Using R, LaTeX and Wiki for an Arabic e-learning platform

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e-Learning

- ⊡ Online education framework.
- ⊡ Web-based teaching materials
- ⊡ Complement to classical learning.
- ⊡ Tools for e-learning
  - ▶ Internet
  - ▶ Computer-based
  - ▶ Audio
  - ▶ Video
  - ▶ Videoconferencing

⊡ Effective education is a necessity.

⊡ Institute for statistics and econometrics of Humboldt-University-Berlin offered more projects in e-learning

- ▶ MM*Stat
- ▶ e-stat
- ▶ Electronic books
- ▶ Moodle
- ▶ Statwiki

- ⊡ Statistics is the field that can profit a lot from e-learning/e-teaching standards.
- ⊡ Arabic e-learning platform in statistics could not be found.
- ⊡ We have done on the development of an Arabic e-learning platform in statistics (Arabic MM*Stat).
- ⊡ Arabic MM*Stat was built through Wiki Technology.

Outline

1. Motivation ✓
2. Difficulties to design Arabic platforms in Statistics.
3. WiKi Technology.
4. Arabic MM*Stat.
5. Integrate LaTeX into Arabic MM*Stat.
6. Integrate R program through Wiki into Arabic MM*Stat.
7. Conclusion.

Difficulties to design Arabic platforms in statistics

There are many problems associated with the making of an Arabic platform, these relate to language, culture and technology.

- ⊡ Language problems
  - ▶ The writing in Arabic is from right to left.
  - ▶ The translation.
- ⊡ Culture problems
  - ▶ Interest rates.
  - ▶ The prohibition of alcohol.
- ⊡ Technology problems
  - ▶ ArabTeX works difficulty with LaTeX.
  - ▶ The interactive examples in Arabic e-learning platform.
  - ▶ E-learning market.
  - ▶ Internet services.

⊡ Therefore we propose the Wiki technology as a solution to these problems.

  ▶ Wiki supports the solutions for language problems.
  ▶ Wiki is an easy tool to create web page.
  ▶ Wiki supports LaTeX and other statistical programs, for instance R.

WiKi Technology

What is Wiki ?

- ⊡ Wiki is a system program that allows users to collaborate in forming the content of a web site.

- ⊡ The first web site in Wiki, WikiWikiWeb was designed by Ward Cunnigham and Bo Leuf in 1995.

- ⊡ Wiki is a simple database that can operate on the World Wide Web.

- ⊡ The goal is to simplify the process of participation and cooperation in the development of content with maximum flexibility.

Why Wiki?

⊡ Wiki uses simple markup rules.

Figure 1: Edit page in Wiki

⊡ The Wiki website keeps the old copies of our pages.

⊡ Wiki are fully editable, everyone who reads the Wiki, can work on the pages and provide new pages.

⊡ Most Wiki site require no registration and therefore contents editing by users is open.

Application of Wiki:

- ⊡ One can use Wiki in several ways:
  - ▶ At universities.
  - ▶ Educational institutes.
  - ▶ In companies.
  - ▶ And specialized web sites.
- ⊡ Many examples of web sites dependent on Wiki as tool for the development of the contents.
  - ▶ like Wikipedia, http://en.wikipedia.org
  - ▶ http://teachwiki.wiwi.hu-berlin.de
  - ▶ There is Arabic e-learning platform in Wiki. http://wiki.arabeyes.org

MM*Stat

- ⊡ MM*Stat was developed at the School for Business and Economics of Humboldt-University-Berlin(Rönz,Müller, Ziegenhagen 2000).
- ⊡ HTML based multimedia environment.
- ⊡ Filing-card structure.
- ⊡ Generated with LaTeX.
- ⊡ Contents:
  - ▶ Lectures
  - ▶ Examples, multiple choice guestions
  - ▶ Interactive examples
  - ▶ Additional information
- ⊡ Available online at:
  http://www.quantlet.com/mdstat/products.html

Figure 2: Standardization is via an HTML filing card system

Arabic MM*Stat

⊡ The basic frame for this platform, the system MM*Stat.

⊡ Arabic MM*Stat will be the first developed platform for Arab users in statistics.

