Text and structure recognition in PDF

Feature rich open source
developer's library for
PDF generation and manipulation
in web and other applications

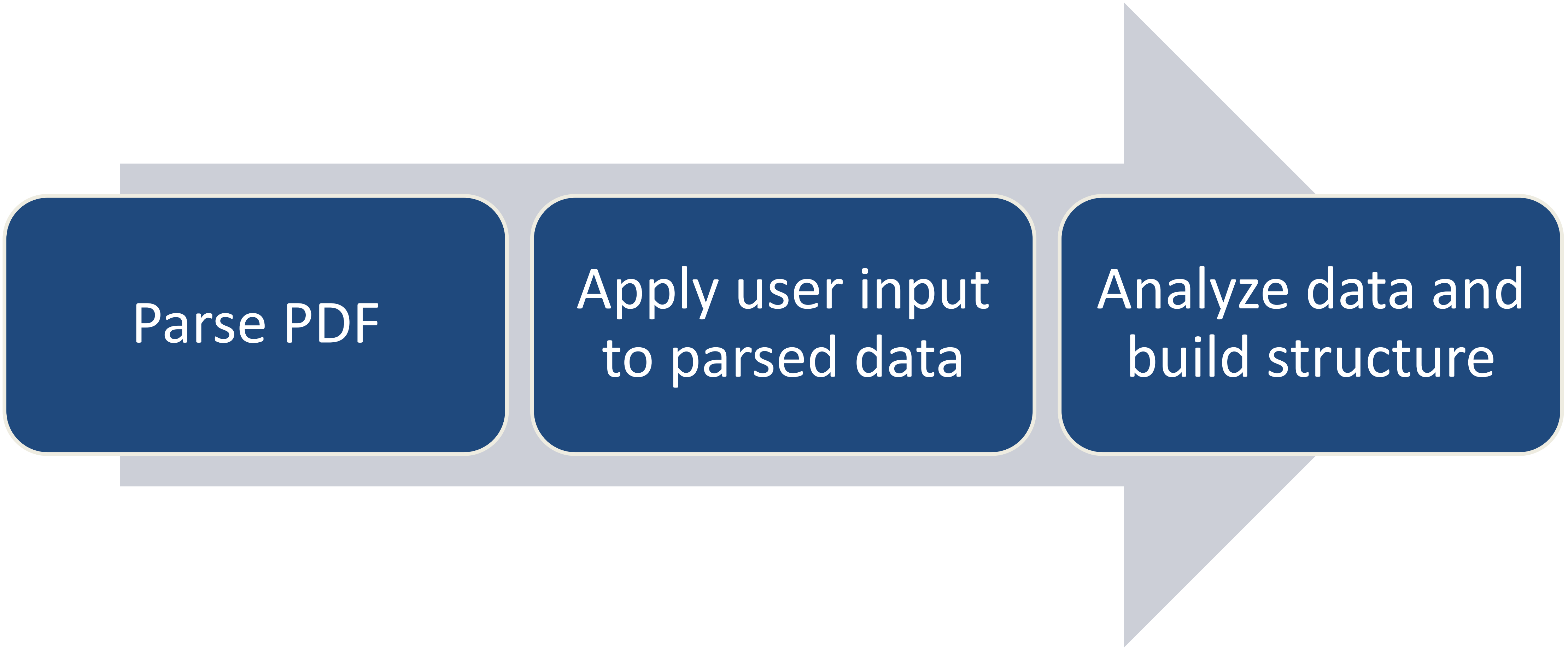
iText

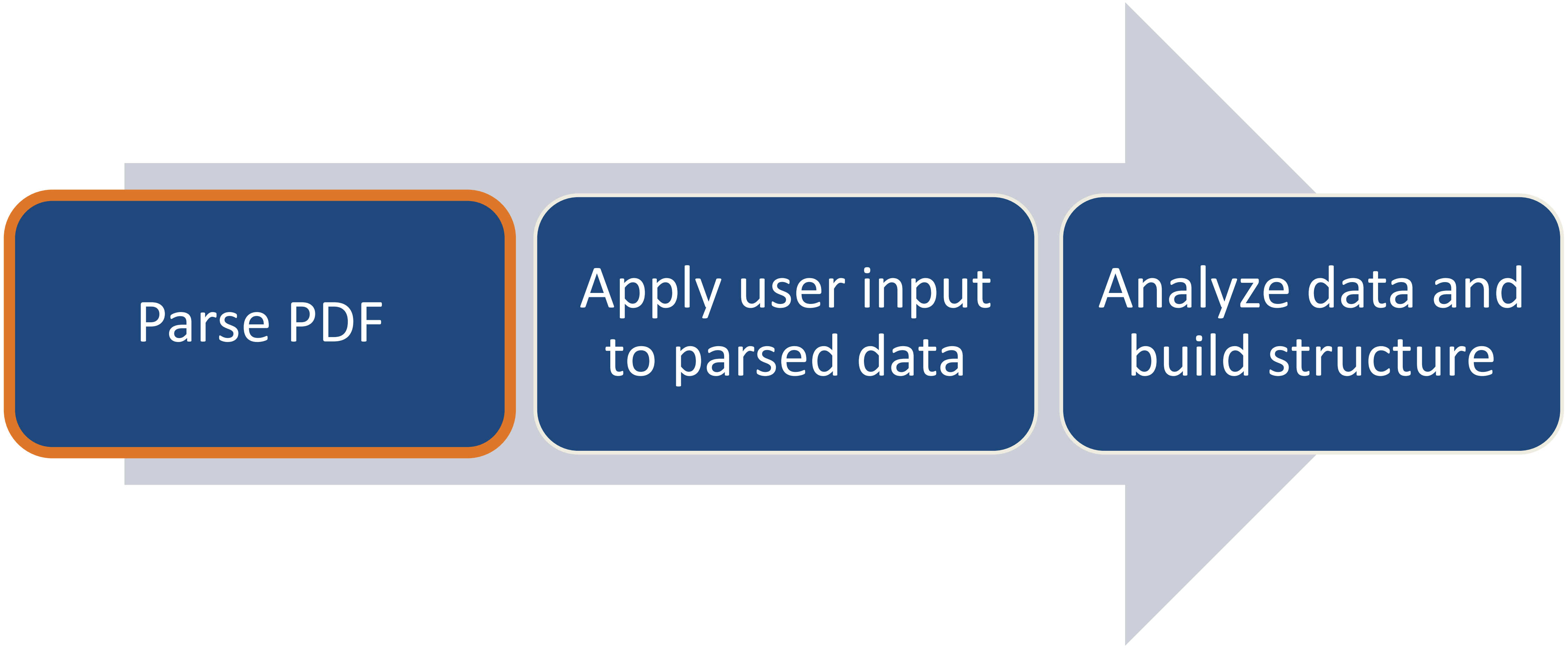
PDF structure recognition **with** iText

Real customer example

PDF structure recognition **in** iText

Presentation road map


Parse PDF
Apply user input to parsed data
Analyze data and build structure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- Extracts images from PDF page content
- Extracts text items from PDF page content
- Images and text items contain full graphics state
- User can specify listeners for extracted images and text items

Parse PDF. iText API

- Extracts images from PDF page content
- Extracts text items from PDF page content
