new media & society*, 14614448251323904.
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