

Department of Software Engineering
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Senior Project Proposal

UNDERGRADUATE

Project Title:	Collage Page Layout
Organization:	Kodak – Retail Photofinishing
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Background Information

As the world's leading supplier in self-service picture kiosks, Kodak has more than 85,000 units installed at retail locations around the globe. The award-winning KODAK Picture Kiosks produce lab-quality pictures in seconds from just about any digital camera memory card, USB thumb-drives and BLUETOOTH imaging-enabled cell phones.

The consumer-friendly touch screen lets consumers preview, select and print the exact digital images they want and zoom, crop, adjust brightness and reduce red eye to create exceptional new digital output products that include prints, CD's DVD, greeting cards and several other digital related products in seconds. The kiosks also allow consumers to save their digital images and create "digital negatives" on a KODAK Picture CD.

Kiosks are generally sold in the MASSFOOD and Drug markets, such as Wal-Mart, Costco, Best Buy, (large retailers), CVS, Walgreens, Rite-Aid (drug stores).

It is a windows-based product using Windows XP embedded and a 15" touch screen for user input. Its workflows are wizard-like to assist consumers getting the product they want quickly and easily. Kodak constantly updates the product offerings to consumers so their experience remains fresh.

Project Description

The purpose of this project is to develop an application that lays out pictures on a page better than what Kodak uses today. These layouts will be used in print products like photobooks and collages. The project is for a windows environment using standard windows tools and will fall into 2 stages:

1. The existing page layout tool (supplied by Kodak) will need to be refactored and improved. The current component uses a variation of the "Simulated Annealing" algorithm to arrange the pictures on the page while minimizing white space. While this algorithm works, what we really need is a solution to the "Backpack problem" to maximize the picture coverage on the page regardless of the sizes/aspect ratios of the images. At a minimum, additional functionality will need to be added (written in C#). At a high level, the following capabilities need to be added to the layout component:
 - Center image if there is only one image on the page
 - Add edge alignment logic so the edges of images line up both horizontally and vertically using a snap-to-grid layout after the gross layout is determined by the algorithm. – This is a standard graphic design concept that creates a more pleasing

multi-image page. This is not trivial and will require the development of cropping rules and possibly some auto cropping logic. The sponsor will be able to offer assistance here.

- Provide a symmetric look – more balanced layout between picture edges relative to the page edge.
 - Capability to fix a picture (or multiple pictures) in one location and size of that image and have other images automatically adjusted around it.
 - Capability to exclude areas for laying out pictures – for use by text tools and also to avoid print edge clipping as well as binding for the picture.
 - Grow the layout to fill the page after the pictures are arranged.
 - Specify min/max images per page
 - Specify page size - to allow arranging, scaling, etc to the product being created.
 - Performance must be minimally equivalent to current algorithm or better.
2. Develop an application that will allow users to select pictures from multiple input sources that use the layout component to arrange them out on a page. At a high level the application must:
1. Ideally, we would like to see the application implemented using web forms running totally on a single PC, without the need for a server.
 2. Allow the user to select a number of images (in a configurable range) using thumbnails of images read from multiple input sources including an SD memory card. As a stretch goal the application should allow adding images from multiple sources for a single page
 3. Lay out the pictures on a page using the layout component. Allow the consumer to modify the layout by accessing capabilities of the layout component.
 4. The look-n-feel to should closely resemble the existing Kodak picture kiosk (sample screen shots attached). All necessary graphics will be provided.
 5. Options for exposing the existing and new methods on the layout component (including a shuffle – to rearrange the images on the page)
 6. An undo option to go back.
 7. Must allow for multi-page products (i.e. photobooks)
 8. The ability to add text to any of the pages and/or images. This ability is independent of the layout application, although the text rectangle must be fixed location and calculated for input to the layout component
 9. The application must be developed for a 15" touch-screen monitor. Hardware will be supplied by Kodak at screen resolution of 1024x768
 10. The application must come with an installer for windows XP

Detailed requirements will need to be developed by the team and approved by the sponsor. The application will not be expected to produce a print, just a rendered image/product.