- Images and text items contain full graphics state
- User can specify listeners for extracted images and text items
- **iText can do all that in only few lines of code!**

Parse PDF. iText API

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Pushbuttons aren't always meant to be pushed (or clicked). In the next example, we'll use pushbuttons as "hot areas" that trigger an action when the mouse moves over them.

7.4.3 A popup triggered by a button that doesn't need to be pushed

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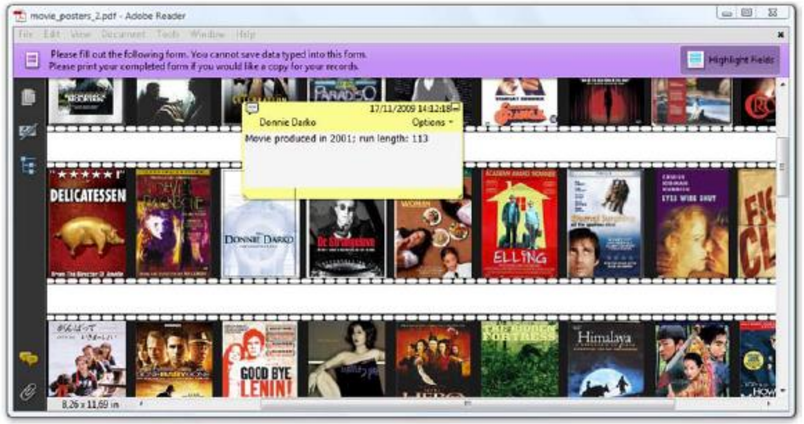
movie_posters_2.pdf - Adobe Reader
File Edit View Document Tools Window Help
Highlight Fields
Options

Please fill out the following form. You cannot save data typed into this form.
Please print your completed form if you would like a copy for your records.

