

Setting up a minimal neovim environment for data science code development

A neovim IDE for R, Python, and Julia

Ronald (Ryy) Glenn Thomas

2023-05-15

Table of contents

1	Introduction	1
2	Install the latest stable version of neovim.	2
3	Configure neovim	2
4	plugin discussions	6
5	cmp config	6
6	basics	8
7	Set up R	10
8	Appendix Ubuntu tweaks	11

1 Introduction

Neovim (a fork of Vim) is a text editor that has several advantages for data science code development. One of the main



Photo by Nathan Waters on Unsplash

attractions is that it is open source and has a number of useful plugins to facilitate working on R, python, and julia code. Also, its modal, keyboard-centric system allows text and code manipulation at potentially far greater speed than conventional, mouse-centric, systems.

In this post we describe both a minimal, yet functional setup, as well as a more extensive setup utilizing several of the newest neovim-only plugins, for neovim to allow IDE style code editing and REPL interaction for the three primary data science coding tools: R, Python, and Julia.

Our presentation here is for a MacOS environment. Appendix one contains required adjustments for a ubuntu linux environment.

2 Install the latest stable version of neovim.

With minimal effort we can install both the terminal and GUI versions of neovim. The simplest approach is to use homebrew:

```
> brew install neovim neovim-qt
```

Set up convenience aliases in zsh.

```
> alias ng = neovim-qt
> alias nt = neovim
```

(mnemonic: the **t** in **nt** is for terminal, the **g** in **ng** is for GUI)

3 Configure neovim

The standard location for **neovim** configuration files on “unix-like” systems is `~/.config/nvim`. The main config file is either `init.vim` (VimL) or `init.lua` (Lua). In this post we’ll focus on lua based configuration.

Specifically, the following code block creates an `nvim` subdirectory under `~/.config` and initialize a configuration file `init.lua`.

Here is the file hierarchy we'll construct. In fact all the code could be bundled into the `init.lua` file, but this approach is clearer and cleaner.

```
.
|-- ginit.vim
|-- init.lua
|-- lazy-lock.json
|-- lua
|   |-- basics.lua
|   |-- leap-config.lua
|   |-- nvim-R-config.lua
|   |-- nvim-cmp-config.lua
|   |-- nvim-telescope-config.lua
|   |-- nvim-tree-config.lua
|   `-- treesitter-config.lua
|-- my_snippets
|   |-- all.snippets
|   |-- giles.tex.snippets
|   |-- mail.snippets
|   |-- r.snippets
|   |-- rmd.snippets
|   |-- snippets.snippets
|   |-- tex.snippets
|   |-- text.snippets
|   `-- txt.snippets
|-- spell
|   |-- en.utf-8.add
|   `-- en.utf-8.add.spl
```

To install the lazy plugin manager

```
git clone https://github.com/folke/lazy.nvim.git \
  ~/.local/share/nvim/lazy/lazy.nvim
```

Add the following code to `init.lua` list the plugins needed to

be installed from `github` and “feed” them to `Lazy` for installation.

Nvim-R, Leap, UltiSnips, and vimtex need additional configuration. The required code is contained in bespoke files under the `lua` directory.

```
vim.g.mapleader = " "
vim.g.maplocalleader = ","
vim.opt.rtp:prepend("~/local/share/nvim/lazy/lazy.nvim")
require('plugins')

require('nvim-cmp-config')
require('lspconfig'.lua_ls.setup{}
require('lspconfig'.r_language_server.setup{}

require('basics')
require('nvim-tree-config')
require('nvim-R-config')
require('nvim-telescope-config')
require('leap').add_default_mappings()
require('leap-config')

vim.api.nvim_create_autocmd('LspAttach', {
  desc = 'LSP actions',
  callback = function()
    local bufmap = function(mode, lhs, rhs)
      local opts = {buffer = true}
      vim.keymap.set(mode, lhs, rhs, opts)
    end
    bufmap('n', 'K', '<cmd>lua vim.lsp.buf.hover()<cr>')
    bufmap('n', 'gl', '<cmd>lua vim.diagnostic.open_float()<cr>')
    bufmap('n', '[d', '<cmd>lua vim.diagnostic.goto_prev()<cr>')
    bufmap('n', ']d', '<cmd>lua vim.diagnostic.goto_next()<cr>')
  end
})
```

