PERSONAL INFORMATION

Himanka Kalita

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Gender Male | Date of birth 24 September 1990 | Nationality Indian

CURRENT POSITION

Ph.D. Researcher at Roma Tre University

TECHNICAL INTERESTS

Behavioural Biometrics, Behavioural profile analysis, Machine Learning, Deep Learning, Image Processing, Image Sharing and Reconstruction, NLP, Android applications (MVVM based apps), Git, REST APIs, Web simulation and application frameworks, Real Time Embedded Systems using Keil-μ-Vision, Microprocessors.

WORK EXPERIENCE

July 2020 – February 2021

Erasmus+ UI/UX Research Intern at Time Village

Paternostervägen 96A,
Stockholm, Sweden.
Time Village Website (old site in display, our UI will replace current UI soon)

- **Responsibilities**: Definition and implementation of an updated UI/UX for Time Village website.
- **Target**: The target of this internship is to define personas including motivation, actions, channels. Scenario and expectation definition, analysis of touchpoints. Journey sketch and empathy map. Choice of appropriate UX/UI tool, definition of the optimal UX, analysis of current UI and its implementation in the front end. Design of UI, definition of UI elements, testing of UI, verification and finalization, and final implementation.
- **Tools**: HTML, CSS, JavaScript, jQuery, Visual Studio Code, Ember.js.
- **Current Status**: Currently working on the front-end of the website and also on the process of integrating different modules of the website.

July 2019 – August 2019

Early Stage Researcher at Signal Generix (H2020 EU Project ENCASE)

23C Gregory Afxentiou street,
P. O. Box 59627, Limassol 4011 Cyprus.
Signal Generix Website,
Encase Website

- **Responsibilities**: Research on Datasets and development for ENCASE's subtask 7.1.
- **Target**: The target of this subtask 7.1 was to re-implement algorithms from Tasks 4 and 5. These algorithms will be fed with real but anonymized OSN data and their output will be logged and analyzed. To capture extreme cases that fall outside our real OSN activity. The system will also rely on synthetically generated input and simulation.
- **Tools**: MySQL, Java, JavaScript, Notepad++, IntelliJ Idea.
- **Current Status**: Successfully completed preparation of the datasets to be used in the CNN architecture for training, validating, and testing the system to detect extreme cases that fall outside our real OSN activity. Project ended in December, 2019.

September 2018 – December 2018   ## Early Stage Researcher at Telefonica (H2020 EU Project ENCASE)

i Martin,
Plaça d'Ernest Lluch, 5,
08019 Barcelona, Spain.
Telefonica Website, Encase Website

- **Responsibilities**: Research and Development for ENCASE's subtask 6.1 & EEG Project.
- **Target**: Two targets:
  - **Part 1**: The primary goal of my work in H2020 ENCASE project's subtask 6.1, was to provide security to personal and sensitive content sharing in online websites continued from my previous task at CyRIC.
  - **Part 2**: Part of PhD research was also conducted on EEG based experiment, that was aimed at developing fake posts from a user's friend in social media. Upon seeing the fake post (good/bad news) by the user, we aimed to record their EEG data and study the difference of behaviour of the EEG signals.
- **Tools**: Java, Javacript, IntelliJ Idea, Tamper-monkey, MongoDB, Postman.
- **Current Status**: Two statuses:
  - **Part 1**: Worked on the Future implementation mentioned in the work experience in CyRIC section, below. Project ended in December, 2019.
  - **Part 2**: Worked on further research scope for the EEG Experiment. Successfully completed the development of a Script using JavaScript and Tamper Monkey to dynamically insert fake posts in the Facebook news feed of the subject of the EEG experiment to show negative and positive news.

May 2018 – August 2018   ## Early Stage Researcher at CyRIC (H2020 EU Project ENCASE)

72, 28th October Avenue,
Office: 301, Engomi,
Nicosia, 2414, Cyprus.
CyRIC Website, Encase Website

- **Responsibilities**: Research and Development for ENCASE's subtask 6.1.
- **Target**: The primary goal of the project's subtask 6.1 is to provide security to personal and sensitive content sharing in online websites. I was assigned to develop a web application whose task was to take an input sentence (supposedly will be the users comment or message) and process and verify that no sensitive, personal, or malicious content is not shared within the process.
- **Tools**: Java, IntelliJ Idea, Spring RESTful APIs, NGINX, Gunicorn, Falcon, Swagger UI.
- **Current Status**: Successfully completed the development of Standalone Application in JAVA. Successfully completed the development of Web Application using Spring REST API Framework. Future work when I left: Specific detection like Bank Account numbers, Passport numbers, difference of numbers between time and street should be implemented in future. Project ended in December, 2019.

