

rdex-server

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1 code/rdex_config.py

```
host = "your.public.fqdn"
mountpoint = "/moo" # leading "/" required
mountpointname = "moo"
mountpointicon = "moo.png"
5 image_dir = '/path/to/moo/images'
  image_url = '/moo/images'
  style_url = '/moo/style'
  database_host = 'localhost'
  database_user = 'rdex'
10 database_pass = '****'
  database_db = 'rdex'
  database_sock = '/var/run/mysqld/mysqld.sock'
```

2 code/rdex_initdb.py

```

# =====
# rdex -- reaction-diffusion explorer
# Copyright (C) 2008,2009,2019 Claude Heiland-Allen <claude@mathr.co.uk>
# License http://www.fsf.org/licenses/licenses/agpl-3.0.html
5 # -----
# rdex server
# =====

# =====
10 # imports
import os
import sys
import string
import MySQLdb

15 # =====
# configuration
PROJECTDIR = os.path.dirname(__file__)
sys.path.append(PROJECTDIR)

20 from rdex_config import *

# =====
# database connector
25 def dbconnect():
    return MySQLdb.connect(
        host = database_host,
        user = database_user,
        passwd = database_pass,
30         db = database_db,
        unix_socket = database_sock)

def create():
    query = [ ]
35     query.append(''
        CREATE TABLE rdex (
            id INTEGER NOT NULL AUTOINCREMENT UNIQUE PRIMARY KEY,
            ru DOUBLE NOT NULL,
            rv DOUBLE NOT NULL,
40             f DOUBLE NOT NULL,
            k DOUBLE NOT NULL,
            behaviour VARCHAR(255),
            coarseness_u DOUBLE,
            contrast_u DOUBLE,
45             directionality_u DOUBLE,
            coarseness_v DOUBLE,
            contrast_v DOUBLE,
            directionality_v DOUBLE
        ''')
50     for r in range(0,8):
        for g in range(0,8):
            for b in range(0,8):
                query.append(' hist_%s_%s_%s DOUBLE' % (r, g, b))
        for s in range(0,32):
55             query.append(' seg_%s DOUBLE' % s)
        query.append('')
    query = string.join(query, '')

```

```

    conn = dbconnect()
    cursor = conn.cursor()
60   cursor.execute(query)
    cursor.close()
    conn.close()

```

3 code/rdex.wsgi

```

# =====
# rdex -- reaction-diffusion explorer
# Copyright (C) 2008,2009,2019 Claude Heiland-Allen <claude@mathr.co.uk>
# License http://www.fsf.org/licenses/licenses/agpl-3.0.html
5 # -----
# rdex server
# =====

# =====
10 # imports
    from webob import Request, Response, exc
    import re
    import math
    import string
15   import random
    import os
    import sys
    import MySQLdb
    from PIL import Image
20
# =====
# configuration
PROJECTDIR = os.path.dirname(__file__)
sys.path.append(PROJECTDIR)
25
    from rdex_config import *

    colour_buckets = 8
    segment_buckets = 32
30   emptyOutput = [ '<div id="empty">(nothing found)</div>' ]

# =====
# style
    focus_rows = 2
35   focus_cols = 2
    gallery_rows = 8
    gallery_cols = 8
    thumbnailsize = (64, 64)

40   def toggleclass(name, mode):
        if name == mode:
            return "active"
        else:
            return "inactive"
45
    def theme_page(mode, body, id = None, count = None, coords = None):
        title = "rdex :: %s :: %s" % (mountpointname, mode)
        idstr = ""
        if id != None:

```

```

50     idstr = "%s" % id
        title = "%s :: %s" % ( title , id)
        latest = ""
        if count != None:
            latest = latesttable(mode, count)
55     coordsstr = "&nbsp;"
        if coords != None:
            coordsstr = "<dl><dt>ru</dt><dd>%s</dd><dt>rv</dt><dd>%s</dd><dt>f</dt><dd>%s</dd><dt>k</dt><dd>%s</dd></dl>" % ( coords['ru'], coords['rv'], ↵
                ↵ coords['f'], coords['k'] )
        return ''
<html>
60     <head>
        <title>%s</title>
        <link rel="shortcut icon" href="%s/rdex.ico" type="image/x-icon" />
        <link rel="stylesheet" type="text/css" href="%s/rdex.css" />
    </head>
65     <body>
        <div id="page">
            <h1 id="logo"><a href="/" title="rdex"></a></h1>
            <h2 id="logo2"><a href="%s/" title="%s"></a></h2 ↵
                ↵ >
            <div id="prelatest">&nbsp;</div>
70     <div id="latest">%s</div>
        <div id="navigation">
            <div id="premetrics">&nbsp;</div>
            <div id="metrics">
                <div class="toggle %s"><a href="%s/nearby%s" title="nearby" >nearby</a ↵
                    ↵ ></div>
75     <div class="toggle %s"><a href="%s/colour%s" title="colour" >colour</a ↵
                    ↵ ></div>
                <div class="toggle %s"><a href="%s/texture%s" title="texture" >texture</ ↵
                    ↵ a></div>
                <div class="toggle %s"><a href="%s/segment%s" title="segment" >segment</ ↵
                    ↵ a></div>
            </div>
        </div>
80     <div id="content">
        %s
    </div>
    <div id="footer">
        <div id="coords">%s</div>
85     </div>
    </div>
</body>
</html>
''' % ( title , style_url , style_url ,
90     style_url ,
        mountpoint, mountpointname, style_url , mountpointicon, mountpointname,
        latest ,
        toggleclass(" nearby", mode), mountpoint, idstr ,
        toggleclass(" colour", mode), mountpoint, idstr ,
95     toggleclass(" texture", mode), mountpoint, idstr ,
        toggleclass(" segment", mode), mountpoint, idstr ,
        body,
        coordsstr )