List of plugins

```

require('lazy').setup({
--
--minimal data science setup
--
'jalvesaq/Nvim-R',
'lervag/vimtex',
'SirVer/ultisnips',
'honza/vim-snippets',
'jmbuhr/otter.nvim',
'quarto-dev/quarto-nvim',
'jalvesaq/vimcmdline',
--
--optional utilities
--
{ "bluz71/vim-moonfly-colors", name = "moonfly", lazy = false, priority = 1000 },
'junegunn/vim-peekaboo',
'preservim/nerdcommenter',
'machakann/vim-highlightedyank',
'kylechui/nvim-surround',
--'junegunn/fzf',
'ggandor/leap.nvim',
--'rhysd/clever-f.vim',
'junegunn/goyo.vim',
'junegunn/limelight.vim',
'junegunn/vim-easy-align',
'voldikss/vim-floaterm',
--
--neovim specific
--
'nvim-lua/plenary.nvim',
'nvim-tree/nvim-web-devicons',
'nvim-tree/nvim-tree.lua',
'nvim-telescope/telescope.nvim',
'nvim-treesitter/nvim-treesitter',
'neovim/nvim-lspconfig',
'hrsh7th/nvim-cmp',
'uga-rosa/cmp-dictionary',
'tamago324/cmp-zsh',
--'hrsh7th/cmp-nvim-lsp-signature-help',

```

```

'hrsh7th/cmp-nvim-lsp',
'hrsh7th/cmp-buffer',
'hrsh7th/cmp-path',
'hrsh7th/cmp-cmdline',
'quangnguyen30192/cmp-nvim-ultisnips',
'jalvesaq/cmp-nvim-r',
'LuaLS/lua-language-server',
})

```

4 plugin discussions

5 cmp config

```

local kind_icons = {
  Function = "f",
  Snippet = "s",
  Text = "t",
}

local cmp_ultisnips_mappings = require("cmp_nvim_ultisnips.mappings")
local cmp = require'cmp'
--local lspkind = require('lspkind')

local mappings = {
  ["<Tab>"] = cmp.mapping(
    function(fallback)
      cmp_ultisnips_mappings.compose { "select_next_item" }(fallback)
    end,
    { "i", "s", --[[ "c" (to enable the mapping in command mode) ]] }
  ),
  ["<S-Tab>"] = cmp.mapping(
    function(fallback)
      cmp_ultisnips_mappings.compose { "select_prev_item" }(fallback)
    end,
    { "i", "s", --[[ "c" (to enable the mapping in command mode) ]] }
  ),
}

```

```

}

cmp.setup({
  window = {
    completion = cmp.config.window.bordered(),
    documentation = cmp.config.window.bordered(),
  },
  formatting = {
    format = function(entry, vim_item)
      vim_item.kind = string.format("%s %s", kind_icons[vim_item.kind], vim_item.kind) --Con
      vim_item.menu = ({
        spell = "[Spellings]",
        ultisnips = "[Snip]",
        cmp_nvim_r = "[R]",
      })[entry.source.name]
      return vim_item
    end,
  },
  snippet = {
    expand = function(args)
      vim.fn["UltiSnips#Anon"](args.body)
    end,
  },

  sources = cmp.config.sources({
    { name = "nvim_lsp" },
    { name = 'cmp_nvim_r' },
    { name = 'nvim_lua' },
    { name = "ultisnips" },
    { name = "dictionary", keyword_length=4, },
    { name = "buffer", option = { get_bufnrs = function()
      return vim.api.nvim_list_bufs()
    end
    }},
    { name = "path" },
    { name = "calc" }
  }),
  mapping = mappings,
})

```

```

require('lspconfig')['r_language_server'].setup {
  capabilities = capabilities
}

require'cmp_nvim_r'.setup({
  filetypes = {'r', 'rmd', 'quarto'},
  doc_width = 58
})

```

6 basics

```

local map = vim.keymap.set
local opts = {noremap = true}
vim.cmd([[
"    copy clipboard to register x for safe keeping
nnoremap <leader>x :let @x=@*
"    paste registers into terminal
tnoremap <expr> <C-R> '<C-\><C-N>'.nr2char(getchar()).'pi'
set background=dark
"colorscheme evening
colorscheme moonfly
let $FZF_DEFAULT_COMMAND = 'rg --files --hidden'
set completeopt=menu,menuone,noinsert,noselect
set number relativenumber
set textwidth=80
set cursorline
set clipboard=unnamed
set iskeyword-=_
set hlsearch
set splitright
set hidden
set incsearch
set noswapfile
set showmatch
set ignorecase
set smartcase