17/11/2009 14:12:18
Donnie Darko
Movie produced in 2001; run length: 113

Figure 7.15 Text annotation in a popup using a button and its events

```
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PdfReader("iText.Book.pdf");
PdfReaderContentParser parser = new
PdfReaderContentParser(reader);
RenderListener renderListener =
parser.processContent(pageNum, new
MyRenderListener());
highlight(renderListener.items, reader, pageNum,
"./target/iText.Book.pdf");
reader.close();
```

Parse PDF. Highlight all items

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PdfReader reader = new
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"./target/iText.Book.pdf");
reader.close();
```

Parse PDF. Highlight all items

```
class MyRenderListener implements RenderListener {
    public List<Item> items = new ArrayList<Item>();
    public void beginTextBlock() {}
    public void renderText(TextRenderInfo textRenderInfo) {
        items.add(createItem(textRenderInfo));
    }
    public void endTextBlock() {}
    public void renderImage(ImageRenderInfo imgRenderInfo) {
        items.add(createItem(imgRenderInfo));
    }
}
```

Parse PDF. Highlight all items

```
class Item {
    public Rectangle rectangle;
}

class ImageItem extends Item {
}

class TextItem extends Item {
    public String fontName;
    public float fontSize;
}
```

Parse PDF. Highlight all items

