IoT-based Smart Village Transaction System using RFID and Load Cell Modules

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***Abstract***— **UMKM (Micro small and Medium Enterprises) dalam desa berperan penting dalam meningkatkan kesejahteraan pemilik usaha maupun konsumennya. UMKM di desa memenuhi kebutuhan hidup penduduk desa. Kebutuhan tersebut dapat berupa pangan yang berasal dari pertanian dan peternakan yang berasal dari desa itu sendiri hingga pakaian dan produk lainnya berasal dari luar desa. Usaha pertanian dan peternakan tidak selelu memiliki penghasilan rutin sehingga terkadang melakukan peminjaman uang pada koperasi untuk memenuhi kebutuhan sehari-hari hingga kebutuha usaha seperti pupuk dan pakan ternak. Penelitian mengembangkan system transaksi desa cerdas berbasis IoT menggunakan RFID dan modul load cell. Penelitian bertujuan untuk menyederhakan transaksi di lingkungan desa yang memiliki sifat khusus dengan usaha pertanian dan peternakannya. Sistem dikembangkan menggunakan raspberry pi yang sekaligus menjadi web servernya. RFID digunakan untuk mencatat transaksi yang dilakukan oleh penduduk desa dengan menscan kartu penduduk mereka. Load Cell digunakan untuk mencatat besaran transaksi untuk produk yang diukur berdasarkan beratnya seperti produk pertanian dan peternakan. Sistem mengedepankan interaksi pengguna dengan menscan kartu RFID pelaku transaksi, representasi produk dan berat produk. Sistem juga mendukung system peminjaman dengan mengadopsi konsep pay later untuk pelaku usaha pertanian dan peternakan. Sistem diujikan menggunakan black-box testing dan mnghasilkan hasil yang valid baik dari segi hardware maupun software. Sistem juga dikalibrasi dengan dibandingkan timbangan pasar dan menghasilkan perbedaan tipis untuk 10 jenis produk yang diujikan. Kelistrikan system juga diujikan dan menghasilkan rata-rata konsumsi listrik rendah sehingga cocok untuk diterapkan secara portable maupun diwilayah desa dengan keterbatasan listrik. Sistem juga telah dievaluasi menggunakan kuisioner kepada penduduk desa yang memiliki usaha dan mendapatkan respon yang positif.**

***Keywords***— **Put your keywords here; keywords are separated by a semicolon.**

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TABLE I  
Font Sizes for Papers

|  |  |  |  |
| --- | --- | --- | --- |
| **Font Size** | **Appearance (in Time New Roman or Times)** | | |
| **Regular** | **Bold** | **Italic** |
| 8 | table caption (in Small Caps), figure caption, reference item |  | reference item (partial) |
| 9 | Institution, author email address, and cell in a table | abstract body | abstract heading (also in Bold)  author affiliation |
| 10 | level-1 heading (in Small Caps),  paragraph |  | level-2 heading,  level-3 heading, |
| 12 | author name |  |  |
| 18 | title |  |  |

1. *Title and Author Details*

Title must be Times New Roman at 18 points in size. Author name must be Times New Roman at 12 points in size. Author affiliation must be Times New Roman at 9 points in size and *italic*. Corresponding email address must be Times New Roman at 9 points in size. All title and author (s) affiliation must be in single-column format and must be centered.