```

```

100 # =====
# routing regex
var_regex = re.compile(r'''
    \{                # The exact character "{"
    (\w+)             # The variable name (restricted to a-z, 0-9, _)
105    (?:::([^\}]+))?)? # The optional :regex part
    \}                # The exact character "}"
''', re.VERBOSE)

# =====
110 # routing templates
def template_to_regex(template):
    regex = ''
    last_pos = 0
    for match in var_regex.finditer(template):
115         regex += re.escape(template[last_pos:match.start()])
         var_name = match.group(1)
         expr = match.group(2) or '[^/]+'
         expr = '(?P<%s>%s)' % (var_name, expr)
         regex += expr
120         last_pos = match.end()
    regex += re.escape(template[last_pos:])
    regex = '^%s$' % regex
    return regex

125 # =====
# router class
class Router(object):
    def __init__(self):
        self.routes = []
130    def add_route(self, template, controller, **vars):
        self.routes.append((re.compile(template_to_regex(template)), controller, ↵
            ↵ vars))
    def __call__(self, environ, start_response):
        req = Request(environ)
        for regex, controller, vars in self.routes:
135             match = regex.match(req.path_info)
             if match:
                 req.urlvars = match.groupdict()
                 req.urlvars.update(vars)
                 return controller(environ, start_response)
140         return exc.HTTPNotFound()(environ, start_response)

# =====
# redirect class
class Redirect(object):
145     def __init__(self, url):
        self.url = url
    def __call__(self, environ, start_response):
        return exc.HTTPFound(location = self.url)(environ, start_response)

150 # =====
# redirect latest class
class RedirectLatest(object):
    def __init__(self, url):
        self.url = url

```

```

155     def __call__(self, environ, start_response):
        conn = dbconnect ()
        count = getcount(conn)
        conn.close()
        if count == None: # or count < 1:
160             return exc.HTTPNotFound()(environ, start_response)
        else:
            return exc.HTTPFound(location = ("%s/%s" % ( self.url, count)))(environ, ↵
                ↵ start_response)

165 # =====
# redirect random class
class RedirectRandom(object):
    def __init__(self, url):
        self.url = url
170     def __call__(self, environ, start_response):
        conn = dbconnect ()
        cursor = conn.cursor ()
        cursor.execute ("SELECT COUNT(id) FROM rdex")
        results = cursor.fetchall ()
175         if cursor.rowcount < 1:
            cursor.close ()
            conn.close ()
            return exc.HTTPNotFound()(environ, start_response)
        else:
180             count = 1
            for row in results:
                count = row[0]
            cursor.close ()
            conn.close ()
185             id = random.randrange(count) + 1
            return exc.HTTPFound(location = ("%s/%s" % ( self.url, id)))(environ, ↵
                ↵ start_response)

# =====
# controller wrapper
190     def rest_controller(cls, ctype = None):
        def replacement(environ, start_response):
            req = Request(environ)
            try:
                instance = cls(req, **req.urlvars)
195                 action = req.urlvars.get('action')
                if action:
                    action += '_' + req.method.lower()
                else:
                    action = req.method.lower()
200                 try:
                    method = getattr(instance, action)
                except AttributeError:
                    raise exc.HTTPNotFound("No action %s" % action)
                resp = method()
205                 if isinstance(resp, basestring):
                    resp = Response(body=resp)
                    if ctype != None:
                        resp.content_type = ctype
            except exc.HTTPException, e:

```

```

210         resp = e
        return resp(envIRON, start_response)
        return replacement

# =====
215 # database connector
def dbconnect():
    return MySQLdb.connect(
        host = database_host,
        user = database_user,
220     passwd = database_pass,
        db    = database_db)

# =====
# database count helper
225 def getcount(conn):
    count = None
    cursor = conn.cursor ()
    cursor.execute ("SELECT COUNT(id) FROM rdex")
    results = cursor.fetchall ()
230     if cursor.rowcount > 0:
        for row in results:
            count = row[0]
    cursor.close ()
    return count

235 # =====
# database coords helper
def getcoords(conn, id):
    coords = None
    cursor = conn.cursor ()
240     cursor.execute ( "SELECT ru,rv,f,k FROM rdex WHERE id = '%s'" % conn.cursor().execute(
        ↳ escape_string('%s'%id) )
    results = cursor.fetchall ()
    if cursor.rowcount > 0:
        coords = { }
245     for row in results:
        coords['ru'] = row[0]
        coords['rv'] = row[1]
        coords['f'] = row[2]
        coords['k'] = row[3]
250     cursor.close ()
    return coords

# =====
# database row fetcher helper
255 def fetchids(cursor):
    ids = [ ]
    for y in range(0,gallery_rows):
        for x in range(0,gallery_cols):
            row = cursor.fetchone ()
260             if row != None:
                ids.append(row['id'])
            else:
                ids.append(None)
    return ids
265

```



```

# =====
# focus table creator
def focustable(id):
    output = [ ]
270    output.append('<table id="focused">')
    for y in range(0,focus_rows):
        output.append('<tr>')
        for x in range(0,focus_cols):
            output.append('<td></td>' % ( image_url, ↵
                ↵ id, id ) )
275    output.append('</tr>')
    output.append('</table>')
    return string.join(output, '')

# =====
280 # latest table creator
def latesttable(mode, id):
    output = [ ]
    output.append('<table>')
    output.append('<tr>')
285    for x in range(0,12):
        if (id > 0):
            output.append(thumbnailcell(mode, id))
        else:
            output.append("&<td>&nbsp;</td>")
290    id = id - 1
    output.append('</tr>')
    output.append('</table>')
    return string.join(output, '')

295 # =====
# thumbnail creator
def thumbnailcell(mode,id):
    return '<td><a href="%s/%s/%s" title="%s"></a>↵
        ↵ ></td>' % ( mountpoint, mode, id, id, image_url, id, id )

300 # =====
# thumbnail table creator
def thumbnailtable(mode, ids):
    output = [ ]
    output.append('<table id="related">')
305    i = 0
    for y in range(0,gallery_rows):
        output.append('<tr>')
        for x in range(0,gallery_cols):
            if (ids[i]) != None:
310                output.append(thumbnailcell(mode, ids[i]))
            else:
                output.append('<td>&nbsp;</td>')
            i = i + 1
        output.append('</tr>')
315    output.append('</table>')
    return string.join(output, '')

# =====
# gallery texture class
320 class GalleryTexture(object):