⊡ It is applied in the following web page.
http://pluto.wiwi.hu-berlin.de/mediawiki/index.php.

Figure 3: Graphical user interface (GUI) of Arabic MM*Stat in WiKi

Implemented Wiki into Arabic MM*Stat

⊡ Editing pages.

⊡ Adding pictures and graphics.

⊡ Addition the internal and external links to Arabic MM*Stat.

⊡ Addition variables and statistical formulas.

⊡ The making of the tables in Arabic MM*Stat.

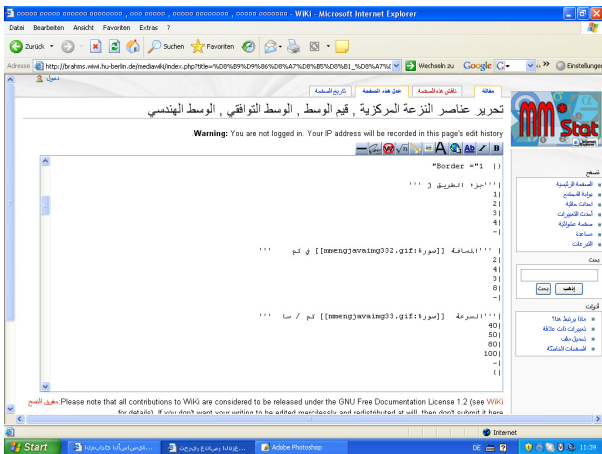Figure 4: Edit table in Arabic MM*Stat using HTML

Figure 5: Edit table in Arabic MM*Stat using Wiki

Integrate LaTeX into Arabic MM*Stat

- ⊡ LaTeX is a document preparation system for high-quality typesetting.
- ⊡ It is most often used for medium-to-large technical or scientific documents.
- ⊡ ArabTeX is a LaTeX-package for typesetting Arabic.
- ⊡ ArabTeX is a free, though copyrighted, package developed by Professor Klaus Lagally of Stuttgart University (1993).

```
\documentstyle[12pt,arabtex]{article}
\begin{document}

\setarab      % choose the language conventions
\vocalize     % diacritics for short vowels on
\transtrue    % additionally switch on the transliteration
\arabtrue     % print arabic text ... is on anyway
\spreadtrue   % spread out caption

\centerline {<^gu.hA wa-.himAruhu>}

\begin{arabtext}
'at_A .sadIquN 'il_A ^gu.hA ya.tlubu minhu .himArahu li-yarkabahu
fI safraTiN qa.sIraTiN wa-qAla lahu:

sawfa 'u'Iduhu 'ilayka fI al-masA'i, wa-'adfa'u laka lu^graTaN. \\
fa-qAla ^gu.hA:

'anA 'AsifuN ^giddaN 'annI lA 'asta.tI'u 'an 'u.haqqiqa
laka ra.gbataka, fa-al.himAru laysa hunA al-yawma. \\
wa-qabla 'an yutimmu ^gu.hA kalAmahu
bada'a al-.himAru yanhaqu fI i.s.tablihi. \\
fa-qAla lahu .sadIquhu:

'innI 'asma'u .himAraka yA ^gu.hA yanhaqu. \\
fa-qAla lahu ^gu.hA:

.garIbuN 'amruka yA .sadIqI!
'a-tu.saddiqu al-.himAra wa-tuka_d_dibunI?
\end{arabtext}

\end{document}
```

Figure 6: *Leftpanel: Sample Arabtex input in LaTeX, right panel: Sample Arabtex output in LaTeX*

- ⊡ Wiki supports LaTeX to writing the complex statistical forms into Arabic MM*Stat.
- ⊡ Integration of LaTeX
  - ▶ $< math > \ldots < /math >$
  - ▶ As graphics:
    $< math > E(X + Y) = E(X) + E(Y) \ < /math >$

Figure 7: Using LaTeX into Arabic MM*Stat

Figure 8: Edit case using LaTeX format

Integrate R program through Wiki into Arabic MM*Stat

- R is a language and environment for statistical computing and graphics.
- R was designed by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand 1997.
- R provides a wide variety of statistical and graphical techniques:
  - ▶ linear and nonlinear modelling.
  - ▶ classical statistical tests.
  - ▶ time-series analysis.
  - ▶ classification.
  - ▶ clustering.
- R is available as Free Software.

