Creating a spinnable disc with QML

Overview

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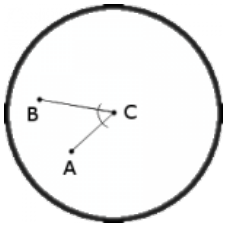
This snippet shows how to create spinnable disc with QML. The rotating of the disc is implemented manually with `Timer` element in order to have better control of the rotation. The timer rotates the disc on the `onTriggered` handler using property `currentSpeed`. The currentSpeed will slowly approach to property `targetSpeed`.



`MouseArea` is used to provide scratching ability to the disc. The interaction is divided into three handlers, `onPressed`, `onPositionChanged` and `onReleased`. On the onPressed handler the place of the press is inspected, if the press hits on the corners of the disc, the mouse event is discarded. This also prevents the onReleased event to be triggered. If the mouse event hits on the disc we store the coordinates of the press and the time when the press occurred. The timer is stopped for rotating the disc - after all we have a mouse (or a finger) on top of the disc and we don't want it to turn. On the onPositionChanged handler the position of the mouse is again inspected, the angle of the previous mouse coordinate and the disc center (AC) and the current mouse coordinate and the disc center (CB) is calculated. The disc is then rotated by adding this angle to the current rotation. The current speed of the disc is set by calculating the angular speed of the disc. Finally when the onReleased event is triggered the timer is resumed and the disc will be rotated by using current speed towards to the target speed.

This technique was used in the Nokia Developer example Dj Turntable to create spinning turntable with touch interaction.

Preconditions

- Qt 4.7 or higher is installed on your platform.

Sources

```
import Qt 4.7

Rectangle {
    width: 640; height: 480
    color: "black"

    Rectangle {
        id: disk

        property real targetSpeed: 1.0
        property real currentSpeed: 0

        width: Math.min(parent.width, parent.height) * 0.85; height: width
        radius: width / 2; color: "gray"
        anchors.centerIn: parent

        Text {
            anchors.centerIn: parent
            text: "Scratch me"
            font { bold: true; pixelSize: parent.width / 10 }
            color: "white"
        }

        Timer {
            id: playTimer

            interval: 16  // 60 fps
            repeat: true
            running: true
            onTriggered: {
                disk.rotation = (disk.rotation + 0.36 * disk.currentSpeed * interval) % 360
                if(Math.abs(disk.currentSpeed - disk.targetSpeed) <= 0.01) {
                    disk.currentSpeed = disk.targetSpeed
                }
                else {
                    disk.currentSpeed += (disk.targetSpeed - disk.currentSpeed) * 0.01
                }
            }
        }
    }

    MouseArea {
        // Don't place this as child of disk because the
        // coordination will change when disk is rotated

        property real centerx: width / 2
        property real centery: height / 2

        property int previousX: 0
        property int previousY: 0
        property variant previousTime

        anchors.fill: disk

        onPressed: {
            var xlength = Math.abs(mouse.x - centerx)
            var ylength = Math.abs(mouse.y - centery)

            if(Math.sqrt(xlength * xlength + ylength * ylength) > centerx) {
                // The mouse press did not hit on the disk, the disk is actually
                // rectangle shaped and the mouse was pressed one of the corners
                mouse.accepted = false
                return
            }
```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```
            playTimer.stop()
            disk.currentSpeed = 0.0

            previousX = mouse.x
            previousY = mouse.y
            previousTime = new Date().getTime()
        }

        onReleased: playTimer.start()

        onPositionChanged: {
            var now = new Date().getTime()

            var ax = mouse.x - centerx
            var ay = centery - mouse.y
            var bx = previousX - centerx
            var by = centery - previousY

            var angledelta = (Math.atan2(by, bx) - Math.atan2(ay, ax)) * 57.2957795
            if(angledelta > 180)       { angledelta -= 360 }
            else if(angledelta < -180) { angledelta += 360 }

            disk.rotation = (disk.rotation + angledelta) % 360

            if(now - previousTime > 0) { disk.currentSpeed = angledelta * 2.77778 / (now - previousTime) }

            previousX = mouse.x
            previousY = mouse.y
            previousTime = now
        }
    }

    TextEdit {
        anchors { bottom: disk.bottom; right: disk.right; bottomMargin: 10 }
        text: "Clicks here\nare discarded"
        readOnly: true
        font.pixelSize: disk.width / 30
        color: "white"
    }
}
```

Postconditions

The snippet demonstrated implementing of a rotating disc with a ability to be scratched with mouse or finger.

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