Archived:How to use touch events with PySymbian

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The article is believed to be still valid for the original topic scope.

Introduction

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This PySymbian sample application demonstrates how to use `appuifw` module which is extended for Touch UI since PySymbian 1.9.3 release.

The article contains code example demonstrating,

- How to define active areas on-screen
- How to capture touch events, how to interpret raw data and user actions based on them.

There is also sample code how to define and handle “virtual softkeys” for Options menu and Exit buttons.

Beginner's Tutorial

First we have a short, hopefully simpler, example for beginners. When you have figured out how this works, you can proceed to the more complex example.

```
import appuifw, audio, e32, key_codes

def draw_state():
    pass
    canvas.clear()
    canvas.text((0,12),u"event",0x008000)
    #audio.say("cleared")

def left(arg):
    # Crash, if called before previous audio.say() has completed
    audio.say("left")

def right(arg):
    # Crash, if called before previous audio.say() has completed
    audio.say("right")

def quit(arg):
    audio.say("quit")
    e32.ao_sleep(1)
    lock.signal()

def callback(event):
    #print event
    #canvas.text((0,12),event,0x008000)
    pass

canvas=appuifw.Canvas(redraw_callback=lambda rect:draw_state())

appuifw.app.screen = 'full'
# Note: directional_pad only with PySymbian 1.9.7 and later
appuifw.app.directional_pad = False
```


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```
appuifw.app.body=canvas

canvas.bind(key_codes.EButton1Down, left, ((0,0),(360,200)))
canvas.bind(key_codes.EButton1Down, right, ((0,440),(360,640)))
canvas.bind(key_codes.EButton1Down, quit, ((160,300),(200,340)))

canvas.rectangle(((0,0),(360,200)), fill = (255,0,0))
canvas.rectangle(((0,440),(360,640)), fill = (0,255,0))
canvas.rectangle(((160,300),(200,340)), fill = (0,0,255))

lock = e32.Ao_lock()
appuifw.app.exit_key_handler=lock.signal
lock.wait()
```

Code Snippet

Little bit more complex example. Screenshots come from this application.

```
'''
Watch Me - Light Touch
Fun color changing touch application for Nokia 5800
'''

VERSION = '1.20'

import sys
import e32
import appuifw
import graphics
import key_codes
import random

# Check if this can run at all
(a, b, c, d, e) = e32.pys60_version_info
if (a > 1) or (a == 1 and b >= 9 and c >= 3):
    if not appuifw.touch_enabled():
        appuifw.note(u"Touch is not enabled!")
        appuifw.app.set_exit()
else:
    appuifw.note(u"Touch is not enabled!")
    appuifw.app.set_exit()

# BUG: should exit, if cannot run
# TODO: How to do it gracefully
# appuifw.app.set_exit()

# RGB color model
# http://en.wikipedia.org/wiki/Rgb
RGB_MIN = 0
RGB_MAX = 255
RGB_RED = (255, 0, 0)
RGB_GREEN = (0, 255, 0)
RGB_BLUE = (0, 0, 255)
RGB_WHITE = (255, 255, 255)
RGB_GRAY = (120, 120, 120)
```


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```
RGB_BLACK = (0, 0, 0)
(rgb_red, rgb_green, rgb_blue) = RGB_BLUE
dir_red = dir_green = dir_blue = -1

# Global variables, UI controls
canvas = img = None
g_maxx = g_maxy = 0
lb = None

# Global variables, save last touch point coordinates
g_rx = g_ry = 0     # Red touch
g_gx = g_gy = 0     # Green touch
g_bx = g_by = 0     # Blue touch

# Control automatic on-screen color rotation
g_rotate_time = 0.01
g_rotate = False

# Control screensaver on/off status
my_timer = e32.Ao_timer()
rot_timer = e32.Ao_timer()
g_screensaver_on = True

def key_lesscolor(a_color, a_value):
    ''' Make RGB value of color smaller '''
    global rgb_red, rgb_green, rgb_blue
    a_value = max(a_value, RGB_MIN)
    if a_color == "red":
        rgb_red = a_value
    elif a_color == "green":
        rgb_green = a_value
    elif a_color == "blue":
        rgb_blue = a_value
    cb_handle_redraw()

def key_morecolor(a_color, a_value):
    ''' Make RGB value of color bigger '''
    global rgb_red, rgb_green, rgb_blue
    a_value = min(a_value, RGB_MAX)
    if a_color == "red":
        rgb_red = a_value
    elif a_color == "green":
        rgb_green = a_value
    elif a_color == "blue":
        rgb_blue = a_value
    cb_handle_redraw()

def set_fullcolor(a_color):
    ''' Set screen to given RGB color '''
    global rgb_red, rgb_green, rgb_blue
    (rgb_red, rgb_green, rgb_blue) = a_color
    cb_handle_redraw()

def validate_rgb(a_value):
    ''' Fit given value inside RGB limits '''
    if a_value < RGB_MIN:
        a_value = RGB_MIN
```