⊡ R will be integrated into Wiki.
⊡ Two new Tags
  ▸ $< R > \ldots < /R >$
  ▸ $< Rform > \ldots < /Rform >$

- ⊡ The Mediawiki is the software behind the Wikipedia.
- ⊡ This extension allows to run R programs within the Mediawiki and to display:
  - ▸ Tables
  - ▸ Graphical output
  - ▸ Interactive examples
- ⊡ Information and Download: (Dr. Sigbert Klinke)
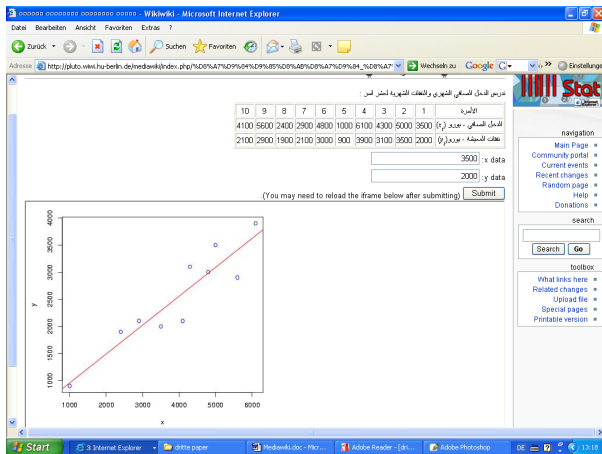 http://mars.wiwi.hu-berlin.de/mediawiki/sk/index.php/R-Plugin-for-MediaWiki

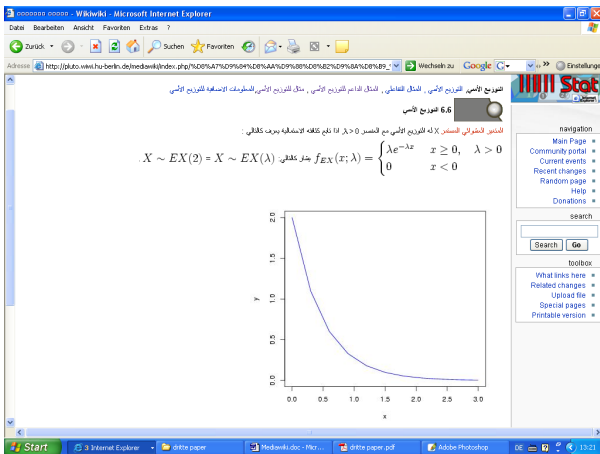Figure 9: The interactive example for linear regression.

Figure 10: The probability function of an exponential distribution.

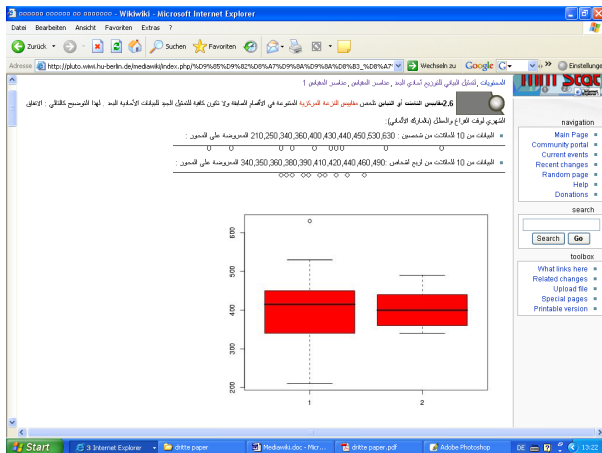Figure 11: Boxplot for measures of scale.

Conclusion

- ⊡ There is the possibility of creating an e-learning system with Arabic MM*Stat through the application of Wiki technology.
- ⊡ Rwiki is the solution for the interactive examples in Arabic MM*Stat.
- ⊡ LaTeX is the solution to writing the complex statistical forms into Arabic MM*Stat.
- ⊡ You are welcome to contribute to Arabic MM*Stat!

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