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ABOUT ME

I'm a Master's student at the Nara Institute of Science and Technology, Japan, with a background in Information Science. My work focuses on leveraging AI, AR, and VR technologies to enhance physical therapy, medical training, and rehabilitation. I have a passion for developing innovative solutions that combine software engineering, computer vision, and interactive media design.

WORK EXPERIENCE

Master's Student | Researcher

Interactive Media Design Laboratory [01/10/2023 – Current]

Address: 8916-5 Takayama-cho, 630-0192 Ikoma (Japan)

- Currently engaged in a research project titled "Experience Augmentation in Physical Therapy by Simulating Patient-Specific Walking Motions," utilizing the HumanML3D dataset.
- Supervised by esteemed lab supervisor Professor Hirokazu Kato and other Assistant Professor Taishi Sawabe and Isidro Butaslac
- Focused on developing innovative solutions that enhance physical therapy through the simulation of individualized walking motions.
- Contributing to cutting-edge research aimed at improving therapeutic outcomes for patients in rehabilitation settings by providing immersive 3D motion simulations.
- Leveraging expertise in Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) to create dynamic, patient-specific motion representations.
- Applying generative AI techniques and large language models (LLMs), including BERT, to analyze and generate impaired human motion data for improved therapeutic applications.

Research Collaborator

Kyoto University [03/2024 – Current]

Address: 54 Kawahara-cho, Shogoin, Sakyo-ku, 606-8507 Kyoto (Japan)

- Collaborating with professors Goshiro Yamamoto, Chang Liu and Hiroaki Ueshima from the Clinical Research Center for Medical Equipment Development.
- Engaged in research titled "Experience Augmentation in Physical Therapy by Simulating Patient-Specific Walking Motions," enhancing rehabilitation outcomes through advanced simulation techniques.
- Involved in multidisciplinary projects focused on optimizing rehabilitation practices in physical therapy settings.
- Integrating generative AI and LLMs, such as BERT, to improve therapeutic interventions and enhance patient communication.
- Leveraging Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) to develop interactive tools that facilitate immersive learning experiences for physical therapists by simulating a wide range of impaired gait patterns.

Team Lead - Software Quality Assurance Engineer

Talent Pro [15/06/2022 – 31/08/2023]

City: Dhaka | **Country:** Bangladesh

- Led the QA efforts and managed testing processes for various projects at TalentPro.
- Created and executed test plans, test cases, and designed automation test scripts.
- Conducted test execution result analysis.
- Specialized in Appium, Selenium WebDriver, TestNG, and Cucumber within Java-based automation frameworks (TDD, BDD).
- Managed API testing, performance testing, security testing, and database testing using REST Assured and GraphQL.

Senior Software Quality Assurance Engineer

RealEzy (Singapore) [15/06/2022 – 31/08/2023]

Address: 10 Anson Rd, Suite 22-03A International Plaza, 079903 (Singapore)

Singapore-based project under TalentPro

- Hired by RealEzy, a leading Singapore real estate platform, for a dedicated QA role on their project.
- Responsible for automating test processes, designing test plans, and ensuring software quality through manual and automated testing.
- Worked extensively with Appium, Selenium, and Java-based automation frameworks to streamline testing efforts for RealEzy's platform.
- Performed API, performance, and security testing using REST Assured, ensuring optimal functionality for the platform.

Team Lead - Software Quality Assurance Engineer

Fanfare (Bangladesh) [03/2023 – 05/2023]

Address: 51 Satmasjid Road Dhanmondi, 1209 Dhaka (Bangladesh)

Bangladesh-based project under TalentPro

- Assigned to Fanfare, a social commerce platform, to ensure quality in their software releases for three months.
- Developed and executed test plans, test cases, and automated testing scripts to support the platform's quality assurance.
- Utilized Appium, Selenium, and Java-based automation frameworks to optimize test cycles.
- Conducted API and performance testing using REST Assured, ensuring smooth integration of new features and updates.