```

```

def __init__(self, req, id):
    self.request = req
    self.id = id
def get(self):
325     conn = dbconnect ()
        cursor = conn.cursor (MySQLdb.cursors.DictCursor)
        cursor.execute ("SELECT coarseness_u ,contrast_u ,directionality_u ,↵
            ↵ coarseness_v ,contrast_v ,directionality_v FROM rdex WHERE id = '%s'" % ↵
            ↵ conn.escape_string('%s'%self.id))
        me = cursor.fetchone()
        if me != None:
330             cursor.close ()
            cursor = conn.cursor (MySQLdb.cursors.DictCursor)
            cursor.execute (',',
                SELECT id FROM rdex ORDER BY (
                    (ABS(coarseness_u - '%s') / 0.11) + (ABS(contrast_u - '%s') / 0.16) + (↵
                    ↵ ABS(directionality_u - '%s') / 0.51) +
335                    (ABS(coarseness_v - '%s') / 0.11) + (ABS(contrast_v - '%s') / 0.16) + (↵
                    ↵ ABS(directionality_v - '%s') / 0.51) ) ASC
                ', '% (
                    conn.escape_string('%s'%me['coarseness_u']), conn.escape_string('%s'%me↵
                    ↵ ['contrast_u']), conn.escape_string('%s'%me['directionality_u']),
                    conn.escape_string('%s'%me['coarseness_v']), conn.escape_string('%s'%me↵
                    ↵ ['contrast_v']), conn.escape_string('%s'%me['directionality_v']) )↵
                ↵ )
            output = [ ]
340             row = cursor.fetchone ()
            if row != None:
                id = row['id']
                output.append(focustable(id))
                output.append(thumbnailtable('texture', fetchids(cursor)))
345             else:
                output = emptyOutput
            else:
                output = emptyOutput
            count = getcount(conn)
350             coords = getcoords(conn, self.id)
            conn.close ()
            return theme_page('texture', string.join(output, ''), self.id, count, coords↵
                ↵ )

# =====
355 # gallery colour class
class GalleryColour(object):
    def __init__(self, req, id):
        self.request = req
        self.id = id
360     def get(self):
        conn = dbconnect ()
        cursor = conn.cursor (MySQLdb.cursors.DictCursor)
        query = []
        query.append("SELECT id")
365         for r in range(0,colour_buckets):
            for g in range(0,colour_buckets):
                for b in range(0,colour_buckets):
                    query.append(",hist_%s_%s_%s" % (r,g,b))
        query.append(" FROM rdex WHERE id = '%s'" % conn.escape_string('%s'%self.id))↵

```

```

        ↵ )
370     query = string.join(query, '')
        cursor.execute(query)
        me = cursor.fetchone()
        if me != None:
            cursor.close ()
375     cursor = conn.cursor (MySQLdb.cursors.DictCursor)
            query = []
            query.append("SELECT id FROM rdex ORDER BY (")
            for r in range(0,colour_buckets):
                for g in range(0,colour_buckets):
380                     for b in range(0,colour_buckets):
                        query.append("ABS(hist_%%s_%%s_%%s - '%s') + " % (r,g,b,conn.↵
                            ↵ escape_string('%%s'%me['hist_%%s_%%s_%%s' % (r,g,b)])))
            query.append("'0' ) ASC")
            query = string.join(query, '')
            cursor.execute(query)
385     output = [ ]
            row = cursor.fetchone ()
            if row != None:
                id = row['id']
                output.append(focustable(id))
390             output.append(thumbnailable('colour', fetchids(cursor)))
            else:
                output = emptyOutput
            else:
                output = emptyOutput
395     count = getcount(conn)
            coords = getcoords(conn, self.id)
            conn.close ()
            return theme_page('colour', string.join(output, ''), self.id, count, coords)

400 # =====
# gallery nearby class
class GalleryNearby(object):
    def __init__(self, req, id):
        self.request = req
405     self.id = id
    def get(self):
        conn = dbconnect ()
        cursor = conn.cursor (MySQLdb.cursors.DictCursor)
        cursor.execute ("SELECT ru,rv,f,k FROM rdex WHERE id = '%s'" % conn.↵
            ↵ escape_string('%s'%self.id))
410     me = cursor.fetchone()
        if me != None:
            cursor.close ()
            cursor = conn.cursor (MySQLdb.cursors.DictCursor)
            cursor.execute ('''
415     SELECT id FROM rdex ORDER BY (
                ((ru - '%s') * (ru - '%s') * 4) + ((rv - '%s') * (rv - '%s') * 4) +
                ((f - '%s') * (f - '%s') * 10) + ((k - '%s') * (k - '%s') * 10) ) ASC
                ''' % (
                    conn.escape_string('%s'%me['ru']), conn.escape_string('%s'%me['ru']),
420     conn.escape_string('%s'%me['rv']), conn.escape_string('%s'%me['rv']),
                    conn.escape_string('%s'%me['f']), conn.escape_string('%s'%me['f']),
                    conn.escape_string('%s'%me['k']), conn.escape_string('%s'%me['k']) ) )
            output = [ ]