March 2017 – November 2017   ## Administration Assistant (Virtual Labs Integration Project)

Department of CSE, Indian Institute of Technology (IITG),
Guwahati, Assam, India. PIN 781039.
Phone: (+91) 361 2583000, Fax: (+91) 361 2690762.
Email: pro@iitg.ernet.in,
IITG Website, Virtual Lab Website

- **Responsibilities**: Code conversion, Code analysis, Unit testing.
- **Target**: The primary goal of the project is to provide remote-access to Virtual Labs in various disciplines of Science and Engineering. These Virtual Labs would cater to students at the undergraduate level, postgraduate level as well as to research scholars. I worked during Phase 2, where the conversion of the labs was being done from Flash to FOSS.
- **Tools**: HTML5, CSS, JavaScript, C++, CPPUnit.
- **Current Status**: Successfully completed the development of Virtual Anthropology Lab. Successfully completed the development of Virtual Creative Design, Prototyping and Experiential Simulation in Human Computer Interaction (HCI) Lab. Successfully completed the development of Virtual Ergonomics Lab for assessing Physical Aspects of Design. Currently Phase 3 is going on and planning for Phase 4.
- Project Investigator: Dr. Ratnajit Bhattacharjee. Co-Project Investigator: Dr. Santosh Biswas.

March 2016 – March 2017   ## Computer Instructor in Kendriya Vidyalaya

Kendriya Vidyalaya,
Indian Institute of Technology,
Guwahati, Assam, India. PIN 781039.
Phone: (+91) 361 2582105, (+91) 361 2692329
Kendriya Vidyalaya Sangathan Website

- **Responsibilities**: Computer Science Teacher.
- **Subjects Taught**: HTML5, CSS, JavaScript, C++, Algorithms, Computers Systems, Adobe Photoshop, Autodesk, Adobe Flash, and MS Office.
- **Project Guided**: A high school science project with title "Disaster Management" for 24th National Children Science Congress organised by National Council for Science and Technology Communication, Department of Science and Technology, Government of India.

June 2012 – July 2012   ## Summer Intern at Indian Oil Corporation Limited

Indian Oil Corporation Limited,
Guwahati Refinery,
P. O. Noonmati,
Guwahati, Assam, India. PIN 781020.
IOCL Website

- **Responsibilities**: Software Development, Understanding the network of IOCL Guwahati.
- Developed a network subnet calculator, which takes input a sub-netted IP and its subnet mask In the output, it provides the detailed information of the whole subnet to which the sub-netted IP belongs.
- **Tools**: Java, NetBeans IDE.
- **Status**: Developed a network subnet calculator, which takes input a sub-netted IP and its subnet mask. In the output, it provides the detailed information of the whole subnet to which the sub-netted IP belongs. The output is provided in tabular format.

EDUCATION ──

November 2017 – May 2021   # Doctor of Philosophy (PhD)

Department of Engineering, Section of Applied Electronics,
Roma TRE University, 00146, Rome, Italy.
Phone: (+39) 065 733 7286, (+39) 065 733 7015, (+39) 065 733 7016
Roma Tre Website, EQF level 8.

- **Research Area**: Biometric recognition of users in mobile scenario through behavioural traits such as keystroke [1], swipes gestures, and signatures. Analysis of mobile behavioural data using machine learning models (generalised) such as GMM [2], GMM-UBM, CNN [3], RNN, and MobileNetv2. Currently in research of RNN, and MobileNetv2 applied towards mobile behavioural biometrics for efficient recognition of users.
- **Research Mobile Applications Developed**:
  - Behavioral biometric data collection app (keystrokes such as password, PIN, fixed and free text, etc. and swipes). Two databases running as background processes.
  - Mobile user biometric recognition app using MobileNetv2 with public behavioural biometric datasets (ongoing research). GitHub repos maintained for all projects.

July 2013 – June 2015   # Master of Technology (M. Tech) in Information Technology

Department of Computer Science and Engineering,
North Eastern Regional Institute of Science and Technology (NERIST),
Nirjuli, Itanagar, Arunachal Pradesh, India. PIN 791109.
Phone: (+91) 360 2257401-08
NERIST Website, EQF level 7.

- **CGPA**: 4.12/5.00 or 82.4%.
- **Principal Subjects Taken**: Image Processing, Advanced Data Structures, Wireless Communication, Multimedia Systems, Information System Design, Advanced Computer Networks, Software Engineering, Reliability Engineering, Advanced Discrete Mathematics, Pattern Recognition, Advanced Computer Architecture.
- **Thesis Title**: Reversible Secret Image Sharing Scheme in Matrix Projection using Discrete Haar Wavelet Transform. (published in national conference, ISBN: 978-93-84935-27-6) [4]

- **Thesis Details** (During 3rd and 4th Semester): As described below:
  - The primary goal of the project was to develop an efficient method for Image Sharing, using the Discrete Haar Wavelet Transform and a Secret Sharing algorithm based on Matrix Projection.
  - Practically implemented the existing Secret Sharing algorithm based on Matrix Projection, previously proposed by Li Bai on a square image and found that the secret sharing scheme can be used to share square images efficiently through a MATLAB API. Also successfully implemented the compression algorithm known as Discrete Haar Wavelet Transform on the square image. These two algorithms were combined in the proposed algorithm to devise a new efficient secret image-sharing algorithm.
  - Developed and practically implemented a new Reversible Secret image-sharing scheme based on Matrix Projection and Discrete Haar Wavelet Transform through a MATLAB API.
  - Practically implemented some noise models on the shares created during the secret image sharing process and analysed the results for the robustness of the newly developed secret sharing scheme through a MATLAB API. Methods used for analysis were Histogram analysis, PSNR, MSE.

