



Web-service GitHub and text editor \LaTeX as effective tools of revision and control of student works at universities

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Dagestan State Pedagogical University. Derbent, Russia

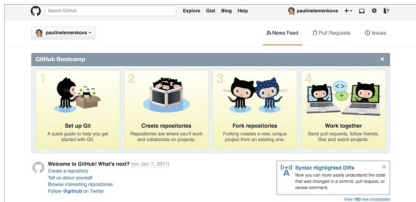
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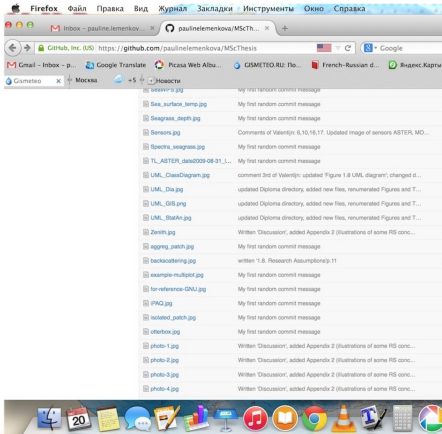
Some Facts



- Octocat (Octopus + Cat) is a symbol of GitHub. It symbolizes sharing a project.
- GitHub is available for free which is useful for students and researchers
- Slogan of GitHub: 'Social Coding', i.e. 'let's code it together'.
- It refers to the programming, but in this presentation I show using GitHub for MSc thesis

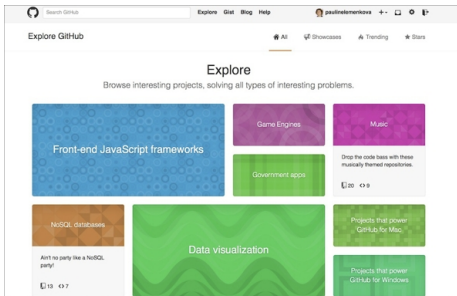
- GitHub - a web-service for hosting (i.e. serving and maintenance) of IT-projects online, as well as their development by multiple authors (incl. graduate projects development).
- GitHub is initially aimed at version control system Git (used in programming)
- GitHub is written in the programming language "Erlang" and "Ruby", a framework Ruby on Rails
- GitHub was created by GitHub, Inc, USA. The first private repository was established in 2008.





- Github allows adding various data types: code, graphics, etc.
- Github allows control latest changes, discuss and discuss work with students, post any comments directly into the text, add online comments
- Github allows registered users to add current version changes to the repository of the current project.
- Github keeps all update versions in the current projects online
- Github gives the opportunity for data sharing
- Github enables coworking

Advantages of Web-Service GitHub



- Online repositories
- Possibilities for co-authorship
- Creating PhD/MSc/BSc theses
- Presenting research works
- Writing and updating articles
- Archive of scientific works
- Sharing with colleagues
- Notification of current updates

L^AT_EX : Advantages over Traditional Text Editors

There are a number of drawbacks when using traditional programs for writing theses (e.g., MS Word). These difficulties are essential when writing a thesis:

- Continuous numbering of the text and illustrations breaks when changing or adding new ones in the middle of the text (which must be corrected manually)
- In case of MS Word, student has to double-check all references to literary sources again, which complicates the work and leads to mechanical difficulties and lengthy monotonous corrections.
- L^AT_EX has a built-in flexible system of bibliographic cross-referencing in the list of references, which enables making automatic linking to the bib sources, as well as updating links.
- L^AT_EX has a built-in BibTeX package that enables compiling bibliography in active mode and leaves hyper refs a d live links to references, i.e. Instantly editable if necessary.