```

```

        row = cursor.fetchone ()
425     if row != None:
        id = row['id']
        output.append(focustable(id))
        output.append(thumbnailable('nearby', fetchids(cursor)))
    else:
430     output = emptyOutput
    else:
        output = emptyOutput
        count = getcount(conn)
        coords = getcoords(conn, self.id)
435     conn.close ()
        return theme_page('nearby', string.join(output, ''), self.id, count, coords)

# =====
# gallery segment class
440 class GallerySegment(object):
    def __init__(self, req, id):
        self.request = req
        self.id = id
    def get(self):
445     conn = dbconnect ()
        cursor = conn.cursor (MySQLdb.cursors.DictCursor)
        query = []
        query.append("SELECT id")
        for s in range(0,segment_buckets):
450     query.append(",seg-%s" % s)
        query.append(" FROM rdex WHERE id = '%s'" % conn.escape_string('%s'%self.id))
        query = string.join(query, '')
        cursor.execute(query)
        me = cursor.fetchone()
455     if me != None:
        cursor.close ()
        cursor = conn.cursor (MySQLdb.cursors.DictCursor)
        query = []
        query.append("SELECT id FROM rdex ORDER BY (")
460     for s in range(0,segment_buckets):
        query.append("ABS(seg-%s - '%s') + " % (s, conn.escape_string('%s'%me['seg-%s' % s])))
        query.append("'0' ) ASC")
        query = string.join(query, '')
        cursor.execute(query)
465     output = [ ]
        row = cursor.fetchone ()
        if row != None:
            id = row['id']
            output.append(focustable(id))
470     output.append(thumbnailable('segment', fetchids(cursor)))
        else:
            output = emptyOutput
    else:
        output = emptyOutput
475     count = getcount(conn)
        coords = getcoords(conn, self.id)
        conn.close ()
        return theme_page('segment', string.join(output, ''), self.id, count, coords)

```

```

        ↪ )

480 # =====
# database rss feed class
class DownloadRSS(object):
    def __init__(self, req):
        self.request = req
485 def get(self):
    conn = dbconnect ()
    cursor = conn.cursor (MySQLdb.cursors.DictCursor)
    cursor.execute ("SELECT id,ru,rv,f,k FROM rdex ORDER BY id DESC")
    output = [ ]
490    output.append(''<?xml version="1.0"?>
<rss version="2.0">
<channel>
<title>rdex :: %s</title>
<link>http://%s%s</link>
495 <description>rdex chronology</description>
        ''' % ( mountpointname, host, mountpoint ) )
        results = cursor.fetchall ()
        if cursor.rowcount > 0:
            for row in results:
500                output.append(''<item>
<title>%s</title>
<description>ru = %s ; rv = %s ; f = %s ; k = %s</description>
<enclosure url="http://%s%s/images/%s.png" type="image/png" />
</item>'') % ( row['id'], row['ru'], row['rv'], row['f'], row['k'], host, ↪
        ↪ mountpoint, row['id'] ) )
505    output.append("</channel></rss>")
    cursor.close ()
    conn.close ()
    return string.join(output, '')

510 # =====
# database txt feed class
class DownloadTXT(object):
    def __init__(self, req):
515        self.request = req
    def get(self):
    conn = dbconnect ()
    cursor = conn.cursor (MySQLdb.cursors.DictCursor)
    cursor.execute ("SELECT id,ru,rv,f,k FROM rdex ORDER BY id ASC")
520    output = [ ]
    output.append("id,ru,rv,f,k")
    results = cursor.fetchall ()
    if cursor.rowcount > 0:
        for row in results:
525            output.append("%s,%s,%s,%s,%s" % ( row['id'], row['ru'], row['rv'], row↪
                ↪ ['f'], row['k'] ) )
    cursor.close ()
    conn.close ()
    return string.join(output, "\n")

530 # =====
# database new item class

```

```

class DbNew(object):
    def __init__(self, req):
535         self.request = req
    def get(self):
        return theme_page('new', '<p>use rdex-client to submit to the database</p>',↵
            ↵ None, None)
    def post(self):
        try:
540             conn = dbconnect ()
            cursor = conn.cursor ()
            image = Image.open(self.request.params['image'].file)
            query = [ ]
            query.append("INSERT INTO rdex ( ")
545             query.append("ru,rv,f,k,behaviour,coarseness_u,contrast_u,directionality_u ↵
                ↵ ,coarseness_v,contrast_v,directionality_v")
            for r in range(0,colour_buckets):
                for g in range(0,colour_buckets):
                    for b in range(0,colour_buckets):
                        query.append(",hist_%s_%s_%s" % (r,g,b))
550             for s in range(0,segment_buckets):
                query.append(",seg_%s" % s)
            query.append(") VALUES ('%s','%s','%s','%s','%s','%s','%s','%s','%s','%s'↵
                ↵ ', '%s'")
            for r in range(0,colour_buckets):
                for g in range(0,colour_buckets):
555                 for b in range(0,colour_buckets):
                    query.append(", '%s'")
            for s in range(0,segment_buckets):
                query.append(", '%s'")
            query.append(")")
560             query = string.join(query, ' ')
            params = [ ]
            params.append(conn.escape_string('%s'%self.request.params['ru']))
            params.append(conn.escape_string('%s'%self.request.params['rv']))
            params.append(conn.escape_string('%s'%self.request.params['f']))
565             params.append(conn.escape_string('%s'%self.request.params['k']))
            params.append(conn.escape_string('%s'%self.request.params['behaviour']))
            params.append(conn.escape_string('%s'%self.request.params['coarseness_u']))↵
                ↵ )
            params.append(conn.escape_string('%s'%self.request.params['contrast_u']))
            params.append(conn.escape_string('%s'%self.request.params['↵
                ↵ directionality_u']))
570             params.append(conn.escape_string('%s'%self.request.params['coarseness_v']))↵
                ↵ )
            params.append(conn.escape_string('%s'%self.request.params['contrast_v']))
            params.append(conn.escape_string('%s'%self.request.params['↵
                ↵ directionality_v']))
            for r in range(0,colour_buckets):
                for g in range(0,colour_buckets):
575                 for b in range(0,colour_buckets):
                    params.append(conn.escape_string('%s'%self.request.params['hist_%s_%s'↵
                        ↵ s_%s' % (r, g, b)]))
            for s in range(0,segment_buckets):
                params.append(conn.escape_string('%s'%self.request.params['seg_%s' % s]))↵
                    ↵ )
            cursor.execute(query % tuple(params))
580             inserted = conn.insert_id ()

