
Subject: Re: Time for little quiz!

Posted by [mirek](#) on Wed, 05 Apr 2006 08:53:10 GMT

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That would be much more code to write. In fact, there is a couple of methods in class, and class instance here is a sort of replacement of Pascal's embedded function/procedures.

BTW, as this is quite nice implementation of median cut palette algorithm, and I was trying quite hard to google some code for this, maybe placing it here will make further implementors search easier:

Median cut palette algorithm in C++:

```
struct sPalMaker {
    int    histogram[RASTER_MAP_R][RASTER_MAP_G][RASTER_MAP_B];
    int    colorcount;
    struct Dim {
        int l, h;

        operator int() { return h - l; }
    };
    enum { G = 0, R = 1, B = 2 };
    void Copy(Dim *d, Dim *s) { d[R] = s[R]; d[G] = s[G]; d[B] = s[B]; }
    struct Box {
        int    volume;
        int    colorcount;
        int    population;
        Dim    dim[3];
        int    avg_r, avg_g, avg_b;

        Dim& operator[](int i) { return dim[i]; }
    };

    void Update(Box& box, int ii);

    sPalMaker(const RGBA *s, int count, RGBA *palette, int ncolors);
};

void sPalMaker::Update(Box& x, int ii)
{
    x.colorcount = 0;
    x.population = 0;
    int a[3][RASTER_MAP_MAX];
    ZeroArray(a[R]);
    ZeroArray(a[G]);
    ZeroArray(a[B]);
    x.avg_r = x.avg_g = x.avg_b = 0;
```

```

for(int r = x[R].l; r < x[R].h; r++)
for(int g = x[G].l; g < x[G].h; g++)
for(int b = x[B].l; b < x[B].h; b++) {
    int q = histogram[r][g][b];
    a[R][r] += q;
    a[G][g] += q;
    a[B][b] += q;
    x.avg_r += q * r;
    x.avg_g += q * g;
    x.avg_b += q * b;
    x.colorcount += (-q >> 31) & 1;
    x.population += q;
}
for(int i = 0; i < 3; i++) {
    Dim& d = x[i];
    while(d.l < d.h && a[i][d.l] == 0)
        d.l++;
    while(d.h > d.l && a[i][d.h - 1] == 0)
        d.h--;
}
x.volume = x[R] * x[G] * x[B];
}

static byte sRc(int avg, int pop, int div)
{
    return Saturate255(255 * (avg + (pop >> 1)) / pop / (div - 1));
}

sPalMaker::sPalMaker(const RGBA *s, int count, RGBA *palette, int ncolors)
{
    ASSERT(ncolors <= 256);
    ZeroArray(histogram);
    for(const RGBA *e = s + count; s < e; s++)
        histogram[s->r >> RASTER_SHIFT_R][s->g >> RASTER_SHIFT_G][s->b >>
RASTER_SHIFT_B]++;
    Buffer<Box> box(256);
    box[0][R].l = 0;
    box[0][R].h = RASTER_MAP_R;
    box[0][G].l = 0;
    box[0][G].h = RASTER_MAP_G;
    box[0][B].l = 0;
    box[0][B].h = RASTER_MAP_B;
    Update(box[0], 0);
    if(box[0].population == 0)
        return;
    colorcount = box[0].colorcount;
    count = 1;
    int method = 1;

```

```

while(count < ncolors) {
    int ii = -1;
    int maxv = 0;
    if(2 * count > ncolors)
        method = 1;
    for(int i = 0; i < count; i++) {
        int v = method ? box[i].volume : box[i].colorcount;
        if(box[i].colorcount > 1 && v > maxv) {
            ii = i;
            maxv = v;
        }
    }
    if(ii < 0)
        break;
    Box& b = box[ii];
    int ci = b[R] > b[G] ? b[B] > b[R] ? B : R : b[B] > b[G] ? B : G;
    if(b[ci] == 1) {
        if(method == 1)
            break;
        method = 1;
    }
    else {
        int m = (b[ci].l + b[ci].h) >> 1;
        Box& b1 = box[count];
        b1 = b;
        b[ci].h = m;
        b1[ci].l = m;
        Update(b, ii);
        Update(b1, count++);
    }
}

for(int i = 0; i < count; i++) {
    RGBA& c = palette[i];
    Box& x = box[i];
    c.r = sRc(x.avg_r, x.population, RASTER_MAP_R);
    c.g = sRc(x.avg_g, x.population, RASTER_MAP_G);
    c.b = sRc(x.avg_b, x.population, RASTER_MAP_B);
    c.a = 255;
}

void CreatePalette(const RGBA *s, int count, RGBA *palette, int ncolors)
{
    ASSERT(ncolors <= 256);
    delete new sPalMaker(s, count, palette, ncolors);
}

```