```



```

set gdefault
filetype plugin on
set encoding=utf-8
set nobackup
set nowritebackup
set updatetime=300
set signcolumn=yes
set colorcolumn=80
autocmd! User GoyoEnter Limelight
autocmd! User GoyoLeave Limelight!

set dictionary+=/usr/share/dict/words
set thesaurus+=/Users/zenn/mthesaur.txt

let g:UltiSnipsSnippetDirectories=["UltiSnips", "my_snippets"]
let g:UltiSnipsEditSplit="vertical"
let g:UltiSnipsUsePythonVersion = 3

autocmd FileType julia,python noremap <buffer> <C-CR> :call VimCmdLineStartApp()<CR>
autocmd FileType julia,python noremap <buffer> <CR> :call VimCmdLineSendLine()<CR>
]])
map('n', ':', ';', opts)
map('n', ';', ':', opts)
map('n', '<leader>u', ':UltiSnipsEdit<cr>', opts)
map('n', '<Space><Space>', '<C-d>', opts)
map('n', '-', '$', opts)
map('n', '<leader>w', 'vipgq', opts)
map('n', '<leader>v', ':edit ~/.config/nvim/init.lua<cr>', opts)
map('n', '<leader>n', ':edit ~/.config/nvim/lua/basics.lua<cr>', opts)
map('n', '<leader>a', 'ggVG', opts)
map('n', '<leader>t', ':tab split<cr>', opts)
map('n', '<leader>y', ':vert sb3<cr>', opts)
map('n', '<leader>0', ':ls!<CR>:b<Space>', opts)
map('n', '<localleader><localleader>', '<C-w>w', opts)
map('n', '<leader>1', '<C-w>:b1<cr>', opts)
map('n', '<leader>2', '<C-w>:b2<cr>', opts)
map('n', '<leader>3', '<C-w>:b3<cr>', opts)
map('n', '<leader>4', '<C-w>:b4<cr>', opts)
map('n', '<leader>5', '<C-w>:b5<cr>', opts)

```

```

map('n', '<leader>6', '<C-w>:b6<cr>', opts)
map('n', '<leader>7', '<C-w>:b7<cr>', opts)
map('n', '<leader>8', '<C-w>:b8<cr>', opts)
map('n', '<leader>9', '<C-w>:b9<cr>', opts)
map('t', 'ZZ', "q('yes')<CR>", opts)
map('t', 'ZQ', "q('no')<CR>", opts)
map('v', '-', '$', opts)
map('t', '<leader>0', '<C-\\><C-n><C-w>:ls!<cr>:b<Space>', opts)
map('t', '<Escape>', '<C-\\><C-n>', opts)
map('t', '<localeader><localleader>', '<C-\\><C-n><C-w>w', opts)
map('i', '<Esc>', '<Esc>`^', opts)

vim.api.nvim_create_autocmd(
  { "BufRead", "BufNewFile" },
  { pattern = { "*.txt", "*.md" }, command = "setlocal spell" }
)

```

7 Set up R

```

vim.cmd([[
let R_auto_start = 2
let R_hl_term = 0
let R_clear_line = 1
let R_pdfviewer = "zathura"
let R_assign = 2
let R_latexcmd = ['xelatex']
augroup rmarkdown
autocmd!
autocmd FileType rmd,r noremap <buffer> <CR> :call SendLineToR("down")<CR>
autocmd FileType rmd,r noremap <buffer> <space> :call RMakeRmd("default")<cr>
autocmd FileType rmd,r noremap <space>i :call RAction("dim")<cr>

```

```
autocmd FileType rmd,r noremap <space>h :call RAction("head")<cr>
autocmd FileType rmd,r noremap <space>p :call RAction("print")<cr>
autocmd FileType rmd,r noremap <space>q :call RAction("length")<cr>
autocmd FileType rmd,r noremap <space>n :call RAction("nvim.names")<cr>
autocmd FileType rmd,r vmap <buffer> <CR> <localleader>sd
autocmd FileType rmd,r nmap <buffer> <space>j <localleader>gn
autocmd FileType rmd,r nmap <buffer> <space>k <localleader>gN
autocmd FileType rmd,r nmap <buffer> <space>l <localleader>cd
augroup END
]])
```

8 Appendix Ubuntu tweaks