Technical Constraints & Assumptions

This project will require investigations into windows graphical tools. Specifically the Windows graphics device interface (GDI) which enables applications to use graphics and formatted text on the video display. This tool will supply most of the constructs you will need.

It will also require development of a web forms for the user interaction. This may require investigation prior to implementation depending on the skills of the team.

All software must be developed using Microsoft Visual Studio 2005 .NET framework using C#. It must be developed to run on the Kiosk Windows XP embedded OS image supplied by the sponsor.

The user interface cannot "hang" during processing for any extended period of time (specific goal to be negotiated with sponsor).

All settings used in the tool must have a control on a configuration screen so they can be quickly altered. Settings might be things like the text attributes, maximum number of images per page or anything else that pops up during development.

A good starting point for the application would be the Kilage project from the SE 2006-2007 year.

Project Scope

This is a real world need that if properly done will be deployed by Kodak on the kiosks. The existing layout tool is already deployed. This project is completely standalone and intended for actual customer use. There are no interdependencies between this work and other projects on the kiosk team.

Graphics, supplies and input screens will be supplied by Kodak.

Department of Software Engineering Required Deliverables

1. Project website holding all work products and project artifacts maintained in the project account on the se.rit.edu web server
2. Project plan, schedule and process methodology definition prepared by the end of week 3 of the Winter term.
3. Tracking report for time/effort worked on the project, and at least two other product/process metrics appropriate to the project and development methodology. Tracking reports updated on the project website at least every two weeks.
4. Interim status and final project presentations
5. Project poster and presentation at "SE Senior Project Day"
6. Project technical report

Expected Deliverables

The project will be considered to be a success if the following are delivered:

1. A working prototype of a page-layout application meeting the specifications and performance requirements.
2. An installer for installing the application on a windows XP system
3. Well-designed and documented source code

Initially we would, as a team, agree on the scope, process and expected deliverables. The team will be expected to clearly document the deliverables up-front and gain agreement with the sponsor. **Weekly client meetings will be required** using the following agenda (more or less):

1. Current progress against plan – using pre-agreed-to metrics, and demonstrations as appropriate.
2. Problems encountered with possible workarounds
3. Review of relevant projects risks
4. Expectations for the next week

During initial stages of the project you will be expected to develop and have client signoff on the following documents:

1. Use Cases
2. Storyboard of the GUI
3. System requirements – including specific specifications regarding the output product
4. Unit test plan
5. Acceptance test plan

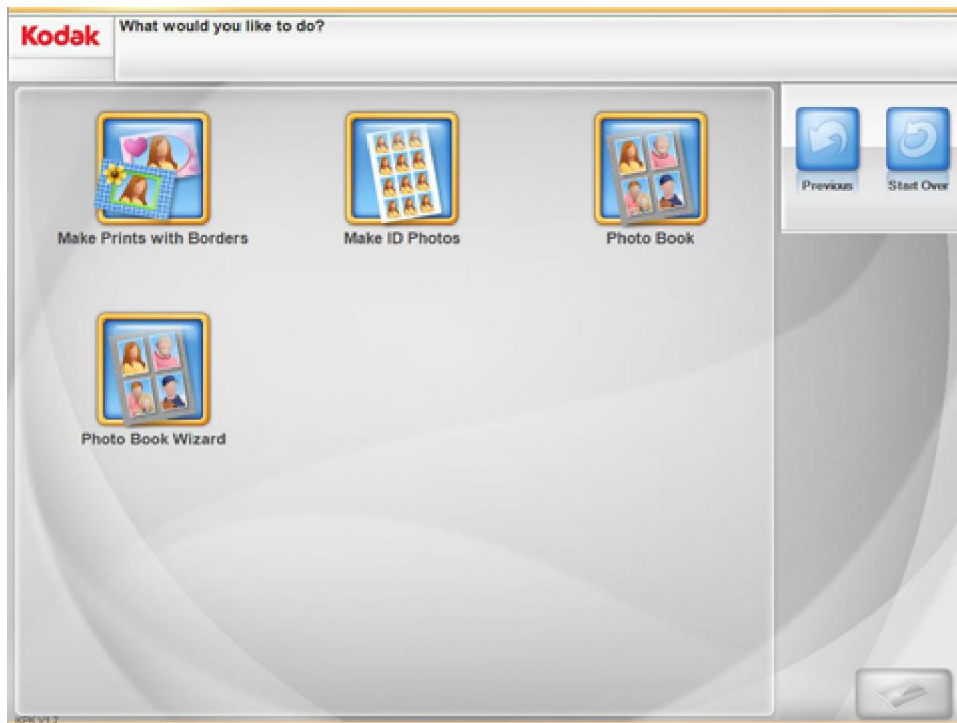
The sponsor will also expect to participate in **formal reviews of both the designs and the code**. These reviews should be scheduled as part of the normal development cycle and not something special for the sponsor. Ideally as part of the weekly sponsor meetings

