**Curriculum vitae**

SWAGATA DAS

TEL/FAX　090－8065－8791

**【Introduction】**

I am originally from India. Ever since I was a kid, I was interested in developing and analyzing new products. After earning a bachelor's degree in engineering, I wanted to deepen my knowledge in the field of electronic engineering, so I participated in the training of an Indian research institute called CSIR CEERI. So I was interested in technology to help people in need (physically or cognitively). Therefore, I entered the Biosystems Engineering Laboratory of Hiroshima University and researched soft-type robot support and force feedback through the "Taoyaka Program". I chose Japan because Japanese technology is advancing, especially in the fields of automation and robots. In Japan, I was able to learn many things such as Japanese and research. I would like to continue living in Japan, improve my skills, and grow as a devoted person.

**【Expertise】**

* Soft Robotics-Human Sensing, Exercise Assistance, Force Feedback
* Development of data classification algorithm using neural network by Python and MATLAB
* Development of interactive virtual reality environment using sensing modules such as VR ~ HMD and Leap Motion

**【Project information】**

|  |  |  |  |
| --- | --- | --- | --- |
| **Period** | **Research Content** | **Working environment** | **Position** |
| October 2020  ~ March 2021  (6 months)              October 2020  ~ July 2021  (10 months) | **■Research theme: Gesture recognition considering signal-dependent noise (SDN) -based motion variation estimation**  -Changes in movement occur irreparably with repeated human gestures. This variation reduces the accuracy of gesture recognition. This issue can be addressed by increasing the number of training data. However, this increases the load on the subject and the experimenter.  -We proposed an algorithm that predicts changes in gesture movement by superimposing SDN (signal-dependent noise) on muscle activity data.  -These predictive data were used to improve the gesture recognition accuracy of high gestures. Gesture data such as chops, punches and slaps.  **■ Research theme: Work title Development of squat excel game for all ages using VR**  ・ The sedentary life can be effectively tackled by the game interface including body movements. This study is a similar approach for all age groups.  -Uses soft actuators to provide dynamically controlled momentary assistance and resistance, motivating you to finish your exercise.  -In addition, AI (artificial intelligence) will be used to evaluate the user's lower limbs before exercise. | MATLAB  Python  Python  C#  Unity  Pneumatic valves  Arduino  GSR sensors  Vive VR | Specially Appointed Assistant Professor  Hiroshima University  Specially Appointed Assistant Professor  Hiroshima University |
| April 2018  ~ October 2020  (30 months)            April 2016  -April 2018  (24 months)            July 2014  -May 2015  (10 months)            July 2012  -May 2013  (10 months) | **■ Research theme: Soft and wearable upper limb assist and force feedback**  ・We have developed a wearable force feedback and support system using artificial muscles and PGM (specially designed low-pressure artificial muscles).  -Use prototypes in 4 applications. VR (Virtual Reality) Force Feedback, Navigation Assistance, Rehabilitation Training, Motor Learning.      **■ Research theme: Design and development of wrist assist device using pneumatic artificial muscle (PAM) and stretch sensor**  ・ We designed and developed a wrist assist device that uses a sensor.  • In training and evaluation sessions, the majority of subjects showed a statistically significant reduction in EMG during glove use.      **■ Research theme: Robot control by interaction between brain and computer**  - Extract the DWT coefficient from the EEG signal and apply PCA (principal component analysis).  - Learning neural networks using datasets for meaningful classification.  - Data processing of gyroscope data using Kalman filter for mouse emulation.  - Integration of the above formulation into a GUI (Graphical User Interface) for driving robots using EEG signals.    **■ Research theme: Performance of hybrid MRC / SC diversity receiver in Rayleigh Fading Channel**  - Mathematical modeling of hybrid MRC / SC receivers in the Rayleigh fading channel.  - Calculation of power outage probabilities and average bit error rates for mathematical models designed for performance measurements | MATLAB  C#  Python  Unity  LeapMotion  Pneumatic valves  Arduino  sEMG sensors (Delsys)  Stretch sensors  Pneumatic Artificial Muscles  MATLAB  Arduino  sEMG sensors (pEMG)  MATLAB  Arduino  Emotiv EPOC  (EEG sensors)  Gyro sensors  Neural Networks  Signal Processing  Mathematica  MATLAB  R  Multisim | Student (Doctor)  Hiroshima University            Student (Master)  Hiroshima University          Student (Master)  Tezpur University (India)          Student (Bachelor) |

**【Language qualifications】**

|  |  |
| --- | --- |
| **Acquisition month** | **Qualification** |
| July 2020 | TOEIC – 945 |
| October 2015 | GRE - 305 |
| August 2021 | JLPT N3 - 120 |

**【IT Skill list】**

|  |  |
| --- | --- |
|  | **Usage experience** |
| 「OS」 Windows | Can be installed from scratch (10 years) |
| 「OS」 iOS | It can be used with basic functions and new apps can be installed (3 years) |
| MATLAB, Python, Unity | You can write the optimum code according to the situation and give guidance (5 years) |
| C++, C, C#,  Simulink | Programming is possible after reading to some extent (2 years) |
| Mathematica, Multisim, R | Beginner, but easy to understand and understand logic (1 year) |

**【PR】**

My greatest strength is being able to work as a team. Understanding team members is very important in teamwork. Especially when there is a deadline, I have to think about problem solving with optimal work allocation in a short span, but I am good at that. You can think future-oriented to solve problems with available resources within a given deadline. During college, I mainly participated in the following team projects. (1) Cassie Lowell (Harvard University student) internship project. I am pleased to be a member of the student team at the host institution, participating in her project and helping to achieve technical results in 6 months. (2) Muscleblazer project (announced in Delft, The Netherlands). In this project, it was a big challenge to prepare the hardware (force feedback suit, control circuit) that can operate without failure in the field while fighting time. Future-oriented, we have prepared materials to prevent failure in field demonstrations and helped members to solve possible problems immediately. (3) Taoyaka Onsite Team Project (part of the Multicultural Doctoral Program). This is a one-year project, with field experiments. The hardest part of this project was that each team member had different goals (technical, social and cultural). However, by supporting each other, we were able to achieve these goals. Other team members helped me collect technical data, and at the same time I helped field research in the lab. In this project, I was able to learn how to act and make the best use of a multicultural project.

以上