```
BaseColor getColor(Item item) {
    if (item instanceof ImageItem)
        return BaseColor.RED;
    if (item instanceof TextItem)
        return BaseColor.BLUE;
    return null;
}
```

Parse PDF. Highlight all items.

RED images, **BLUE** text

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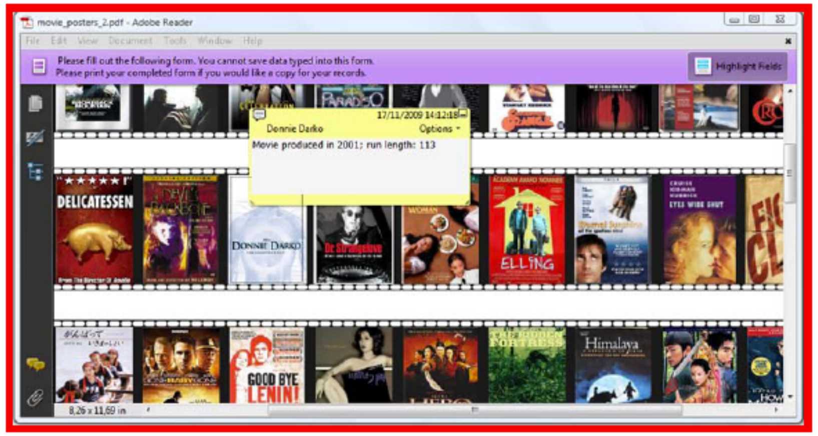
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Highlight Fields
8,26 x 11,69 in

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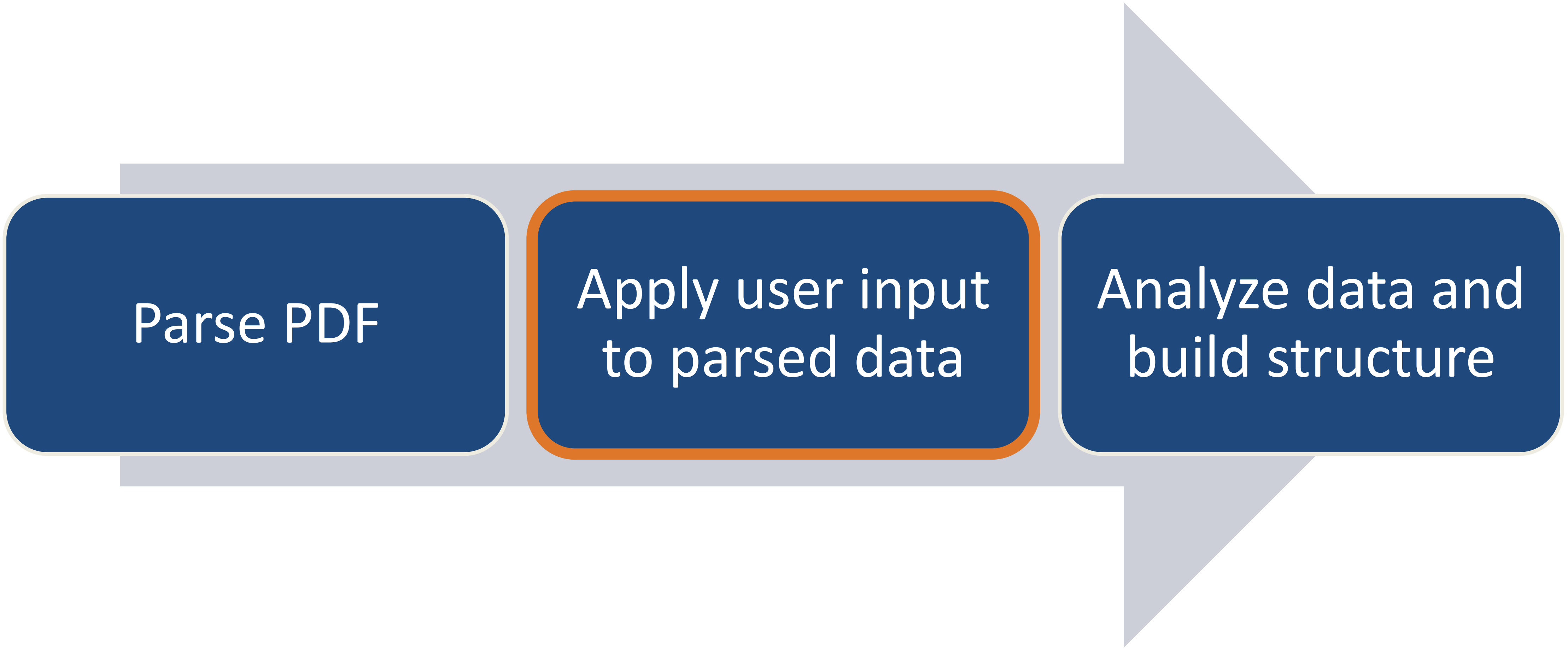
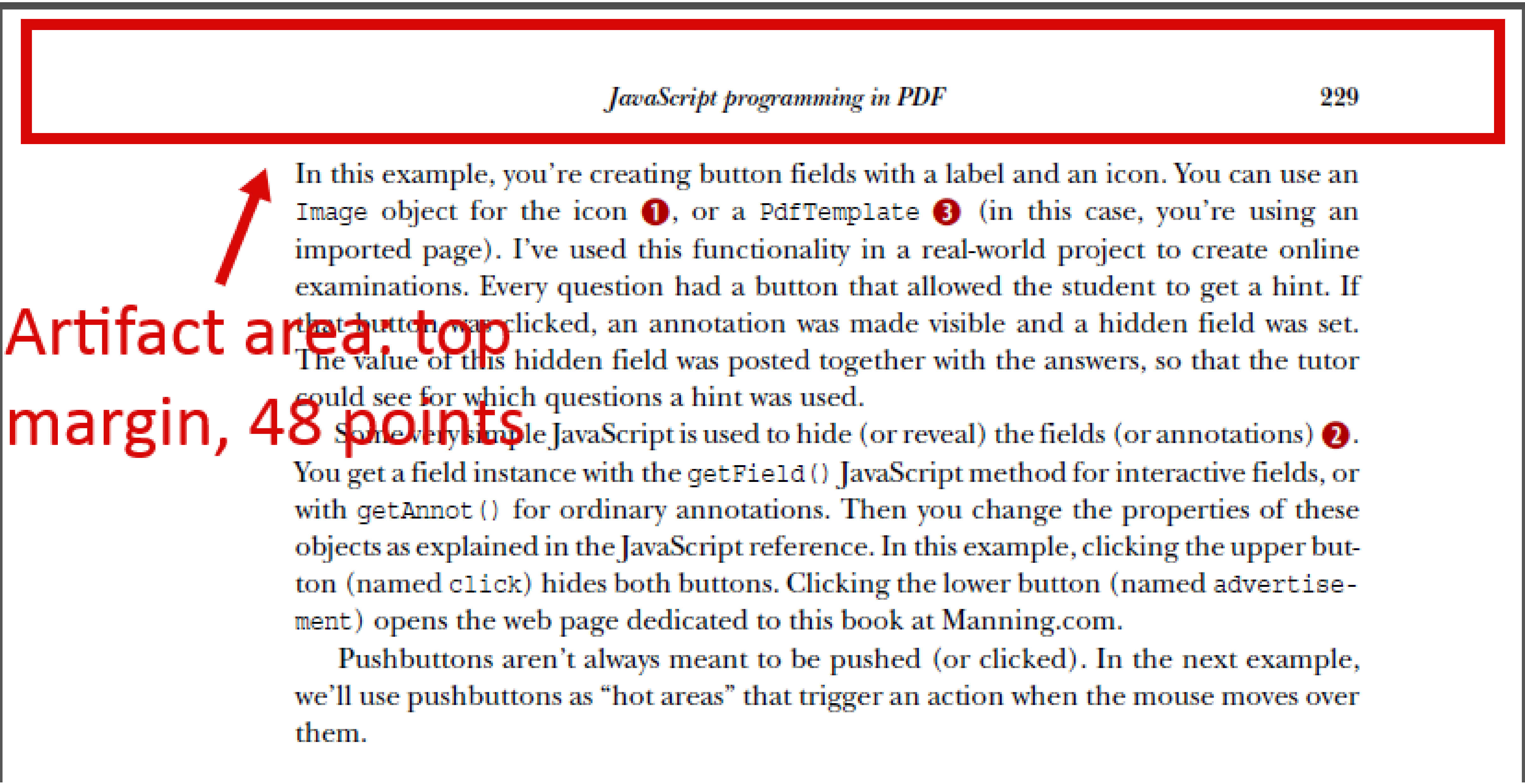

Parse PDF
Apply user input to parsed data
Analyze data and build structure

