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Recent Research

PhD thesis "A novel multisensoric system recording and analyzing human biometric features for biometric and biomedical applications"

PhD obtained in January 2011 from University of Regensburg (Institute of Biophysics and Pre-clinical Medicine) and University of Applied Sciences, Biometric Smart Pen **BiSP** center Regensburg, Germany.

One way to study the dynamics of human motor functions of fingers and hand movements is to investigate the dynamic features of handwriting, drawing or hand gestures. A novel multisensoric pen device BiSP has been developed to record the movements during handwriting or drawing on paper pad or free in air. The biometric features recorded by BiSP have not only been analyzed to recognize person, handwritten object or hand gesture in behavioral biometrics but also to characterize motor dysfunctions of the probands due to disease (e.g., Parkinson's disease) for diagnostics or for control of medication in medical applications. For above applications, research has been conducted that involves improved procedures for diverse sensing techniques of data acquisition, signal processing and pattern recognition for person or object recognition based on signals (time series) obtained from novel pen.

Education

2006 Sept- 2011 Jan **PhD** (Germany)
2002 **MSc** Computer Science www.uet.edu.pk
1999 **MSc** Physics www.pu.edu.pk
1997 **BSc** (Majors: Mathematics and Physics) www.fccollege.edu.pk

Research Interests

Biometrics, Human Computer Interactions, Handwriting Biometrics, Multimodal Biometrics, Medical Data and Image Processing, Human Movement Disorder Analysis, Pattern Recognition, Time Series Data Analysis, Dynamic Time

Warping (DTW), Support Vector Machines (SVM), Singular Value Decomposition (SVD), Biophysics, Computational Physics and MATLAB based programming etc

Publications

- **M Bashir** and F Kempf, "Advanced biometric pen system for recording and analyzing handwriting". In Journal of Signal Processing Systems, **Springer** (**2011**)
- **M Bashir** and J Kempf, "DTW based classification of diverse pre-processed time series obtained from handwritten PIN words and signatures". In Journal of Signal Processing Systems, **Springer** (**2010**). DOI 10.1007/s11265-010-0501-x
- **M Bashir** and J Kempf, "Person authentication with RDTW using handwritten PIN and signature with a novel biometric smart pen device. In SSCI Computational Intelligence in Biometrics, **IEEE**, **Nashville, USA**, **2009**.
- **M Bashir** and J Kempf, "Bio-inspired reference level assigned DTW for person identification using handwritten signatures". In BioID_MultiComm2009 Madrid, Spain, LNCS 5707; pp. 208-214, **Springer-Verlag 2009**.
- **M Bashir**, J Kempf et al, "Online person authentication using dynamic signature on a novel tactile and pressure sensitive pad". In 17th Telecommunication forum, TELFOR Belgrade, **Serbia** (**2009**)
- **M Bashir** and J Kempf, "Reduced dynamic time warping for handwriting recognition based on multi-dimensional time series of a novel pen device". World Academy of Science, Engineering and Technology, 45, **Paris** (**2008**). (Conf. Proc. Published Also in journal$)
- **M Bashir** and J Kempf, "Reduced dynamic time warping for handwriting recognition based on multi-dimensional time series of a novel pen device". In Inter. Journal of Intelligent Systems and Technologies$, 3.4, Paris (**2008**).
- **M Bashir** and J Kempf, "Biometric smart pen system applied for the characterization of Parkinson's diseased subjects". **To be submitted**.

Other Presentations

- "Bio-Sensing of hand and finger movements "Colloquium Bio-Physics, University of Regensburg, 2008, Germany.
- "Extended WACOM graphic Tablet equipped with BiSP-Sensors, University of Applied Sciences Workshop 2008 BiSP, Regensburg, Germany
- "Piezoelectric film based finger Grip Sensor: Experiments and Signal evaluations", University of Applied Sciences Workshop 2006 BiSP, Regensburg, Germany

Supervision of Master Students in BiSP laboratory

Student	University
1) Erica Yamasaki	**Tokyo University of Science**

Topic: DTW based analysis of (1) BiSP data and (2) Lips movement data

2) Takashi Sano **Tokyo University of Science**
Topic: Lower bounding of DTW distance for (1) BiSP data and (2) Spoken Japanese words data

3) Takayuki Takatori **Tokyo University of Science**
Topic: Development of Hand Tremor Detector Software using SVM for the characterization of Parkinson diseased writer based on BiSP medical data.

Job Experience

October 2002-March 2011 Lecturer
April 2011-Todate Assistant Professor
Department of Physics,
University of the Punjab (PU), Lahore, Pakistan

Job duties

- Teaching to BSc (h) and MSc Students
- The subjects included Computational Physics, Basic Electronics and Digital Electronics & Laboratory work.
- Computer Science I & II
- Computer Programming Courses: **MATLAB** and **C^{++}**
- Computer Laboratory Administrator

2003 (Semester-II) Visiting Lecturer
Department of Space Science (PU)

Job duties

- Teaching to BSc (h)
- The subject included Basic Electronics & Laboratory work

2004 (Semester-IV) Visiting Lecturer
Department of Mathematics (PU)

Job duties

- Teaching to BSc (h)
- The subject included Digital Logic and Computer Design

References

Please contact me for references.