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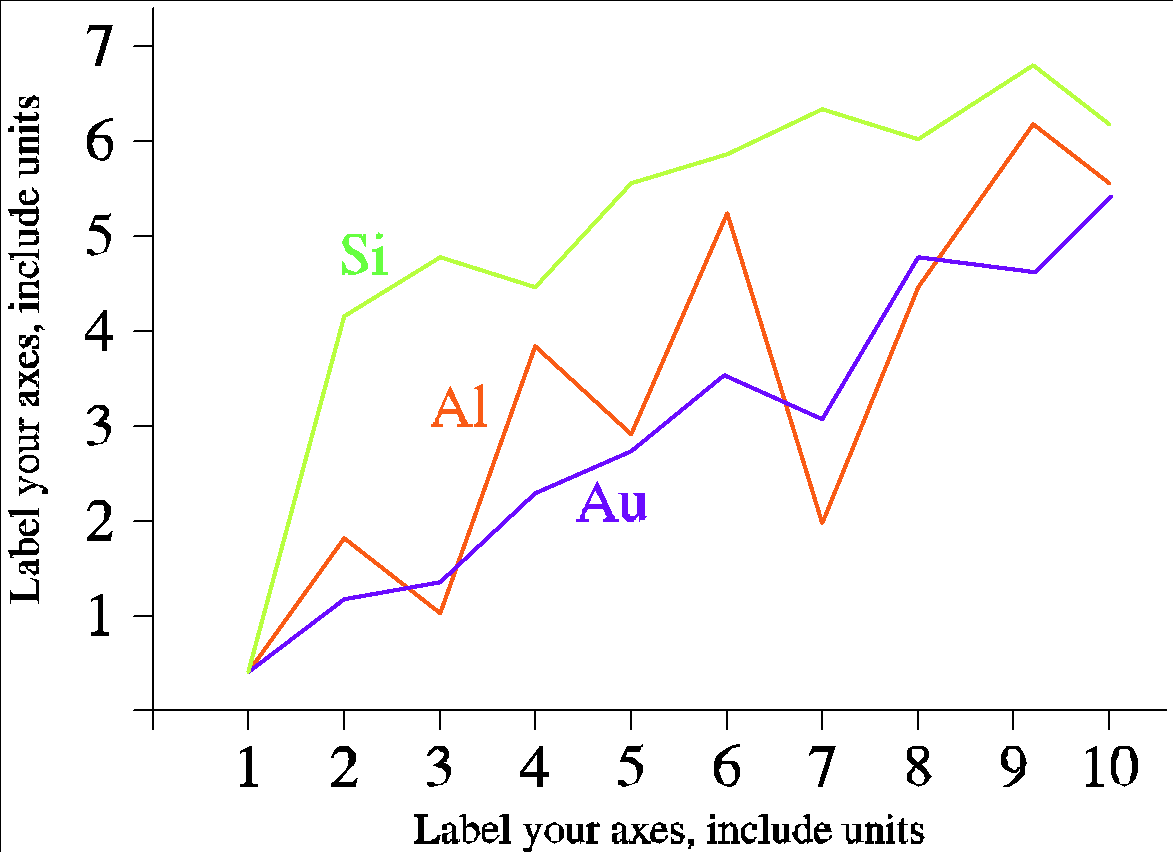


Fig. 1 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

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Fig. 2 shows an example of a low-resolution image which would not be acceptable, whereas Fig. 3 shows an example of an image with adequate resolution. Check that the resolution is adequate to reveal the important detail in the figure.

Please check all figures in your paper both on screen and on a black-and-white hardcopy. When you check your paper on a black-and-white hardcopy, please ensure that:

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* the image used in each figure is clear,
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Figures must be numbered using Arabic numerals. Figure captions must be Times New Roman at 8 points in size. Captions of a single line (e.g., Fig. 2) must be centered whereas multi-line captions must be justified (e.g., Fig. 1). Captions with figure numbers must be placed after their associated figures, as shown in Fig. 1.



Fig. 2 Example of an unacceptable low-resolution image



Fig. 3 Example of an image with acceptable resolution

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Nomenclature

a specific surface area m2m-3

x length co-ordinate m

Greek letters

α heat transfer coefficient Wm-2K-1

τ residence time s

Subscripts

i inlet

e equilibrium

Acknowledgment

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References

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1. J. U. Duncombe, “Infrared navigation—Part I: An assessment of feasibility,” *IEEE Trans. Electron Devices*, vol. ED-11, no. 1, pp. 34–39, Jan. 1959, 10.1109/TED.2016.2628402.
2. E. P. Wigner, “Theory of traveling-wave optical laser,”   
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3. E. H. Miller, “A note on reflector arrays,” *IEEE Trans. Antennas Propagat*., to be published.

*Basic format for reports:*

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2. J. H. Davis and J. R. Cogdell, “Calibration program for the 16-foot antenna,” Elect. Eng. Res. Lab., Univ. Texas, Austin, TX, USA, Tech. Memo. NGL-006-69-3, Nov. 15, 1987.