- Helps structure recognition processor to analyze parsed data
- User Input can be:
  - Text styles definitions
  - Page artifact areas definitions
  - …

Apply user input to parsed data

- Helps structure recognition processor to analyze parsed data
- User Input can be:
  - Text styles definitions
  - Page artifact areas definitions
  - …
- **Let’s add some input!**

Apply user input to parsed data



Artifact area: top margin, 48 points

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7.4.3 *A popup triggered by a button that doesn't need to be pushed*

Header: FranklinGothic, 10.5pt

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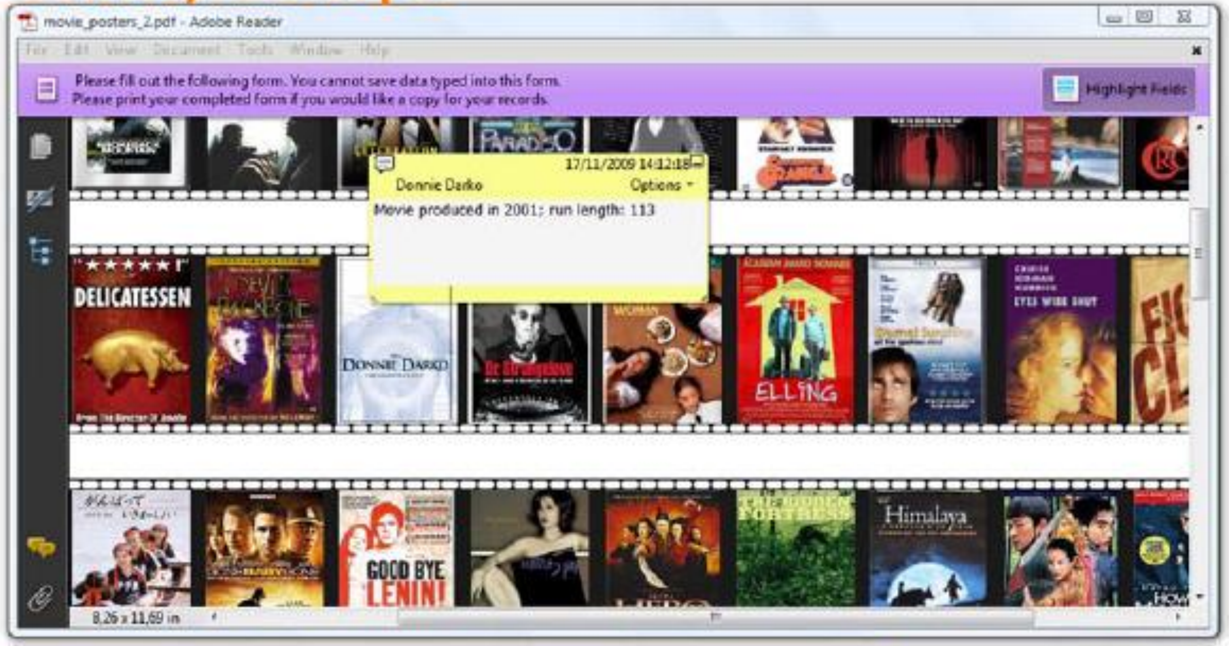