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```
    elif a_value > RGB_MAX:
        a_value = RGB_MAX
    return a_value

def validate_color(r, g, b):
    ''' Make sure given values can be used as RGB color '''
    r = validate_rgb(r)
    g = validate_rgb(g)
    b = validate_rgb(b)
    return (r, g, b)

def cb_red_down(pos=(0, 0)):
    ''' Event handler for Red area '''
    global g_rx, g_ry
    g_rx, g_ry = pos

def cb_red_up(pos=(0, 0)):
    ''' Event handler for Red area '''
    pass

def cb_red_drag(pos=(0, 0)):
    ''' Event handler for Red area '''
    global g_rx, g_ry
    if pos[0] < g_rx:
        key_lesscolor("red", rgb_red-(g_rx-pos[0]))
    else:
        key_morecolor("red", rgb_red+(pos[0]-g_rx))
    g_rx, g_ry = pos

def cb_green_down(pos=(0, 0)):
    ''' Event handler for Green area '''
    global g_gx, g_gy
    g_gx, g_gy = pos

def cb_green_up(pos=(0, 0)):
    ''' Event handler for Green area '''
    pass

def cb_green_drag(pos=(0, 0)):
    ''' Event handler for Green area '''
    global g_gx, g_gy
    if pos[0] < g_gx:
        key_lesscolor("green", rgb_green-(g_gx-pos[0]))
    else:
        key_morecolor("green", rgb_green+(pos[0]-g_gx))
    g_gx, g_gy = pos

def cb_blue_down(pos=(0, 0)):
    ''' Event handler for Blue area '''
    global g_bx, g_by
    g_bx, g_by = pos

def cb_blue_up(pos=(0, 0)):
    ''' Event handler for Blue area '''
    # Options softkey box
    if pos[0] < 100 and pos[1] > g_maxy-100:
```


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```
        cb_options_menu()
    # Exit softkey box
    elif  pos[0] > g_maxx-100 and pos[1] > g_maxy-100:
        cb_quit()

def cb_blue_drag(pos=(0, 0)):
    ''' Event handler for Blue area '''
    global g_bx, g_by
    if pos[0] < g_bx:
        key_lesscolor("blue", rgb_blue-(g_bx-pos[0]))
    else:
        key_morecolor("blue", rgb_blue+(pos[0]-g_bx))
    g_bx, g_by = pos

def cb_options_menu(dummy=(0, 0)):
    ''' Look-a-like Options menu handler '''
    # Change Options menu item text dynamically
    if g_rotate:
        s = u"Stop Color Rotation"
    else:
        s = u"Start Color Rotation"

    # Show look-a-like Options menu
    i = appuifw.popup_menu(\
        [s, u"Set RGB Color", u"About", u"Exit"],
        u"Options")

    # Handle selection
    if i == 0:
        menu_rgb_rotate()
    elif i == 1:
        menu_rgb_query()
    elif i == 2:
        menu_about()
    elif i == 3:
        cb_quit()

def rgb_rotate():
    ''' Do on-screen color rotation '''
    rot_timer.cancel()

    global rgb_red, rgb_green, rgb_blue
    global dir_red, dir_green, dir_blue

    # Red
    value = random.choice([0, 1, 2])
    if dir_red < 0:
        value = -value
    rgb_red = validate_rgb(rgb_red + value)
    if rgb_red <= RGB_MIN or rgb_red >= RGB_MAX:
        dir_red = -dir_red
    # Green
    value = random.choice([0, 1, 2, 3])
    if dir_green < 0:
        value = -value
    rgb_green = validate_rgb(rgb_green + value)
    if rgb_green <= RGB_MIN or rgb_green >= RGB_MAX:
```