```

```

        image.save('%s/%s.png' % (image_dir, inserted))
        image2 = image.crop((0,0,128,128))
        image2.thumbnail(thumbnailsize, Image.ANTIALIAS)
        image2.save('%s/%s.jpg' % (image_dir, inserted), quality=90)
585     result = '%s' % inserted
    except:
        result = exc.HTTPInternalServerError('bad POST')
    finally:
        cursor.close ()
590     conn.commit ()
        conn.close ()
    return result

# =====
595 # build application routes
application = Router()
application.add_route('', Redirect('%s/' % ( mountpoint )))
application.add_route('/', Redirect('%s/nearby' % ( mountpoint ) ↵
    ↵ ))
application.add_route('/nearby', Redirect('%s/nearby/' % ( mountpoint ↵
    ↵ )))
600 application.add_route('/colour', Redirect('%s/colour/' % ( mountpoint ↵
    ↵ )))
application.add_route('/texture', Redirect('%s/texture/' % ( mountpoint ↵
    ↵ )))
application.add_route('/segment', Redirect('%s/segment/' % ( mountpoint ↵
    ↵ )))
application.add_route('/nearby/', Redirect('%s/nearby/latest ' % ( ↵
    ↵ mountpoint )))
application.add_route('/colour/', Redirect('%s/colour/latest ' % ( ↵
    ↵ mountpoint )))
605 application.add_route('/texture/', Redirect('%s/texture/latest ' % ( ↵
    ↵ mountpoint )))
application.add_route('/segment/', Redirect('%s/segment/latest ' % ( ↵
    ↵ mountpoint )))
application.add_route('/nearby/latest', RedirectLatest('%s/nearby' % ( ↵
    ↵ mountpoint )))
application.add_route('/colour/latest', RedirectLatest('%s/colour' % ( ↵
    ↵ mountpoint )))
application.add_route('/texture/latest', RedirectLatest('%s/texture' % ( ↵
    ↵ mountpoint )))
610 application.add_route('/segment/latest', RedirectLatest('%s/segment' % ( ↵
    ↵ mountpoint )))
application.add_route('/nearby/random', RedirectRandom('%s/nearby' % ( ↵
    ↵ mountpoint )))
application.add_route('/colour/random', RedirectRandom('%s/colour' % ( ↵
    ↵ mountpoint )))
application.add_route('/texture/random', RedirectRandom('%s/texture' % ( ↵
    ↵ mountpoint )))
application.add_route('/segment/random', RedirectRandom('%s/segment' % ( ↵
    ↵ mountpoint )))
615 application.add_route('/nearby/{id:\d+}', rest_controller(GalleryNearby))
application.add_route('/colour/{id:\d+}', rest_controller(GalleryColour))
application.add_route('/texture/{id:\d+}', rest_controller(GalleryTexture))
application.add_route('/segment/{id:\d+}', rest_controller(GallerySegment))
application.add_route('/download/rss', rest_controller(DownloadRSS, "text/ ↵
    ↵ xml"))

```

```

620 application.add_route('/download/txt',      rest_controller(DownloadTXT, "text/↵
      ↵ plain"))
application.add_route('/upload/new',      rest_controller(DbNew))

# =====
# limit upload size class
625 # http://wiki.pylonsHQ.com/display/pylonscookbook/A+Better+Way+To+Limit+File+↵
      ↵ Upload+Size
class LimitUploadSize(object):
    def __init__(self, app, size):
        self.app = app
        self.size = size
630 def __call__(self, environ, start_response):
    req = Request(environ)
    if req.method=='POST':
        len = req.headers.get('Content-length')
        if not len:
635         return exc.HTTPBadRequest("No content-length header specified")(environ, ↵
            ↵ start_response)
        elif int(len) > self.size:
            return exc.HTTPBadRequest("POST body exceeds maximum limits")(environ, ↵
            ↵ start_response)
        resp = req.get_response(self.app)
        return resp(environ, start_response)
640
# =====
# main application
application = LimitUploadSize(application, 666666)

645 # EOF

```

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Version 3, 19 November 2007

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SUCH DAMAGES.

610 17. Interpretation of Sections 15 and 16.

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620

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest
possible use to the public, the best way to achieve this is to make it
625 free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest
to attach them to the start of each source file to most effectively
state the exclusion of warranty; and each file should have at least
630 the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

635 This program is free software: you can redistribute it and/or modify
it under the terms of the GNU Affero General Public License as published by
the Free Software Foundation, either version 3 of the License, or
(at your option) any later version.

640 This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU Affero General Public License for more details.

645 You should have received a copy of the GNU Affero General Public License
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Also add information on how to contact you by electronic and paper mail.

650 If your software can interact with users remotely through a computer
network, you should also make sure that it provides a way for users to

get its source. For example, if your program is a web application, its interface could display a "Source" link that leads users to an archive of the code. There are many ways you could offer source, and different solutions will be better for different programs; see section 13 for the specific requirements.

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU AGPL, see <http://www.gnu.org/licenses/>.

