Study of Bone Mineral Density among women in central Taiwan

許文斌、王安祥

E-mail: 9315399@mail.dyu.edu.tw

ABSTRACT

The osteoporosis of Taiwan prevails in recent years. Creating a database for women's bone mineral density (BMD) in central Taiwan may help to find the state of the adult women's ostepenia in early days. The research includes two stages. In the first stage, 217 normal BMD data in central Taiwan of women were collected to create a mineral density database for women's bone mineral density (BMD) in central Taiwan. In the second stage, 1031 BMD data in central Taiwan of women were collected, then were applied into SVM tool to predict BMD classification. In BMD database, it was found that lumbar vertebrae L2-L4 of BMD is relatively lower than women of the north of Taiwan and Caucasians women. In comparison with other existing BMD databases, our database is specialized for the diagnosis of Ostepenia or Osteoporosis for women in central Taiwan. In the research of SVM classifying machine, predictive performance can reach to Az = 0.7862. All finding of this research can help the doctor to get better osseous discrimination while diagnosing.

Keywords : Bone Mineral Density (BMD), Support Vector Machine (SVM), Database

Table of Contents

REFERENCES

王景南(2003) :多類支向機之研究。元智大學資訊管理學系碩士 班碩士論文。 內政部內政國際指標主要國家平均餘命(2001) : http://www.moi.gov.tw/W3/stat/national/4421.htm 內政部內政統計年報人口年齡分配(2001) : http://www.moi.gov.tw/W3/stat/year/y02-01.xls 吳志誠(2001) :資料探勘於影像資訊之應用-以乳房微鈣化特徵處理為案例。大葉大學工業工程學系碩士班論文。 林興中(1994) :骨質疏鬆症之最近進展。臺灣醫界 37；37-40 許朝欽(1998) :健康世界月刊2(146) ；42-44 蔡明倫(2002) :二維點狀影像資訊之強化、特徵擷取及辨識-以X光乳房微鈣化檢測為案例。大葉大學工業工程學系碩士班論文。 劉文禎(2002) :太極拳運動對骨質密度影響之研究。國立體育學 院教練研究所碩士論文。 Brown, M., Grundy, W., Lin, D., Cristianini, N., Sugent, C., Furey, T., Ares, M., and Haussler, D., (1999) "Knowledge-based analysis of microarraygene expression data using support vector machines", Technicalreport, University of California in Santa Cruz, (submitted for publication). Gluer, C. C., Steiger, P., Selvidge, R., Kathrin, E. K., Hayashi, C., and Genant, H. K., (1990) "Comparative Assessment of Dual-Photon Absorptiometry and Daul-Energy Radiography", Radiology, 174, 223-228. Cullum, I. d., Ell, P. J., and Ryder, J. P., (1989) "X-ray dual-photonabsorptiometry: a new method for the measurement of bone density", The British Journal of Radiology, 62, 587-592. Hagino, H., Yamamoto, K., Teshima, R., Kishimoto, H., and Kagawa, T., (1992) "Radial bone mineral change in pre-and postmenopausal healthy Japanese women: cross-sectional and longitudinal studies", J Bone Miner Res , 7, 147-152. Jergas, M., and Genant, H. K., (1993) "Current Methods and Recent Advances in The Diagnosis of Osteoporosis", Arthritis & Rheumatism, 36, 1649-1662. Kao C. H., Chen C. C., and Wang S. J., (1994) "Normal data for lumbar spine bone mineral content in healthy elderly Chinese: influences of sex, age, obesity and ethnicity", Nuclear Medicine Communications, 15, 916-920. LeCun, Y., Jackel, L. D., Bottou, L., Brunot, A., Cortes, C., Denker, J. S., Drucker, H., Guyon, I., Muller, U. A., Sackinger, E., Simard, P., and Vapnik, V., (1995) "Comparison of learning algorithm for handwritten digit recognition", In Fogelman-Soulie, F. and Gallinari, P., editors, Proceedings ICANN'95, volume II, pages

53-60. EC2, 1995. Nello, C. J., Shave, T., (2000) "An Introduction to Support Vector Machines: and other Kernel-Based Learning Method", Cambridge University press,2000. Oren, M., Papageorgiou, C., Sinha, P., Osuna, E., and Poggio, T., (1997) "Pedestrian Detection Using Wavelet Templates", the Proceedings of CVPR'97, June. Osuna, E., Freund, R., Girosi, F., "Training Support Vector Machines: an Application to Face Detection", the Proceedings of CVPR'97, June 1997. Ross, P.D., Norimatsu, H., Davis, J.W., Yano, K., Wasnich, R.D., Fujiwara, S., Hosoda, Y., and Melton, L.J., (1991) "Acomparison of hip fracture incidence mong native Japanese,Japanese Americans and American Caucasians", Am JEpidemiol , 133, 801-809. Ross, P. D., He, Y. F., Yates, A. J., Coupland, C., Ravn, P., McClung, M., Thompson, D., and Wasnich, R. D., for the EPIC Study Group, (1996) "Body Size Accounts for Most Differences in Bone Density Between Asian and CaucasianWomen", Calcif Tissue Int, 59, 339-343. The WHO Study Group, (1994) "Assessment of fracture risk and It's application to screening for postmenopausal osteoporosis:, World Health Organ Tech Rep Ser, 843, 1-129. Thoo, F. L., Chng, S. M., Lam, K. S., Lee, J. B. I., Tan, M. C., Teh, H. S., Khoo, T. K., (2002) "To Establish the Normal Bone Mineral Density Reference Database for the Singapore Male", Ann Acad Med Singapore, 31, 21-5. Tobias, J. H., Cook, D. G., Chambers, T. J. & Dalzell, N. (1994) "A comparison of bone mineral density between Caucasian, Asian and Afro-Caribbean women", Clinical Science, 87(1), 587-591. Tsai .K. S., Huang .K. M., Chieng .P. U. and Su.C. T. (1991) "Bone Mineral Density of Normal Chinese Women in Taiwan", Calcified Tissue International, 48, 161-166. Tsai, S. C., Kao, C. H., Wang, S.J., ChangLai, S. P., Yen, R. F., and Chieng, P. U., (1997) "Normal Data for Lumbar Spine Bone Mineral Content in Healthy Chinese Men", Calcif Tissue Int, 61, 114-116. Tsai, K. S., Pan, W. H., Hsu, S. H. J., Cheng, W. C., Chen, C. K., Chieng, P. U., Yang, R. S., and Twu, S. T., (1996) "Sexual Differences in Bone Markers and Bone Mineral Density of Normal Chinese", Calcif Tissue Int, 59, 454-460. Tang, W. L., Yang, T. S., Yen, M. S., and Chou, M. P., (1990) "Bone Mineral Density in Taiwanese Women", J Obstet & Gynecol ROC, 29, 35-38. Yang, R. S., Liu, T. K., Hang, Y. S., Chieng, P. U., and Tsai, K. S., (1999) "Factor of Risk for Hip Fracture in Normal Chinese Men and Women in Taiwan", Calcif Tissue Int, 65, 422-426. Yano, K., Wasnich, R.D., Vogel, J.M., and Heilbrun, L.K., (1984) "Bone mineral measurements among middle-aged and elderly Japanese residents in Hawaii", Am J Epidemiol, 119, 751-764. Yu, S., Guan, L., (2000) "A CAD System for the Automatic Detection of Clustered Microcalcifications in Digitized Mammogram Films", IEEE Trans. Med. Imag., 2, 115-126.