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```
        dir_green = -dir_green
    # Blue
    value = random.choice([0, 1, 2, 3, 4])
    if dir_blue < 0:
        value = -value
    rgb_blue = validate_rgb(rgb_blue + value)
    if rgb_blue <= RGB_MIN or rgb_blue >= RGB_MAX:
        dir_blue = -dir_blue
    # Update screen, make it visible
    draw_screen()
    rot_timer.after(g_rotate_time, rgb_rotate)

def cb_listbox():
    ''' Callback for RGB query listbox '''
    global lb
    global rgb_red, rgb_green, rgb_blue
    i = lb.current()

    # Red edit
    if i == 0:
        a = appuifw.query(u"New \'Red\' value (0-255):", "number", int(rgb_red))
        rgb_red = validate_rgb(a)
    # Green edit
    elif i == 1:
        a = appuifw.query(u"New \'Green\' value (0-255):", "number", int(rgb_green))
        rgb_green = validate_rgb(a)
    # Blue edit
    elif i == 2:
        a = appuifw.query(u"New \'Blue\' value (0-255):", "number", int(rgb_blue))
        rgb_blue = validate_rgb(a)

    # Refresh listbox with new value
    entries = [
        (u"Red", unicode(int(rgb_red))),
        (u"Green", unicode(int(rgb_green))),
        (u"Blue", unicode(int(rgb_blue))),
        ]
    lb = appuifw.Listbox(entries, cb_listbox)
    appuifw.app.body = lb

def menu_rgb_query():
    ''' Define listbox for RGB query '''
    # Force screen size 'normal', otherwise looks weird
    appuifw.app.screen = "normal"

    # Create a new Listbox with current color RGB values
    entries = [
        (u"Red", unicode(int(rgb_red))),
        (u"Green", unicode(int(rgb_green))),
        (u"Blue", unicode(int(rgb_blue))),
        ]
    global lb
    lb = appuifw.Listbox(entries, cb_listbox)
    appuifw.app.exit_key_handler = cb_rgb_close
    appuifw.app.body = lb
```


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```
    # Use Listbox specific Options menu
    appuifw.app.menu = [
        (u"Select", cb_listbox),
        (u"Close", cb_rgb_close)]

def cb_rgb_close():
    ''' Callback for RGB query listbox Exit '''
    # Restore initial application setup
    appuifw.app.screen = "full"
    appuifw.app.body = canvas
    appuifw.app.exit_key_handler = cb_quit
    # Make it visible
    draw_screen()

def menu_rgb_rotate():
    ''' Toggle on-screen color rotation status '''
    cb_handle_redraw()

    global g_rotate
    if g_rotate:
        g_rotate = False
        rot_timer.cancel()
    else:
        g_rotate = True
        rgb_rotate()

def menu_about():
    ''' Callback for menu item About '''
    appuifw.note(u'Watch Me - Light Touch v' + VERSION + u'\n'+\
        u'jouni.miettunen.googlepages.com\n\u00a9 2009 Jouni Miettunen')

def cb_handle_redraw(dummy=(0, 0, 0, 0)):
    ''' Overwrite default screen redraw event handler '''
    global img
    if img == None:
        img = graphics.Image.new(canvas.size)
    draw_screen()

def draw_screen():
    ''' Prepare off-screen and show it '''
    if img:
        img.clear((rgb_red,rgb_green,rgb_blue))
        canvas.blit(img)

def handle_screensaver():
    ''' Callback to handle screensaver activation '''
    global g_screensaver_on
    if g_screensaver_on:
        # Reset inactivity timer to keep lights on
        e32.reset_inactivity()
        my_timer.cancel()
        # N82 Settings UI has minimum value 5 seconds
        # Guess: set timeout as 4 seconds
        my_timer.after(4, handle_screensaver)
    else:
        my_timer.cancel()
```