Step 1: Key Generation

```
lease make sure you have the correct access rights
and the repository exists.
polinas-mbp:TeX_CV pauline$ cat ~/.gitconfig
[user]
  email = pauline.lemenkova@gmail.com
  name = paulinelelenkova
polinas-mbp:TeX_CV pauline$ git config --global user.name "Pauline Lemenkova"
polinas-mbp:TeX_CV pauline$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/Users/pauline/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /Users/pauline/.ssh/id_rsa.
Your public key has been saved in /Users/pauline/.ssh/id_rsa.pub.
The key fingerprint is:
5:b1:b2:5a:c1:3b:41:dd:bd:1f:e4:62:d8:8b:92:d4 pauline@polinas-mbp
The key's randomart image is:
--[ RSA 2048 ]-----+
  ..oo . |
  o .o . . |
  = + o o . |
  O E + . o |
  S . o o . |
  o + . . . |
  . . . |
  |
  |
-----+-----
polinas-mbp:TeX_CV pauline$ cat
C
polinas-mbp:TeX_CV pauline$ cat ~/.ssh/
id_rsa id_rsa.pub known_hosts
polinas-mbp:TeX_CV pauline$ cat ~/.ssh/id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCECufGPWrxmb1r/TmiUX7qdD438jrGt4v43/sY
KZC4AIQhp2zSZL3iqfBwi rogx+Y3rd1b2tOPDWF978Bkk+8HiaDc98zGAuce+o3Ga500qGw6nQL
G+Ite4tttem)+GFlm6Fv1eet9A0Dy4D0prIRHUKCY6kFlvL008qFVbMz3653Akg+Yb0LaVp6Zm7
```



Step 3: Generating Project

Key Commands and Tools:

```
GitHub_commands.txt
git init
git add files #all that I want to add
git commit -a -m "My first random commit message"
git diff
git remote add origin git@github.com:paulinelemenkova/CV-git
git push origin master
git add picture.jpg #may be something more to add
git commit -a -m "added my picture"
git push

touch .gitignore
echo ".aux" >> .gitignore
echo ".gz" >> .gitignore
echo ".log" >> .gitignore
echo ".out" >> .gitignore
echo ".pdf" >> .gitignore
echo ".synctex.gz" >> .gitignore

git diff
git status
git commit -a -m "changed ..."
git push

git diff
git commit -a -m "update statistics PASM 1B"
git push

.gitignore file for LaTeX projects
*.glo
*.idx
*.log
*.toc
*.ist
*.acn
*.acr
*.alg
*.bib
*.bbl
*.blg
*.dvi
*.gls
*.gls
*.log
*.ind
*.lof
*.lot
*.maf
*.nnc
*.BNCI
*.out
*.synctex.gz >> .gitignore
Lemenkova_CV.log
```

'git init' - initiation project from scratch. 'git add files' - selecting all files for the project. (texts, tables, graphs, maps, figures).

```
iTerm Shell Edit View Profiles Toolbelt Window Help
1 bash
nothing added to commit but untracked files present
polines@pauline:~/CV: pauline$ git diff
polines@pauline:~/CV: pauline$ pwd
/Users/pauline/Documents/DOCUMENTS/CURRICULUM_VITAE/TeX_CV
polines@pauline:~/CV: pauline$ ls -l
total 1568
-rw-r--r--  1 pauline  staff   3971 Dec 19 17:18 CV_Lemenkova.aux
-rw-r--r--  1 pauline  staff  61880 Dec 19 17:18 CV_Lemenkova.log
-rw-r--r--  1 pauline  staff   1824 Dec 19 17:18 CV_Lemenkova.tex
-rw-r--r--  1 pauline  staff  337858 Dec 19 17:18 CV_Lemenkova.pdf
-rw-r--r--  1 pauline  staff  186172 Dec 19 17:18 CV_Lemenkova.synctex.gz
-rw-r--r--  1 pauline  staff   57776 Dec 19 17:18 CV_Lemenkova.tex
-rw-r--r--  1 pauline  staff   58789 Feb 16 2013 Photo_Lemenkova-rr.jpg
-rw-r--r--  1 pauline  staff  135533 Oct 13 2006 Photo_Lemenkova.jpg
-rw-r--r--  1 pauline  staff   15008 Feb 16 2013 Photo_Polina.jpg
polines@pauline:~/CV: pauline$ ls -la
total 1592
drwxr-xr-x  14 pauline  staff   476 Dec 20 10:41 .
drwxr-xr-x  29 pauline  staff   986 Dec 20 10:41 ..
-rw-r--r--  1 pauline  staff   6148 Dec 20 10:41 .DS_Store
drwxr-xr-x  12 pauline  staff   408 Dec 20 10:19 git
-rw-r--r--  1 pauline  staff    76 Jan 8 2011 gitignore
-rw-r--r--  1 pauline  staff   3971 Dec 19 17:18 CV_Lemenkova.aux
-rw-r--r--  1 pauline  staff  61880 Dec 19 17:18 CV_Lemenkova.log
-rw-r--r--  1 pauline  staff   1824 Dec 19 17:18 CV_Lemenkova.out
-rw-r--r--  1 pauline  staff  337858 Dec 19 17:18 CV_Lemenkova.pdf
-rw-r--r--  1 pauline  staff  186172 Dec 19 17:18 CV_Lemenkova.synctex.gz
-rw-r--r--  1 pauline  staff   57776 Dec 19 17:18 CV_Lemenkova.tex
-rw-r--r--  1 pauline  staff   58789 Feb 16 2013 Photo_Lemenkova-rr.jpg
-rw-r--r--  1 pauline  staff  135533 Oct 13 2006 Photo_Lemenkova.jpg
-rw-r--r--  1 pauline  staff   15008 Feb 16 2013 Photo_Polina.jpg
polines@pauline:~/CV: pauline$ git log
commit 259166c8a8081440344e0c950f6a58f6cbf3
Author: paulinelemenkova <pauline.lemenkova@gmail.com>
Date: Sat Dec 20 10:27:06 2014 -0800

update 2014
```