movie_posters_2.pdf - Adobe Reader

Please fill out the following form. You cannot save data typed into this form.
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Highlight Fields

Donnie Darko 17/11/2009 14:12:18 Options

Movie produced in 2001; run length: 113

8.26 x 11.69 in

Figure 7.15 Text annotation in a popup using a button and its events

Caption, FranklinGothic, 8pt

Plain text:

NewBaskerville, 10pt;

Courier, 9.5pt

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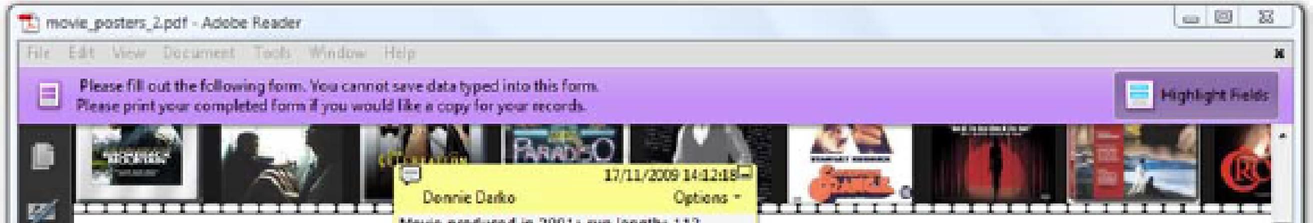
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Donnie Darko

[PSEUDO CODE]