*Basic format for handbooks:*

*Name of Manual/Handbook, x* ed., Abbrev. Name of Co., City of Co., Abbrev. State, Country, year, pp. *xxx-xxx.*

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1. *Transmission Systems for Communications*, 3rd ed., Western Electric Co., Winston-Salem, NC, USA, 1985, pp. 44–60.
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2. *The Founders’ Constitution*, Philip B. Kurland and Ralph Lerner, eds., Chicago, IL, USA: Univ. Chicago Press, 1987. [Online]. Available: http://press-pubs.uchicago.edu/founders/
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4. Philip B. Kurland and Ralph Lerner, eds., *The Founders’ Constitution.* Chicago, IL, USA: Univ. of Chicago Press, 1987, Accessed on: Feb. 28, 2010, [Online] Available: http://press-pubs.uchicago.edu/founders/

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1. J. S. Turner, “New directions in communications,” *IEEE J. Sel. Areas Commun*., vol. 13, no. 1, pp. 11-23, Jan. 1995.
2. W. P. Risk, G. S. Kino, and H. J. Shaw, “Fiber-optic frequency shifter using a surface acoustic wave incident at an oblique angle,” *Opt. Lett.*, vol. 11, no. 2, pp. 115–117, Feb. 1986.
3. P. Kopyt *et al., “*Electric properties of graphene-based conductive layers from DC up to terahertz range,” *IEEE THz Sci. Technol.,* to be published. DOI: 10.1109/TTHZ.2016.2544142.

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1. R. J. Hijmans and J. van Etten, “Raster: Geographic analysis and modeling with raster data,” R Package Version 2.0-12, Jan. 12, 2012. [Online]. Available: http://CRAN.R-project.org/package=raster
2. Teralyzer. Lytera UG, Kirchhain, Germany [Online]. Available: http://www.lytera.de/Terahertz\_THz\_Spectroscopy.php?id=home, Accessed on: Jun. 5, 2014

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*Example:*

1. U.S. House. 102nd Congress, 1st Session. (1991, Jan. 11). *H. Con. Res. 1, Sense of the Congress on Approval of Military Action*. [Online]. Available: LEXIS Library: GENFED File: BILLS

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   pp. 585–590.

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1. D. Ebehard and E. Voges, “Digital single sideband detection for interferometric sensors,” presented at the *2nd Int. Conf. Optical Fiber Sensors,* Stuttgart, Germany, Jan. 2-5, 1984.

*Basic format for patents:*

J. K. Author, “Title of patent,” U.S. Patent *x xxx xxx*, Abbrev. Month, day, year.

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*Examples:*

1. J. O. Williams, “Narrow-band analyzer,” Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, USA, 1993.
2. N. Kawasaki, “Parametric study of thermal and chemical nonequilibrium nozzle flow,” M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.

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1. A. Harrison, private communication, May 1995.
2. B. Smith, “An approach to graphs of linear forms,” unpublished.
3. A. Brahms, “Representation error for real numbers in binary computer arithmetic,” IEEE Computer Group Repository, Paper R-67-85.

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1. IEEE Criteria for Class IE Electric Systems, IEEE Standard 308, 1969.
2. Letter Symbols for Quantities, ANSI Standard Y10.5-1968.

*Article number in reference examples:*

1. R. Fardel, M. Nagel, F. Nuesch, T. Lippert, and A. Wokaun, “Fabrication of organic light emitting diode pixels by laser-assisted forward transfer,” *Appl. Phys. Lett.*, vol. 91, no. 6, Aug. 2007, Art. no. 061103.
2. J. Zhang and N. Tansu, “Optical gain and laser characteristics of InGaN quantum wells on ternary InGaN substrates,” *IEEE Photon. J.*, vol. 5, no. 2, Apr. 2013, Art. no. 2600111

*Example when using et al.:*

1. S. Azodolmolky *et al.*, Experimental demonstration of an impairment aware network planning and operation tool for transparent/translucent optical networks,” *J. Lightw. Technol.*, vol. 29, no. 4, pp. 439–448, Sep. 2011.

References

1. S. M. Metev and V. P. Veiko, *Laser Assisted Microtechnology*, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
2. J. Breckling, Ed., *The Analysis of Directional Time Series: Applications to Wind Speed and Direction*, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.
3. S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, “A novel ultrathin elevated channel low-temperature poly-Si TFT,” *IEEE Electron Device Lett.*, vol. 20, pp. 569–571, Nov. 1999.