PUBLICATIONS

[2024]

[Pending] Experience Augmentation in Physical Therapy by Simulating Patient-Specific Walking Motions We propose a novel system for **physical therapy training** that enhances understanding of **impaired gait patterns** usin g the **HumanML3D dataset** . Our approach combines a **classification model** for predicting motion length from textual descriptions and a **temporal variational autoencoder** for generating diverse 3D motion sequences. By utilizing **residual vector quantization** and a **Masked Transformer** , the system ensures **precise and consistent motion generation** . This **interactive tool** allows therapists to simulate **patient-specific movements** in **mixed reality environments** , transforming therapeutic training and personalizing rehabilitation strategies.

[2022]

Virtual Reality Based Medical Training Simulator and Robotic Operation System This study introduces a virtual reality (VR) medical training simulator to enhance learning in medical education. Using 3D models, students can interactively explore human anatomy and physiology, perform surgical operations, and repeatedly practice without the constraints of real human bodies. Additionally, the system connects to a robotic platform, enabling skilled surgeons to perform remote surgeries using VR to control robotic tools. This reduces the need for patients in remote areas to travel to cities for specialized care, offering an innovative solution for medical training and remote surgery.

PROJECTS

[12/2023 – 03/2024]

PoseTrainer: Augmented Reality Support System for Motor Rehabilitation The depicted system integrates Augmented Reality (AR) to support motor rehabilitation by enabling real-time motion analysis and feedback. A depth sensor(Azure Kinect) captures the patient's movement data, which is processed on a PC to generate skeletal tracking visualizations. These data are transmitted via UDP/IP to an AR device, such as a HoloLens, allowing therapists and patients to interact with virtual avatars in real time. The system offers immediate feedback on pose accuracy and performance scores, enhancing rehabilitation by providing immersive, precise guidance and monitoring for motor skill improvement.

Link: https://drive.google.com/file/d/1GU9YgjXGqyFPv7kpbDkelXkG7q63cEy_/view

HONOURS AND AWARDS

University of Trento

Erasmus ICM (Nomination completed) Erasmus International Credit Mobility (ICM) Exchange Programme
Duration: March-May, 2025
Purpose: Research Activity Internship

[01/10/2023] Nara Institute of Science and Technology, Japan

Monbukagakusho (MEXT) Scholarship MEXT Scholarship Master's student
Duration: 2023-2025

[01/2023] TalentPro

Tech Genius Awards I was recognized for delivering the Best Performance as a Team Leader.

[12/2019] Bangladesh University of Engineering and Technology (BUET)

1st Runner-Up at the IEEE RAS Hackathon BUET Winter School IEEE RAS Hackathon

[03/2019] LICT-JOB Fair

1st Runner-Up at the Robotics Exhibition and Competition LICT-JOB Fair Project Showcasing

EDUCATION AND TRAINING

Master of Engineering

Nara Institute of Science and Technology, Japan [01/10/2023 – Current]

City: Ikoma | **Country:** Japan | **Website:** https://www.naist.jp/en/ | **Field(s) of study:** Information Science | **Final grade:** 3.54/4.00 | **Thesis:** Experience Augmentation in Physical Therapy by Simulating Patient-Specific Walking Motions

Information Science, Computer Vision, Human Augmentation, Human-Computer Interaction, Augmented Reality, Virtual Reality, Mixed Reality

Bachelor of Science in Engineering

University of Rajshahi [01/2017 – 12/2020]

Address: Shahid Syed Nazrul Islam Administration Building University of Rajshahi, 6205 Rajshahi (Bangladesh) | **Website:** https://www.ru.ac.bd/ | **Field(s) of study:** Information and Communication Engineering | **Final grade:** 3.55/4.00 | **Thesis:** Virtual Reality Based Medical Training Simulator and Robotic Operation System

DIGITAL SKILLS

• Application programming and Artificial Intelligence (Machine Learning/Neural Network) / C# for Unity (Unity3d) / Augmented & Virtual Reality / programming: Python, MATLAB and SQL / Programming: C Python Java C++ C# JavaScript / Git / Javascript(Nodejs, ExpressJs) / Meta Quest

DRIVING LICENCE

Driving Licence: B 14/08/2024 – 27/03/2027