Project Push and Update

```
l. bash
commit 33236a417e284fc6014438dc9d0c18372d5f060d
Author: paulinelemenkova <pauline.lenenkova@gmail.com>
Date: Sat Dec 20 10:27:06 2014 +0300

    update 2014

commit 386934c4d378117b22e179e296db7ad1f1b0fff
Author: Поліна Лемєнкова <pauline@me-0981.koleje.cuni.cz>
Date: Fri Jan 31 15:33:16 2014 +0100

    My CV update as of 31.01.2014

commit 045adf813437567ffc6fdcc26306891f922fc5812
Author: Pauline Lemenkova <pauline@para.g4.ntu.edu.tw>
Date: Thu Apr 11 14:50:53 2013 +0800

    updated my CV, Taiwan

commit e0e04c2e3dd5c427ea35a6f9930b14defcd7575
Author: Pauline Lemenkova <pauline@Pauline-Lemenkovas-MacBook-Pro.local>
Date: Wed Oct 24 17:36:37 2012 +0200

    current update of CV

paulina-nbp:TeX_CV pauline$ git show
commit 33236a417e284fc6014438dc9d0c18372d5f060d
Author: paulinelemenkova <pauline.lenenkova@gmail.com>
Date: Sat Dec 20 10:27:06 2014 +0300

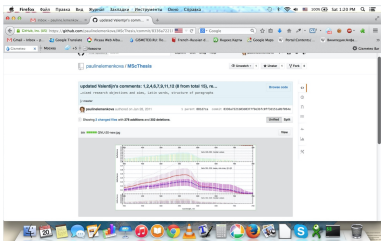
    update 2014

diff --git a/CV_Lemenkova.tex b/CV_Lemenkova.tex
index 076e2b0..fa3ad12 100644
--- a/CV_Lemenkova.tex
+++ b/CV_Lemenkova.tex
@@ -1,7 +1,10 @@
 %%%%%%%%%%%%%%%%%%%%%%%%%%%%% Document Setup %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
 \documentclass[10pt]{article}
 \usepackage{calc}
 \usepackage[greek, english]{babel}
```

- git commit -a -m 'name of update'
- e.g.: git commit -a -m 'added tables No 14, 15, 17'
- 'git diff' - a key command of GitHub,
- 'git diff' - detects and recognizes all updates in the text
- 'git diff' highlights them green/red, respectively

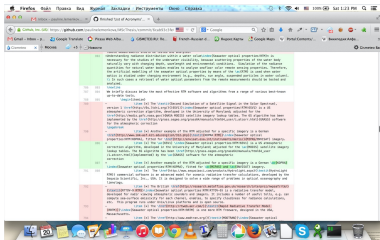


Syntax Coloring



- Important feature of Github: built-in color management for updated code
- All recent updates are syntactically highlighted green in the command line

- Added text, lines and whole fragments and paragraphs of paragraphs are colored green
- On the contrary, selected sections of text deleted from the last session are colored red.