July 2009 – June 2013   ## Bachelor of Technology (B. Tech) in Computer Science and Engineering

Don Bosco College of Engineering and Technology under Assam Don Bosco University,
Airport Road, Azara, Guwahati, Assam, India. PIN 781017.
Phone: (+91) 361 2139291-92.
Assm Don Bosco University Website, EQF level 6.

- **Marks Obtained**: **CGPA**: 6.8/10.00 or 68%.
- **Principal Subjects Taken**: C-Programming, Object Oriented Programming (C++), Pattern Recognition, Microprocessors, Artificial Intelligence, Algorithm, Embedded Systems, Cloud Computing, Engineering Mathematics, Compilers, Automata Theory, Operating System, Relational Databases, Data Warehousing and Data Mining, etc.
- **Thesis Title**: GSM based Home Security System (published in IEEE, DOI: 10.1109/ICICICT.2014.6781278) [5]
- **Thesis Details** (During 7th and 8th Semester): We had developed a system by which anyone with a mobile phone can be sure about his/her home being safe even if he/she is not present in their respective homes. For this, we have devised a system that can detect any intruders at home and will automatically send a text message to the owner in his/her mobile phone. The owner can reply to it whether to ring the alarm or to disarm the alarm depending on who enters the house. An Android application was also devised which sends a message back to the system if the owner doesn't reply in allotted time, assuming that the user owns an Android OS based mobile phone.
- **Other projects during B. Tech**:
  - Developed a Media Played using JAVA in the 5th Semester of B. Tech.
  - Developed a Two Player Chess Game using JAVA Applet in 6th Semester of B. Tech.

PERSONAL SKILLS ▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬ ■

Mother tongue   Assamese

Other languages

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
English				
C1	C2	C1	C1	C1
Complete Education in English (India) C1				
Hindi				
C1	C1	C1	C1	B1
Learned Hindi throughout high school (India) C1				
Italian				
A1	A1	A1	A1	A1
Italian Certificate from Centro Linguistico di Ateneo (Roma Tre University) A1				

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Technical skills
– **Operating System**: WINDOWS 98/ XP/ 7/ 8.1/ 10, LINUX (Fedora, Ubuntu), DOS.
– **Computer Languages**: C, C++, Kotlin, Python, JAVA, HTML5, CSS, JavaScript, Embedded C for 8051, Assembly for 8051.
– **Scientific IDE**: MATLAB (Image Processing and Deep Learning Toolboxes), pandas, scikit-learn, tensorflow, and PyTorch using PyCharm.
– **IDE**: Android Studio, VS Code, IntelliJ Idea, NetBeans, Keil-µ-Vision.
– **Database**: MySQL, Firebase for Android, MongoDB.
– **VCS**: Git.
– **Testing**: Postman for API testing, CPPUnit for C++ unit testing.
– **Documentation tools**: LaTeX, MS-Publisher, Swagger UI.

Digital competences

SELF-ASSESSMENT				
Information Processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Independent user	Proficient user

Digital competences - Self-assessment grid

Hobbies
Amateur Photographer (street, wildlife), Art admirer, and Computer gamer. Enjoy sports particularly Cricket, Football and Chess. Traveller. Indian and Italian cooking enthusiast.

PUBLICATIONS

[1] Emanuele Maiorana, **Himanka Kalita**, and Patrizio Campisi. "Mobile keystroke dynamics for biometric recognition: An overview". In: *IET Biometrics* 10.1 (2021). Paper link, pp. 1–23.

[2] **H. Kalita**, E. Maiorana, and P. Campisi. "Keystroke Dynamics for Biometric Recognition in Handheld Devices". In: *2020 43rd International Conference on Telecommunications and Signal Processing (TSP)*. Paper link. 2020, pp. 410–416.

[3] E. Maiorana, **H. Kalita**, and P. Campisi. "Deepkey: Keystroke Dynamics and CNN for Biometric Recognition on Mobile Devices". In: *2019 8th European Workshop on Visual Information Processing (EUVIP)*. Paper link. 2019, pp. 181–186.

[4] **H. Kalita**, M.M. Singh, and T. Tuithung. "A Reversible Secret Image Sharing Scheme in Matrix Projection Using Discrete Haar Wavelet Transform". In: *2015 National Conference on Computing, Communication and Information Processing (NCCCIP)*. Paper link. 2015, pp. 105–111.

[5] R. K. Sharma, A. Mohammad, **H. Kalita**, and D. Kalita. "Android interface based GSM home security system". In: *2014 International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT)*. Paper link. 2014, pp. 196–201.

DECLARATION

I hereby declare that the particulars mentioned above are to the best of my knowledge and belief.

Himanka Kalita