5 data/style/beta.png



6 data/style/beta.svg

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/
  ↵ xlink" width="26" height="26">
<defs>
  <filter id="Stroke" filterUnits="objectBoundingBox" x="-10%" y="-10%" width=
    ↵ ="150%" height="150%">
5    <feMorphology in="SourceGraphic" radius="0.5" operator="dilate" result="
      ↵ dilated" />
    <feColorMatrix type="matrix" values="0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1
      ↵ 0" in="SourceGraphic" result="black" />
    <feMerge><feMergeNode in="dilated" /><feMergeNode in="black" /></feMerge>
  </filter>
</defs>
10 <g>
  <rect x="0" y="0" width="26" height="26" fill="#ffffff" />
  <g stroke="black" stroke-width="0.2">
    <path id="O" fill="#cccccc" fill-rule="evenodd" d="M 0.2 6.5 L 22.732 6.5 A
      ↵ 14.534 14.534 0 0 1 22.732 19.5 L 0.2 19.5 A 14.534 14.534 0 0 0 0.2 6.5
      ↵ Z" />
  </g>
</g>
```

```

    <text id="BETA" fill="#ffffff" filter="url(#Stroke)" text-anchor="middle" x="
    ↵ ="13" y="14.25" font-size="5" font-family="Courier">(beta)</text>
15 </g>
    </g>
    </svg>

```

7 data/style/coords.png



8 data/style/coords.svg

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/
    ↵ xlink" width="208" height="13" >
<g>
    <rect x="0" y="0" width="208" height="14" fill="#ffffff" />
5 <g stroke="black" stroke-width="0.2">
    <path transform="scale(2)" id="coords" fill="#cccccc" fill-rule="evenodd" d="M
    ↵ 0 0 A 3.2 3.2 0 0 1 3.2 3.2 A 3.2 3.2 0 0 0 6.4 6.4 L 97.6 6.4 A 3.2
    ↵ 3.2 0 0 0 100.8 3.2 A 3.2 3.2 0 0 1 104 0 L 104 -10 L 0 -10 L 0 0 Z" />
    </g>
    </g>
    </svg>

```

9 data/style/kiblix.png



10 data/style/kiblix.svg

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/
    ↵ xlink" width="26" height="26">

```

```

<defs>
  <filter id="Stroke" filterUnits="objectBoundingBox" x="-10%" y="-10%" width↵
    ↵ ="150%" height="150%">
5    <feMorphology in="SourceGraphic" radius="0.5" operator="dilate" result="↵
      ↵ dilated" />
    <feColorMatrix type="matrix" values="0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1 ↵
      ↵ 0" in="SourceGraphic" result="black" />
    <feMerge><feMergeNode in="dilated" /><feMergeNode in="black" /></feMerge>
  </filter>
</defs>
10 <g>
  <rect x="0" y="0" width="26" height="26" fill="ffffff" />
  <g stroke="black" stroke-width="0.2">
    <path fill="cccccc" fill-rule="evenodd" d="M 0.2 6.5 L 22.732 6.5 A 14.534 ↵
      ↵ 14.534 0 0 1 22.732 19.5 L 0.2 19.5 A 14.534 14.534 0 0 0 0.2 6.5 Z" />
    <text fill="ffffff" filter="url(#Stroke)" text-anchor="middle" x="13" y↵
      ↵ ="14.25" font-size="5" font-family="Courier">kiblix</text>
15 </g>
  </g>
</svg>

```

11 data/style/rc1.png



12 data/style/rc1.svg

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/↵
  ↵ xlink" width="26" height="26">
<defs>
  <filter id="Stroke" filterUnits="objectBoundingBox" x="-10%" y="-10%" width↵
    ↵ ="150%" height="150%">
5    <feMorphology in="SourceGraphic" radius="0.5" operator="dilate" result="↵
      ↵ dilated" />

```

```

    <feColorMatrix type="matrix" values="0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1 1 ↵
      ↵ 0" in="SourceGraphic" result="black" />
    <feMerge><feMergeNode in="dilated" /><feMergeNode in="black" /></feMerge>
  </filter>
</defs>
10 <g>
  <rect x="0" y="0" width="26" height="26" fill="#ffffff" />
  <g stroke="black" stroke-width="0.2">
    <path fill="#cccccc" fill-rule="evenodd" d="M 0.2 6.5 L 22.732 6.5 A 14.534 ↵
      ↵ 14.534 0 0 1 22.732 19.5 L 0.2 19.5 A 14.534 14.534 0 0 0 0.2 6.5 Z" />
    <text fill="#ffffff" filter="url(#Stroke)" text-anchor="middle" x="13" y↵
      ↵ ="14.25" font-size="5" font-family="Courier">(rc1)</text>
15 </g>
  </g>
</svg>

```

13 data/style/rdex.css

```

html, body, div, h1, h2, h3, h4, h5, h6, table, tbody, tr, th, td, a, img, dl, ↵
  ↵ dt, dd {
  margin: 0px;
  border: 0px;
  padding: 0px;
5   text-decoration: none;
}

html, body {
  background-color: white;
10 }

body {
  text-align: center;
}

15 div#page {
  width: 1024px;
  margin-left: auto;
  margin-right: auto;
20   margin-top: 8px;
  margin-bottom: 8px;
}

table {
25   border-collapse: collapse;
  float: left;
  color: black;
  background-color: #cccccc;
}

30 h1, h2, div#navigation, div#selection, div#metrics {
  float: left;
}

35 h1, h2 {
  width: 128px;
  height: 128px;
  line-height: 128px;