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```
def cb_focus(fg):
    ''' System callback to tell when focus is lost/regained '''
    global g_screensaver_on
    if fg:
        # Got focus
        g_screensaver_on = True
    else:
        # Lost focus
        g_screensaver_on = False
    handle_screensaver()

def cb_quit():
    ''' Prepare for application exit, do clean-up '''
    my_timer.cancel()
    rot_timer.cancel()
    app_lock.signal()

# Initialize application
appuifw.app.screen = 'full'
canvas = appuifw.Canvas(redraw_callback = cb_handle_redraw)
appuifw.app.body = canvas
appuifw.app.exit_key_handler = cb_quit
appuifw.app.focus = cb_focus
appuifw.app.title = u"Watch Me - Light Touch";

# Setup global variables with screen max resolution
g_maxx, g_maxy = canvas.size
y1 = g_maxy/3
y2 = 2 * y1

# Define touchable areas
# HOX: additional code left in comments to help further expiriments

# Blue vertical box
canvas.bind(key_codes.EButton1Down, cb_blue_down, ((0,y2+1), (g_maxx,g_maxy)))
canvas.bind(key_codes.EButton1Up, cb_blue_up, ((0,y2+1), (g_maxx,g_maxy)))
canvas.bind(key_codes.EDrag, cb_blue_drag, ((0,y2+1), (g_maxx,g_maxy)))
#canvas.bind(key_codes.ESwitchOn, lambda:set_fullcolor(RGB_BLUE), ((0,y2+1),
(g_maxx,g_maxy)))
#canvas.rectangle(((0,y2+1), (g_maxx,g_maxy)), fill=RGB_BLUE, width=5)

# Green vertical box
canvas.bind(key_codes.EButton1Down, cb_green_down, ((0,y1+1), (g_maxx,y2)))
#canvas.bind(key_codes.EButton1Up, cb_green_up, ((0,y1+1), (g_maxx,y2)))
canvas.bind(key_codes.EDrag, cb_green_drag, ((0,y1+1), (g_maxx,y2)))
#canvas.bind(key_codes.ESwitchOn, lambda:set_fullcolor(RGB_GREEN), ((0,y1+1),
(g_maxx,y2)))
#canvas.rectangle(((0,y1+1), (g_maxx,y2)), fill=RGB_GREEN, width=5)

# Red vertical box
canvas.bind(key_codes.EButton1Down, cb_red_down, ((0,0), (g_maxx,y1)))
#canvas.bind(key_codes.EButton1Up, cb_red_up, ((0,0), (g_maxx,y1)))
canvas.bind(key_codes.EDrag, cb_red_drag, ((0,0), (g_maxx,y1)))
#canvas.bind(key_codes.ESwitchOn, lambda:set_fullcolor(RGB_RED), ((0,0), (g_maxx,y1)))
#canvas.rectangle(((0,0), (g_maxx,y1)), fill=RGB_RED, width=5)
```


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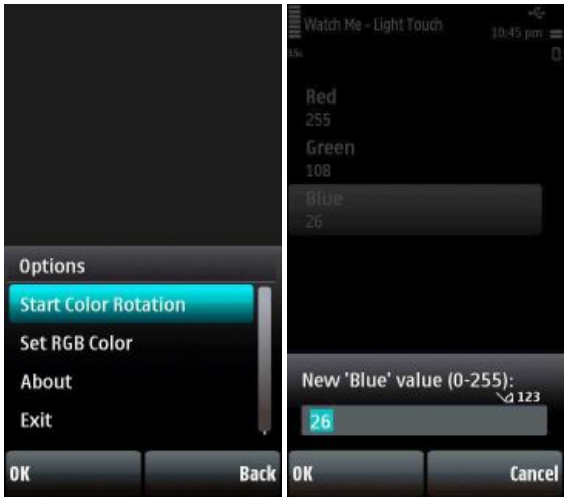
```
handle_screensaver()

# Wait for user to do anything
app_lock = e32.Ao_lock()
app_lock.wait()
```

Screenshots



Related Link

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