“Sample” screenshots – Starting point for application

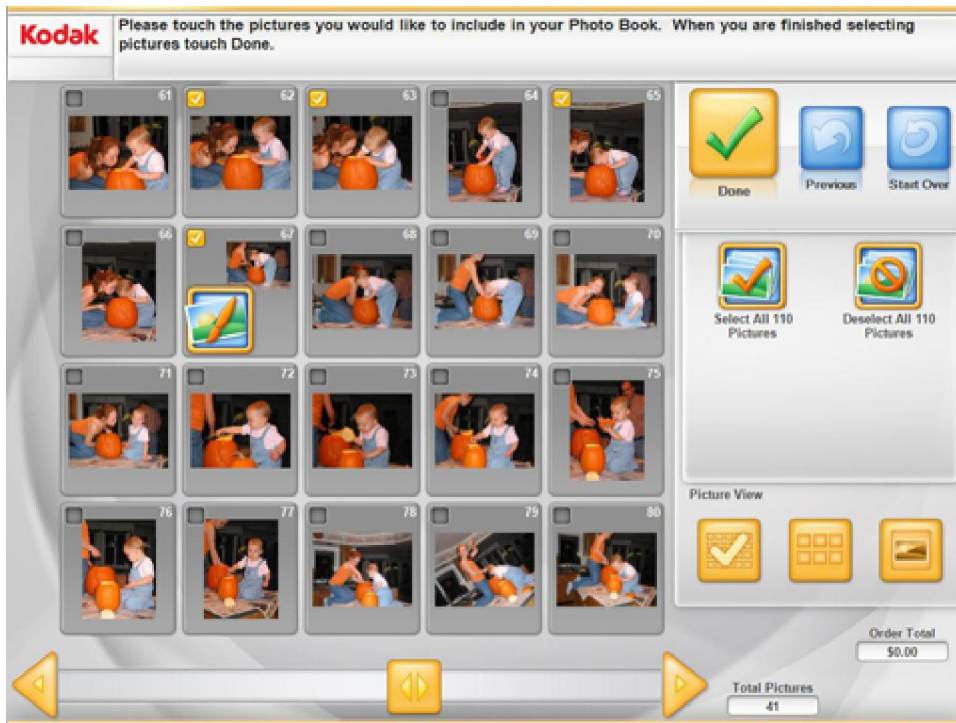
These are merely an examples taken from the existing Kodak picture kiosk – meant to supply a feel for the project. Specific screen layouts will be developed by the project team using storyboarding.

Main selection screen – there will be two options here:

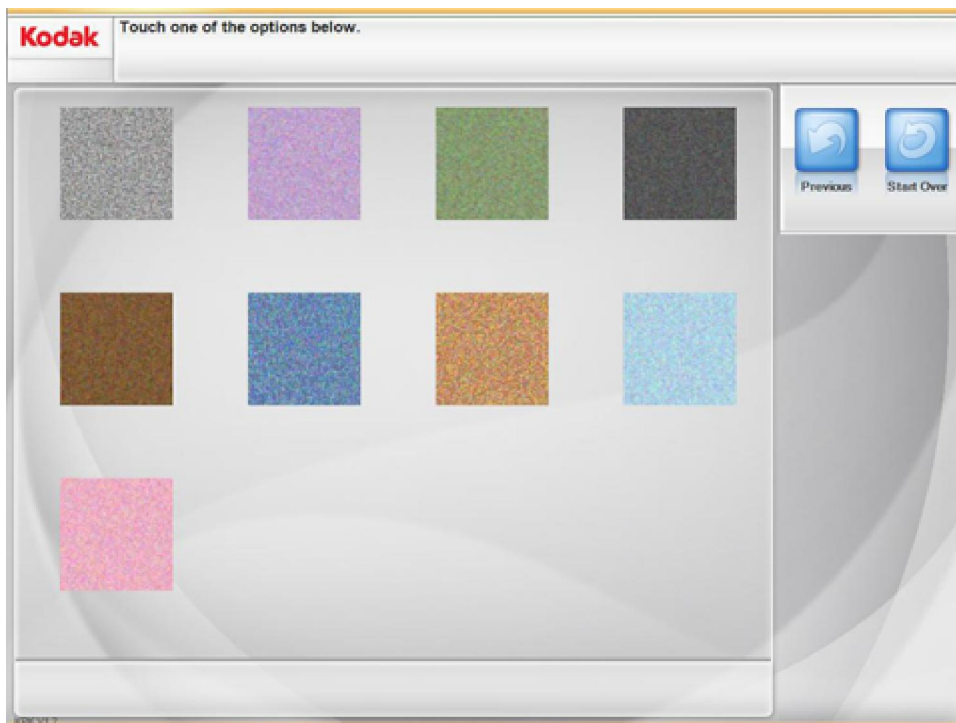
1. Multi-page photobook
2. Single page collage



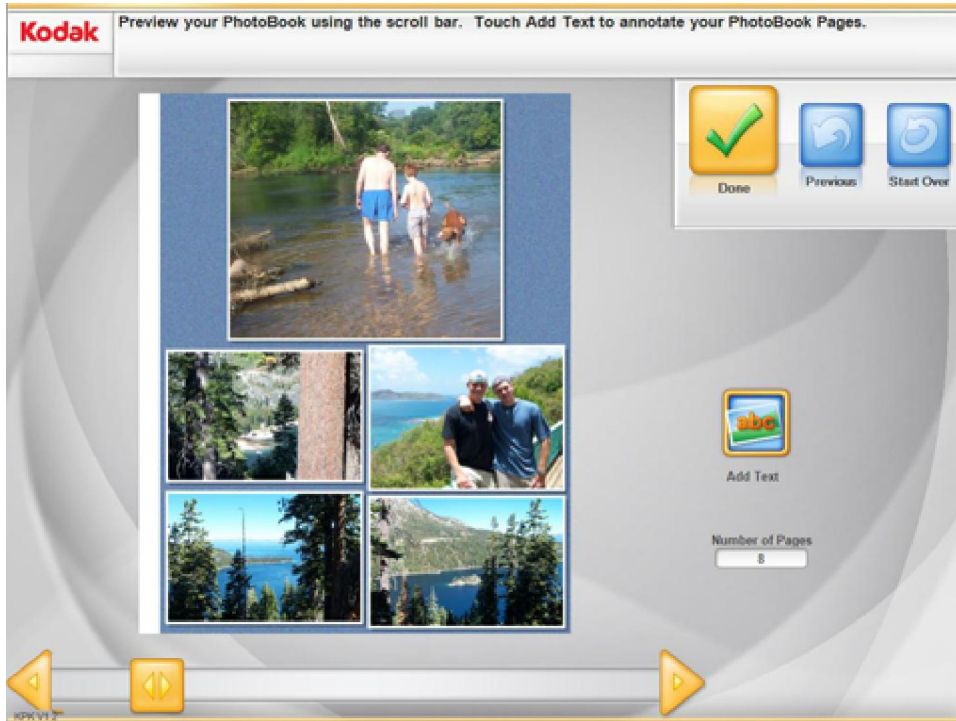
Pick images for your product:



Pick a background



Main creation page. More options would need to be added here, basically exposing the capabilities of the improved layout tool.



Some type of checkout page - This screen could be greatly simplified. The "Place Order" button will essentially end the application