```
BaseColor getColor(Item item) {
    if (item instanceof ImageItem)
        return BaseColor.RED;
    if (item instanceof TextItem) {
        if (item.baseline.y > pageSize.y - 48)
            return BaseColor.RED;
        else
            return textStyles.get(new TextStyle(item.fontName,
item.fontSize));
    }
    return null;
}
```

Apply user input to parsed data.

RED artifacts, BLUE text, ORANGE headers, GREEN captions

[PSEUDO CODE]

```
Map<TextStyle, BaseColor> textStyles = {
      (new TextStyle("FranklinGothic", 10.5), 
BaseColor.ORANGE);
      (new TextStyle("FranklinGothic", 8), 
BaseColor.GREEN);
      (new TextStyle("NewBaskerville", 10), 
BaseColor.BLUE);
      (new TextStyle("Courier", 9.5), 
BaseColor.BLUE);
}
```

Apply user input to parsed data. Text styles

[PSEUDO CODE]

```
class TextStyle {
    String fontName;
    Float fontSize;

    TextStyle(String fontName, float fontSize) { … }

    boolean equals(TextStyle ts) {
        return fontName.equals(ts.fontName) &&
            fontSize.equals(ts.fontSize);
    }

    int hashCode() { … }
}
```

Apply user input to parsed data. Text styles

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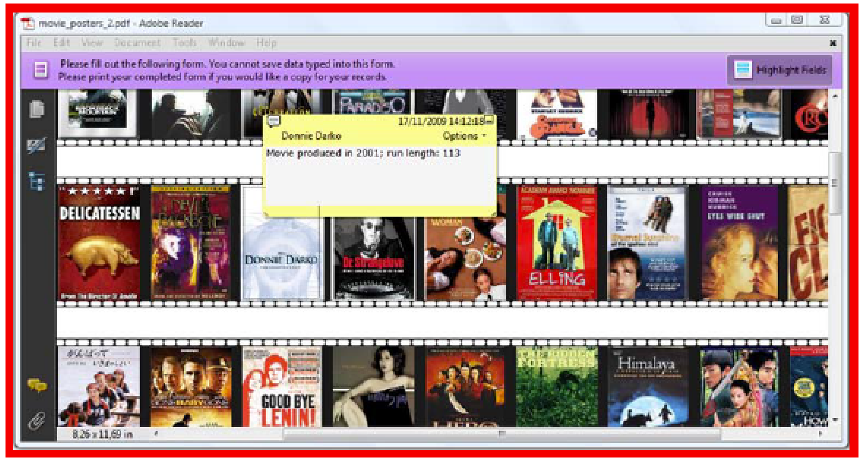
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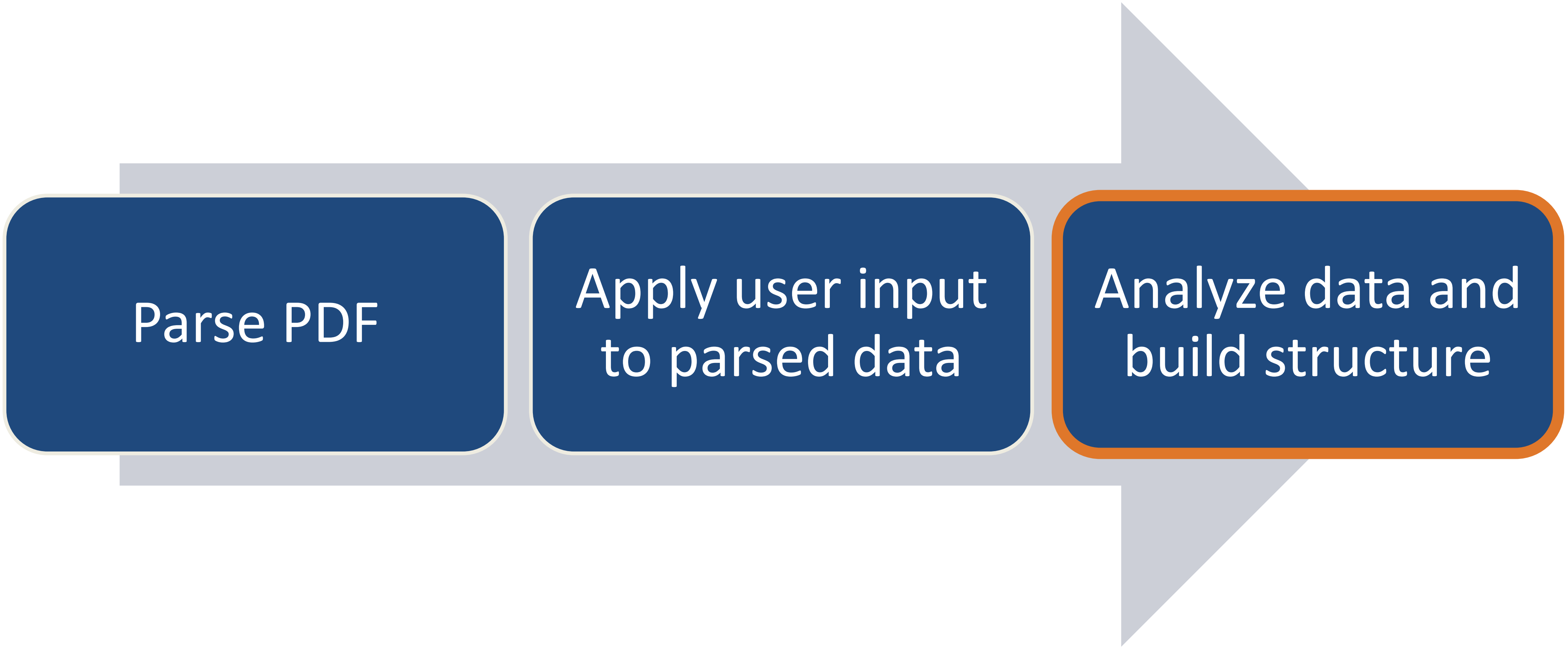
Parse PDF
Apply user input to parsed data
Analyze data and build structure

- Sort all items in natural reading order
  - Items appear in PDF page content chaotically
- Combine items into lines
- Combine lines into common structures
  - Paragraphs
  - Headers
  - Captions

Analyze data and build structure

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RenderListener renderListener =
parser.processContent(pageNum, new
MyRenderListener());
List<Item> items = sort(renderListener.items);
List<List<Item>> lines = getLines(items);
highlight(lines, reader, pageNum,
"./target/iText.Book.pdf");
reader.close();
```

