

Original footprint De-noised footprint

Figure 1 showing the original footprint and the de-noised footprint using Morphological Opening

B. Experimental Result on Partitioning

After the de-noised image had been partitioned the resulting output is shown in figure 2 below

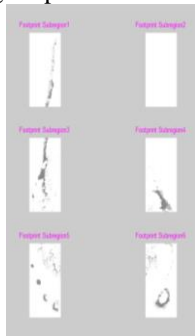


Figure 2 Partitioned foot print with each region labelled

C. Experimental Result on Matching

A test foot was now trained against other foot in the database. Below are just three categories of the output found for matching the test print with foot print in the database.

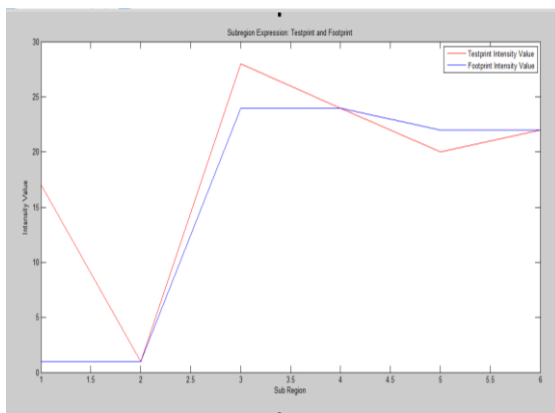


Figure 3: Intensity comparisons between prints using graph

Figure 3 above shows the graph representation of intensity comparison of the regions in the Test print with one

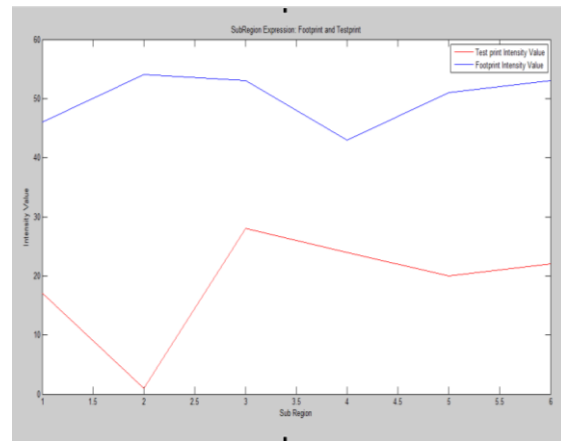


Figure 4: Intensity comparisons between prints using graph

Figure 4 shows the comparison between the test print and another foot print that does not have any similarity in their intensity values.

Meanwhile figure 5 below shows the comparison of the test print with itself giving an output that has same intensity at same point.

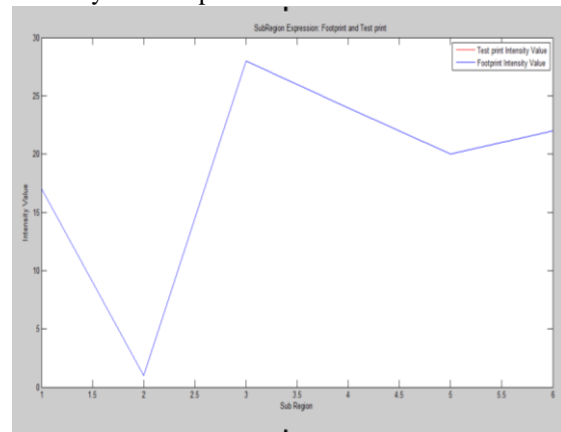


Figure 5: Intensity comparisons between prints using graph

of the print in the database. It can be deduce from the graph that the test print is not the same as the footprint. They only have similar values at region 2, 3 and 6.

VII. CONCLUSION

This paper adopted mathematical morphology, image partitioning (resizing) and graph representation to analyse barefoot print for person identification. This proposed system cannot work as a standalone system for person identification but as a support system. It can be adopted for use by organisation or forensics experts, but the data capturing must be done carefully, so that additional pressure will not be introduced that will make the acquired data inconsistent for analysis as the intensity value is feature needed for comparison.

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REFERENCES

- [1] Brenda M. A. Rohren, M.A (2009).” Estimation of Stature from Foot and Shoe Length: Applications in Forensic Science” Department of Forensic Science, 5000 Saint Paul Avenue, Lincoln, Nebraska Nebraska Wesleyan University
- [2] Elias O.G., Olajide M.S., Olaleke J.O. and Adetunmbi A.O. “Processing Biomedical Images Using Low Level Algorithm”, Proceedings of the Second International Conference on Mobile e-Services, volume 2
- [3] Hussey J. (2009) “Shoeprint Recognition, an Introduction” University of Edinburgh, School of Informatics, retrieved on June 02, 2012 from http://homepages.inf.ed.ac.uk/rbf/CVOnline/local_copies/AV0809/
- [4] Ian T. Young, Jan J. Gerbrands and Lucas J. Van Vliet (1998). “*Fundamentals of Image Processing.*” Delft University of Technology, Netherlands.
- [5] Kennedy R.B. and Yamashita A. B. (2007) “Barefoot Morphology Comparisons: A Summary” Journal of Forensic Identification volume 57 issue 3 pages 383 – 413
- [6] Podiatry Channel (2014) “Anatomy of foot and Ankle”
- [7] Robert B. Kennedy, Sanping Chen, Irwin S. Pressman, A. Brian Yamashita, and Ari E. Pressman (2005) “A Large-Scale Statistical Analysis of Barefoot Impressions” Journal of Forensic Science, Sept. 2005, Vol. 50, No. 5
- [8] Running Warehouse (2014) “Foot Analysis- Foot Motion Characteristics” retrieved on 25th August, 2014 from <http://www.runningwarehouse.com/learningcenter/footanalysis.html>
- [9] Ramsland K. (2014) “All about Fingerprints and other impression”, retrieved August 25th, 2014 from Crime library at http://www.crimelibrary.com/criminal_mind/forensics/fingerprints/9.html
- [10] Seamann, T. (2003). *Digital Image Processing Using Local Segmentation*. Ph.D Thesis, School of Computer Science and Software Engineering, Faculty of Information Technology Monash University, Australia
- [11] Shih Frank (2010) “Image Processing and Pattern Recognition”, Institute of Electrical Electronic Engineers, Inc.
- [12] Silver, B. (2000). *An Introduction to Digital Image Processing*. Cognex Corporation, Modular Vision System Division Natick
- [13] Vinod K. P (2013) “Foot Anatomy”, in Medscape- Drug and Disease edited by Thomas R. G. retrieved August 25th, 2014 from <http://emedicine.medscape.com/article/1922965-overview>
- [14] Yamashita A.B. (2007) “ Forensic Barefoot Morphology Comparison” Canadian Journal of Criminology and Criminal Justice, volume 49, NO.5 pp 647-656
- [15] Zhang J., Qian G., Kidane A (2009) “Footprint Tracking and Recognition Using A Pressure Sensing Floor”, in conference proceedings of IEEE international conference on Image Processing, Cairo, Egypt
- [16] Fisher R., Perkins A., Walker and Wolfart E.(2013) “Morphology” retrieved on 25th of August, 2014 from <http://homepages.inf.ed.ac.uk/rbf/HIPR2>
- [17] DWAYNE S. H. (2000) “FOOTWEAR, THE MISSED EVIDENCE”, CLPE LEAD LATENT PRINT EXAMINER SCOTTSDALE POLICE CRIME LAB.