```

```
}
40
div#prelatest {
    float: left;
    width: 768px;
    height: 32px;
45    line-height: 32px;
    text-align: right;
}

div#latest table tr td {
50    width: 64px;
    height: 64px;
}

div#premetrics {
55    width: 256px;
    height: 40px;
    line-height: 40px;
    text-align: right;
    float: left;
60 }
div#metrics {
    width: 512px;
    height: 32px;
    margin-top: 8px;
65 }

table#focused tr td {
    width: 256px;
    height: 256px;
70 }

table#related tr td {
    width: 64px;
    height: 64px;
75 }

div.toggle {
    float: left;
    width: 128px;
80    height: 32px;
    line-height: 32px;
    text-align: center;
    background-image: url("tab.png");
}
85
div.toggle, div.toggle * {
    color: black;
    background-color: transparent;
}
90
div.toggle.active, div.toggle.active * {
    font-weight: bold;
}

95 div#content, div#footer {
```



```
        clear: both;
    }

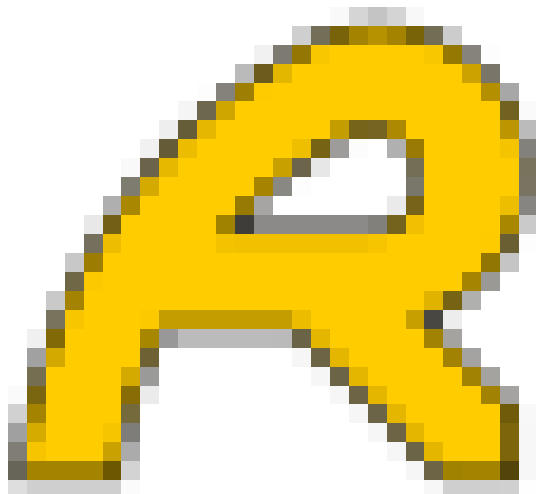
    100  div#footer {
        width: 1024px;
        height: 32px;
        line-height: 32px;
    }

    105  div#footer div, dl, dt, dd {
        display: inline;
    }
    div#coords {
    110  float: left;
        width: 512px;
        background-image: url("coords.png");
        background-repeat: no-repeat;
    }

    115  div#empty {
        width: 1024px;
        height: 64px;
        line-height: 64px;
        color: black;
    120  background-color: #cccccc;
    }

    dt {
    125  font-variant: small-caps;
        margin-left: 16px;
        margin-right: 8px;
    }
    dl dt[1] { margin-left: 0px; }
    130  dd {
        font-size: 12px;
        margin-left: 8px;
        margin-right: 16px;
    }
    135  dl dd[-1] { margin-right: 0px; }
```

14 data/style/rdex.ico



15 data/style/rdex.png



16 data/style/rdex.svg

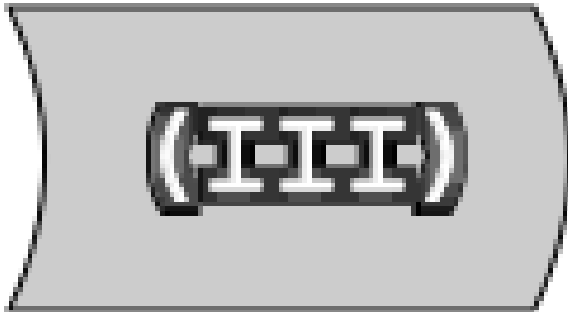
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/x
  ↵ xlink" width="26" height="26">
<g>
  <rect x="0" y="0" width="26" height="26" fill="#ffffff" />
```

```

5  <g stroke="black" stroke-width="0.2">
    <circle id="O" fill="#cccccc" cx="13" cy="13" r="12.8" />
    <path id="R" fill="#ffcc00" fill-rule="evenodd" d="M 12 12 L 10.586 12 L 7.586 ↵
      ↵ 9 L 4.938 9 A 9 9 0 0 0 4.056 12 L 2.046 12 A 11 11 0 0 1 7.5 3.474 A 3 ↵
      ↵ 3 0 1 1 10.175 8.761 L 12 10.586 L 12 12 Z M 6.292 7 A 9 9 0 0 1 8.5 ↵
      ↵ 5.206 A 1 1 0 1 1 9 7 L 6.292 7 Z" />
    <path id="D" fill="#ff20cc" fill-rule="evenodd" d="M 14 12 L 14 2.046 A 11 11 ↵
      ↵ 0 0 1 22.526 7.5 A 3 3 0 0 1 19.928 12 L 14 12 Z M 16 10 L 16 4.515 A 9 ↵
      ↵ 9 0 0 1 20.794 8.5 A 1 1 0 0 1 19.928 10 L 16 10 Z" />
    <path id="E" fill="#20ff40" fill-rule="evenodd" d="M 12 14 L 12 16 L 6.072 16 ↵
      ↵ A 1 1 0 0 0 5.208 17.5 A 9 9 0 0 0 5.517 18 L 10 18 L 10 20 L 7.343 20 A ↵
      ↵ 9 9 0 0 12 21.944 L 12 23.954 A 11 11 0 0 1 3.474 18.5 A 3 3 0 0 1 ↵
      ↵ 6.072 14 L 12 14 Z" />
10  <path id="X" fill="#2088ff" fill-rule="evenodd" d="M 14 14 L 15.414 14 L ↵
      ↵ 17.961 16.5469 A 11 11 0 0 1 23.950 14.050 A 11 11 0 0 1 23.549 16.1178 ↵
      ↵ A 9 9 0 0 0 19.383 17.968 L 21.453 20.039 A 11 11 0 0 1 20.039 21.453 L ↵
      ↵ 17.968 19.383 A 9 9 0 0 0 16.264 22.837 A 3 3 0 0 1 14.529 21.630 A 11 ↵
      ↵ 11 0 0 1 16.5469 17.961 L 14 15.414 L 14 14 Z" />
    </g>
  </g>
</svg>

```

17 data/style/sounding-diy-iii-vm-ml.png



18 data/style/sounding-diy-iii-vm-ml.svg

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/ ↵
  ↵ xlink" width="26" height="26">
<defs>
  <filter id="Stroke" filterUnits="objectBoundingBox" x="-10%" y="-10%" width ↵
    ↵ ="150%" height="150%">
5  <feMorphology in="SourceGraphic" radius="0.5" operator="dilate" result=" ↵
    ↵ dilated" />

```

```

    <feColorMatrix type="matrix" values="0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1 ↵
      ↵ 0" in="SourceGraphic" result="black" />
    <feMerge><feMergeNode in="dilated" /><feMergeNode in="black" /></feMerge>
  </filter>
</defs>
10 <g>
  <rect x="0" y="0" width="26" height="26" fill="#ffffff" />
  <g stroke="black" stroke-width="0.2">
    <path fill="#cccccc" fill-rule="evenodd" d="M 0.2 6.5 L 22.732 6.5 A 14.534 ↵
      ↵ 14.534 0 0 1 22.732 19.5 L 0.2 19.5 A 14.534 14.534 0 0 0 0.2 6.5 Z" />
    <text fill="#ffffff" filter="url(#Stroke)" text-anchor="middle" x="13" y↵
      ↵ ="14.25" font-size="5" font-family="Courier">(III)</text>
15 </g>
  </g>
</svg>