Analyze data and build structure.

Sort all items and combine into lines

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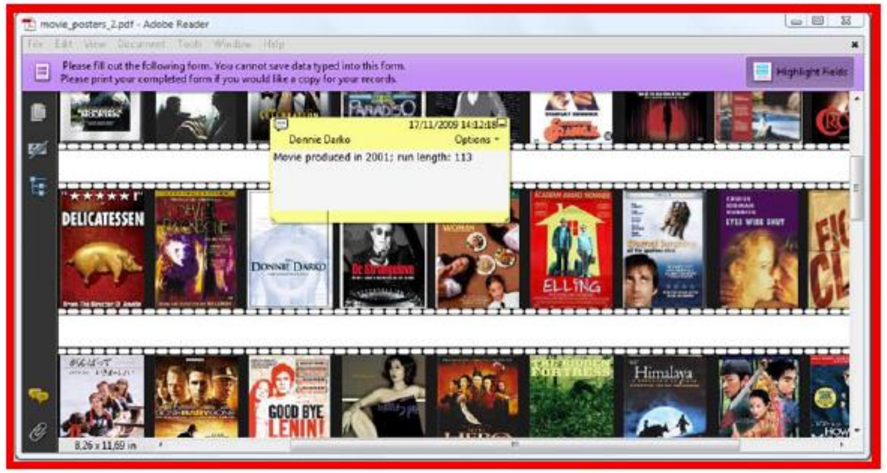
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List<Item> items = sort(renderListener.items);
List<List<Item>> lines = getLines(items);
List<List<List<Items>>> structures =
getStructures(lines);
highlight(structures, reader, pageNum,
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reader.close();
```

Analyze data and build structure.

Combine lines into common structures

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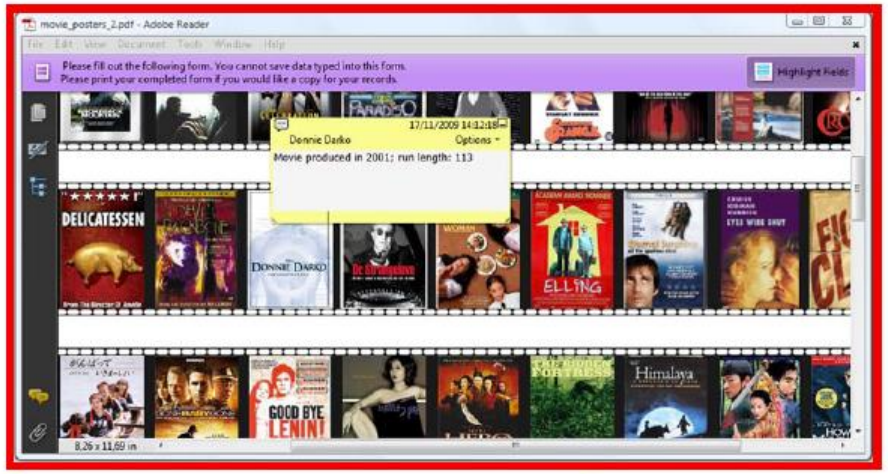
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PDF structure recognition **<u>with</u>** iText.

Done!

- Comments to example
  - Not all methods are exposed
  - Though structure is recognized we do not create tagged PDF here. We only highlight structure elements by color
- Limitations
  - More difficult layouts (multi column text, tables etc.) are not handled in this example
  - If plain text, headers, captions use same styles output can be incorrect

An iText project for GlobalSubmit, a health care service provider

Examining the content of PDF documents with the goal to add interactive features such as links bookmarks and annotations

Version 2.0.0.0
Copyright GlobalSubmit, Inc. 2014
All Rights Reserved. This program is protected by US and international copyrights laws.
License expiration: 7/22/2014

Real customer example. Live demo

- Build structure recognition API on a top of PDF parsing API
- Minimize user input for structure recognition
- Support more element types:
  - Lists
  - Tables
  - TOCs
- Support for complex layouts
- Possibility to export recognized structure to different output formats

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Asia and Africa

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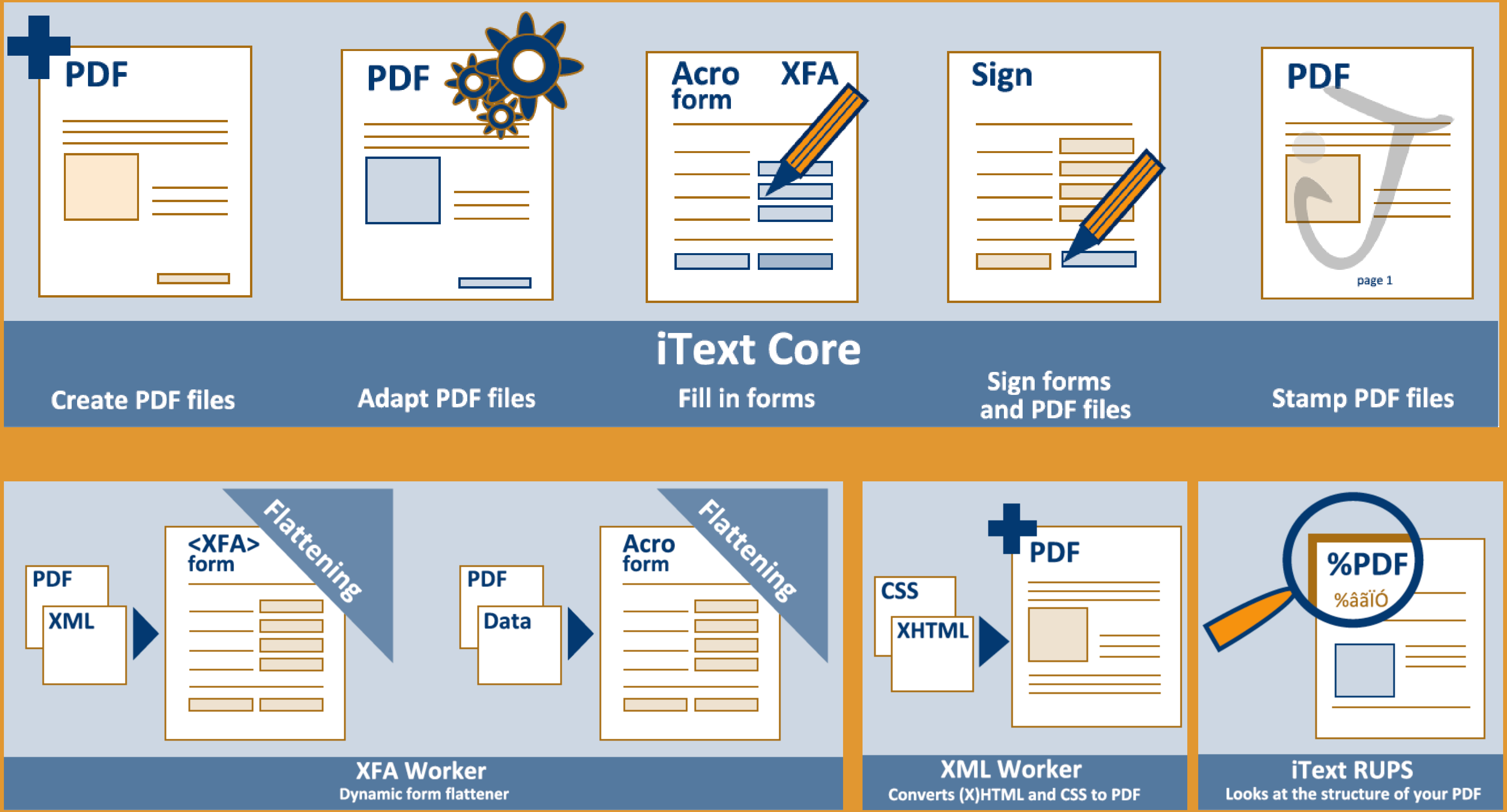
Cambridge, MA 02142
USA

T: +1 617 982 2646
F: +1 617 982 2647
E: sales.isc@itextpdf.com

www.itextpdf.com

Contact us!



iText technology

www.itextpdf.com/learn

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