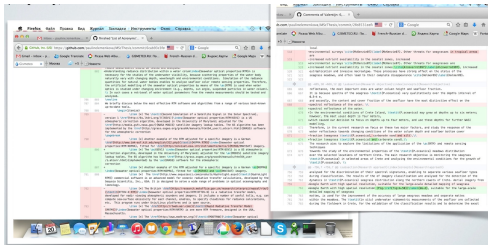
Advantages of GitHub in Academia

Time Monitoring

Using GitHub facilitates monitoring research progress and to assess the work done recently, to timely response to the comments and corrections of colleagues.

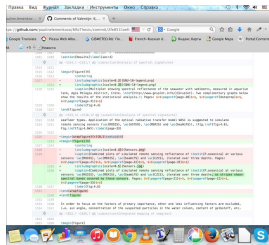
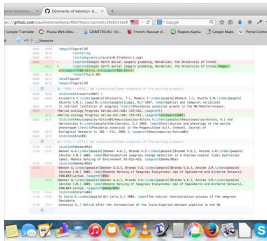
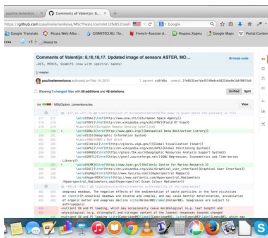
Retrospective Editing

Retrospective and comparative editing of texts in the Github environment allows to return to the old, previous version of the work, saved a while ago, to cancel updates.



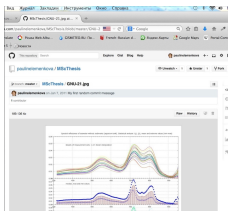
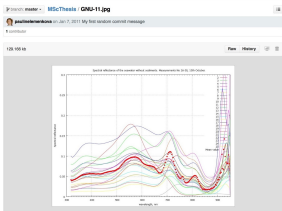
System of Control and Revision

All versions and changes of the thesis are recorded and available in the system. Thus, using GitHub revision control system and text code management, the project was regularly updated. Hence, supervisors can regularly monitor the project.