```

19 data/style/tab.png



20 data/style/tab.svg

```

<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/↵
  ↵ xlink" width="52" height="13" >
  <g>
    <rect x="0" y="0" width="52" height="13" fill="#ffffff" />
5    <g stroke="black" stroke-width="0.2">
      <path transform="scale(2)" id="tab" fill="#cccccc" fill-rule="evenodd" d="M 0 ↵
        ↵ 6.5 A 3.2 3.2 0 0 0 3.2 3.3 A 3.2 3.2 0 0 1 6.4 0.1 L 19.6 0.1 A 3.2 3.2 ↵
        ↵ 0 0 1 22.8 3.3 A 3.2 3.2 0 0 0 26 6.5 L 26 10 L 0 10 L 0 6.5 Z" />
      </g>
    </g>
  </svg>

```

21 README

rdex -- reaction-diffusion explorer

Software Requirements

```

5 -----
  * Linux (maybe works on other OS's too)
  * WSGI web server (apache2 with mod_wsgi works well)
  * MySQL database
10 * Python imaging library
  * Python mysql library
  * Python WebOb library

```

For example, on a minimal Lenny vserver, install these packages:

```
15  apache2 libapache2-mod-wsgi mysql-server python-imaging python-mysqldb python-✓
    ↪ webob
```

Installation And Configuration

```
20  This is a rough description of my setup, no proper installation instructions
    yet. In roughly reverse order:
```

```
apache2 config (with 'rdex' in /etc/hosts):
```

```
25  <VirtualHost *:80>
    ServerName rdex
    ServerAdmin you@yourhost
    # root html
30  DocumentRoot /home/claude/www/rdex/public
    # beta server
    Alias /beta/images /home/claude/www/rdex/beta/data/images
    Alias /beta/style /home/claude/www/rdex/beta/data/style
    WSGIScriptAlias /beta /home/claude/www/rdex/beta/code/rdex.wsgi
35  # rc1 server
    Alias /rc1/images /home/claude/www/rdex/rc1/data/images
    Alias /rc1/style /home/claude/www/rdex/rc1/data/style
    WSGIScriptAlias /rc1 /home/claude/www/rdex/rc1/code/rdex.wsgi
    # root html
40  <Directory /home/claude/www/rdex/public>
        Options Indexes FollowSymLinks MultiViews
        AllowOverride None
        Order allow,deny
        allow from all
45  </Directory>
    ErrorLog /var/log/apache2/rdex_error.log
    LogLevel warn
    CustomLog /var/log/apache2/rdex_access.log combined
    </VirtualHost>
```

```
50  rdex-config.py (change according to your setup):
```

```
    image_dir = '/home/claude/www/rdex/beta/data/images' # www-data writeable
    image_url = '/beta/images'
55  style_url = '/beta/style'
    database_host = 'localhost'
    database_user = 'rdex'
    database_pass = '****'
    database_db   = 'rdex'
```

```
60  database initialisation (once per rdex installation):
```

```
    $ mysql -u root -p
    > CREATE USER 'rdex'@'localhost' IDENTIFIED BY '****';
65  > CREATE DATABASE rdex;
    > GRANT ALL ON rdex.* TO 'rdex'@'localhost' IDENTIFIED BY '****';
    $ mysql -u rdex -p
    > CONNECT rdex;
    > DROP TABLE rdex;
70  $ python -i rdex_initdb.py
```

```
> create()
```

```
database configuration (for complex queries):
```

```
75      /etc/mysql/my.cnf :: thread_stack = 1024K
```

```
image directory writeable by www-data
```

```
      $ chgrp www-data rdex/data/images
80      $ chmod g+w rdex/data/images
```

```
Legal
```

```
-----
```

```
85      rdex -- reaction-diffusion explorer
      Copyright (C) 2008,2009,2019 Claude Heiland-Allen <claude@mathr.co.uk>
```

```
90      This program is free software: you can redistribute it and/or modify
      it under the terms of the GNU Affero General Public License as published by
      the Free Software Foundation, either version 3 of the License, or
      (at your option) any later version.
```

```
95      This program is distributed in the hope that it will be useful,
      but WITHOUT ANY WARRANTY; without even the implied warranty of
      MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
      GNU Affero General Public License for more details.
```

```
100     You should have received a copy of the GNU Affero General Public License
      along with this program. If not, see <http://www.gnu.org/licenses/>.
```

22 TODO

```
rdex-server tickets
```

```
=====
```

```
TODO
```

```
5      ----
```

```
      * texts for front page
      * confirm everything is valid XHTML (or RSS, etc) with correct HTTP headers
      * add a rudimentary API for getting batches of images (planning phase 3)
10     * make additional graphics for the kiblix installation version
      * user authentication for rdex server upload
      * audit any security issues (rdex.config.py must be secret)
      * write proper installation documentation
```

```
15     LATER
      ----
```

```
20     * see if the metric selection tab graphics can be improved somehow
      * finalize database specification
      * maybe reduce number of colour bins?
      * ajax auto-refresh latest in browser
      * ajax hmds or 4d explore gallery mode
      * library downloads (png.tar.gz ?)
```

25 * library downloads via p2p?

DONE

30 * make pretty design with better logos / buttons / icons / etc
 * feeds / identi.ca ?
 * machine readable database output
 * put parameter coordinates of target point in footer
35 * decide what belongs in the footer
 * save thumbnails from uploads (##.jpg 64x64 quality 95%)
 * make it more useable (thanks to Aymeric for feedback!)