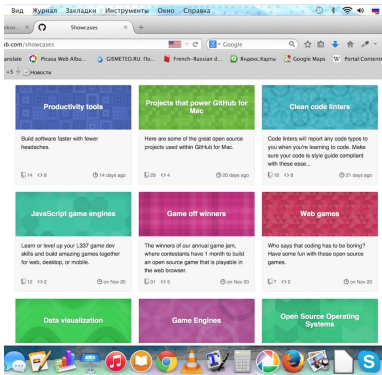
Unpublished Works

Both public and private repositories are maintained: the colleague/co-author/supervisors may receive private links to the current version of research and have access to the work.



```
1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 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1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 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```


Online Feature of GitHub: Data-Sharing



GitHub's use of the standard command line interface in programming

- Adding current version changes to the repository of the current project.
- Supports both a public repository and a closed one in limited access (private).
- Keeping closed unpublished works, with restricted access to coworkers.
- Successfully defended dissertations, master's projects and theses can be posted in open access.
- Access is configured for both the general public and the university archive.
- Data can be stored there for an unlimited time.

Project Interface in the Github Environment

Opportunities

GitHub: excellent opportunities in academia for supervisors, students, lecturers, researchers.

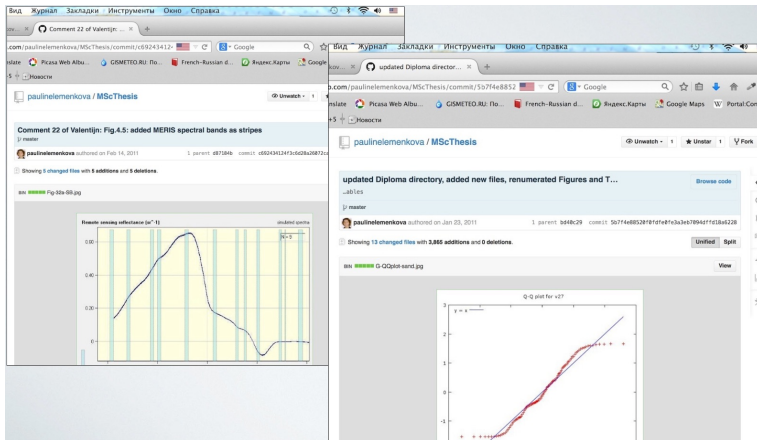
Monitoring

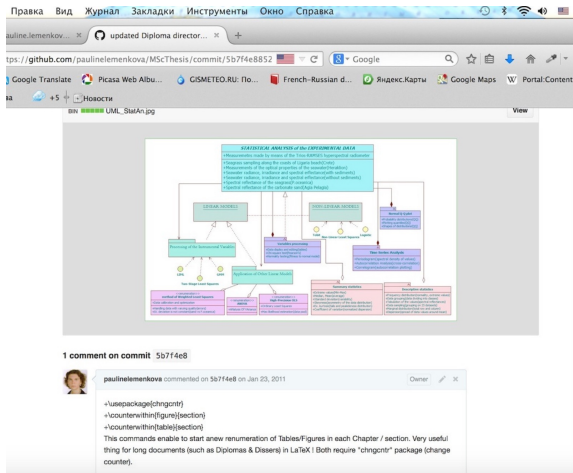
The use of \LaTeX and Github provided timely access for the project's supervisors to monitor research progress

Examples

Updating Unlike traditional MS Word, combination of \LaTeX and Github allowed supervisors to check current progress on-line as updates, comments and corrections made.

Adding New Data to the Project





The screenshot shows a web browser window displaying a GitHub commit page. The browser's address bar shows the URL: `https://github.com/paulinelemenkova/MScThesis/commit/5b7f4e8852`. The page title is "updated Diploma director...". The main content is a commit message for commit `5b7f4e8` by `paulinelemenkova` on Jan 23, 2011. The commit message includes a title "STATISTICAL ANALYSIS OF THE ECONOMIC GROWTH" and a detailed description of the thesis content, such as "Measurements made by means of the Van Kampen's asymptotic method" and "Integration sampling along the roots of Laguerre's method". Below the commit message, there is a section titled "1 comment on commit 5b7f4e8" with a comment from `paulinelemenkova` on Jan 23, 2011. The comment contains the following text: `+usepackage{chngcntr}`, `+\counterwithin{figure}{section}`, `+\counterwithin{table}{section}`, and a paragraph explaining that these commands enable starting a new renumbering of Tables/Figures in each Chapter / section, which is very useful for long documents like Diplomas & Dissers in LaTeX. Both require the `"chngcntr"` package (change counter).

Audience

Despite obvious advantages and prospects of the GitHub service, the majority of its users are programmers and IT specialists. Using GitHub in academia is still limited.

Popularization in Academia

There is an need to popularize and demonstrate the GitHub service and environment in the student and academic environment: in research centers, universities, institutes.

Examples

Geologists: Getting acquainted with GitHub would be of especial advantage for faculties of natural and Earth sciences, since they often have common fieldwork data and projects.

Current problem with GitHub and \LaTeX is their non-popularity in academia caused by following reasons.

Student Works

Some students are not informed about the \LaTeX or GitHub and do not know how to use them. The functionality of these tools, multifunctional environments should be popularized.

Difficulty of Learning Curve

GitHub and \LaTeX are sometimes regarded as difficult programs. The basics of using \LaTeX and GitHub should be initially studied for some time, but it is rewarding. Further advantages of using \TeX and GitHub are obvious and worth the efforts and time to master them.

Examples

Advantages: Joint combination of using \LaTeX and GitHub facilitates writing, typesetting and managing versions upgrades while working on a project.

Opportunities

Traditional for IT industry and programmers, GitHub offers great opportunities for effective collaboration such as 'student-supervisor' or 'group of students' or 'group of colleagues'.

Unlike traditional programs, the use of innovative technologies of text editors, such as \LaTeX and data archiving such as GitHub allows supervisor to monitor student's research progress.

Advantages

A great advantage of GitHub consists in its color syntax and maintaining history of updates versions. The presentation demonstrated conceptual principles of the Github and \LaTeX .

Possibilities

The possibilities for collaborative data sharing, research progress updating and creative works are illustrated. Current work is a technical illustration of using IT in education.

Résumé

This work aimed to give an example of the effective use of the GitHub web service specifically in an academic environment. The case study was given to a MSc thesis that was written completely using \LaTeX and GitHub. The presentation illustrated how specifically one can apply new technologies and innovative approaches in the educational environment.

Highlights

Technical issues of running project, creating repositories, making updates, adding new files to the system are demonstrated with a series of screenshot illustrations of the process. Important conceptual features and advantages of using Github and \LaTeX in the academic environment are listed and discussed.

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Thank you for attention !

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