🎯 Layout Analysis & AI Recognition Guide

Overview

This guide provides comprehensive instructions for creating optimal layout images that work best with the Sports Bar AI Assistant's automated TV position detection and mapping system.

📋 Image Specifications for Optimal AI Analysis

Recommended File Formats

- **PDF**: Preferred for vector-based layouts (AutoCAD, architectural drawings)
- **PNG**: Best for raster images with sharp details
- **JPEG**: Acceptable but may lose fine detail in text/numbers

Optimal Image Settings

Specification	Recommended Value	Benefit
Resolution	2400×1800+ pixels	Better text/number recognition
DPI	300+ for PDFs	Sharp conversion to raster
File Size	5-20MB (max 25MB)	High quality without performance issues
Color Mode	RGB or Grayscale	Consistent processing
Compression	Minimal/Lossless	Preserve fine details

Layout Content Guidelines

✅ **DO Include:**
- Clear, readable TV/marker numbers (TV 1, TV 2, etc.)
- Consistent numbering scheme throughout
- Wall labels or directional indicators
- Room/area names or sections
- High contrast between numbers and background
- Font size 12pt+ for text elements

❌ **AVOID:**
- Blurry or pixelated numbers
- Inconsistent numbering (mixing TV 1, Screen A, Display #3)
- Very small fonts (under 10pt)
- Low contrast colors
- Overlapping text or numbers
- Rotated text that's hard to read

🤖 How the AI Analysis Works

Detection Process

1. **PDF Conversion**: PDFs converted to PNG at 300 DPI
2. **Number Extraction**: AI scans for TV/marker numbers using pattern recognition
3. **Position Analysis**: Determines wall positions from text descriptions
4. **Smart Mapping**: Maps detected numbers to physical positions
5. **Fallback Generation**: Creates grid layouts for unrecognized patterns

Pattern Recognition

The AI looks for these patterns:
- `TV 1`, `TV 2`, `TV 3...`
- `Marker 1`, `Marker 2`, `Marker 3...`
- `Display 1`, `Screen 1`, etc.
- `1 is located...`, `2 is on the...`

Position Detection

Wall positions determined by text context:
- **Left Wall**: “left wall”, “vertical wall” + “left”
- **Right Wall**: “right wall”, “vertical wall” + “right”
- **Top Wall**: “top wall”, “upper wall”, “horizontal wall” + “top”
- **Bottom Wall**: “bottom wall”, “lower wall”, “horizontal wall” + “bottom”
- **Corner**: “corner”, “angled”

🎨 Graphics Designer Guidelines

Creating New Layouts

1. **Use Consistent Numbering**
   `✅ Good: TV 1, TV 2, TV 3, TV 4...`
   `❌ Bad: TV-1, Display A, Screen #3, Monitor Four`

2. **Add Descriptive Text**
   `✅ Good: "TV 5 is on the right wall near the entrance"`
   `❌ Bad: Just showing "5" with no context`

3. **Include Area Names**
   `✅ Good: "Main Bar Area", "Side Dining", "VIP Section"`
   `❌ Bad: Unlabeled room sections`

4. **Use High Contrast**
   - Dark numbers on light backgrounds
   - Bold, sans-serif fonts
   - Minimum 12pt font size

Layout Structure Examples

Architectural Floor Plan:

```
Main Bar Area:
- TV 1: Left wall, near entrance
- TV 2: Behind main bar, center
- TV 3: Right wall, corner position

Side Dining Area:
- TV 4: Top wall, above booth seating
- TV 5: Left wall, facing tables
```

Simple Grid Layout:

```
[TV 1]    [TV 2]    [TV 3]
  |         |         |
[TV 4]    [TV 5]    [TV 6]
  |         |         |
[TV 7]    [TV 8]    [TV 9]
```

🔧 Technical Implementation

Image Processing Pipeline

1. **Upload**: File uploaded via bartender interface
2. **Validation**: Format and size checks (max 25MB)
3. **Conversion**: PDFs converted at 300 DPI using `pdftoppm`
4. **Optimization**: Sharp processing with 95% PNG quality
5. **Analysis**: AI parsing of text and number patterns
6. **Mapping**: Intelligent position assignment

Supported File Types

```
const validTypes = [
  'image/jpeg',
  'image/png',
  'image/gif',
  'image/webp',
  'application/pdf'
]
```

Processing Limits

- **File Size**: 25MB maximum
- **Resolution**: Up to 2400×1800 optimized output
- **TV Count**: Up to 50 TVs per layout
- **Processing Time**: ~5-15 seconds depending on complexity

📊 Testing Your Layouts

Upload Process

1. Navigate to Management → Layout Import
2. Upload your layout file
3. Review AI-detected TV positions

4. Use “Import Layout Positions” to apply to matrix
5. Verify mappings in Matrix Control section

Validation Checklist

- [ ] All TV numbers detected correctly
- [ ] Positions mapped to appropriate walls
- [ ] No overlapping TV locations
- [ ] Matrix outputs properly assigned
- [ ] Bartender interface displays layout correctly

🚀 Best Practices

For Maximum Accuracy:

1. **Create dedicated layout documents** (don’t use existing floor plans with cluttered text)
2. **Use sequential numbering** starting from 1
3. **Include wall descriptions** in text form
4. **Test with simple layouts first** before complex designs
5. **Provide multiple views** if needed (overview + detail views)

Common Issues & Solutions

Problem	Solution
Numbers not detected	Increase font size, improve contrast
Wrong positions	Add wall descriptions in text
Overlapping TVs	Improve spacing, use edge margins
Missing TVs	Ensure consistent numbering scheme
Poor quality conversion	Use higher DPI PDFs or PNG format

📞 Support

If you encounter issues with layout analysis:
1. Check the browser console for error messages
2. Verify your image meets the recommended specifications
3. Try a simplified version of your layout first
4. Review the AI analysis results in the management interface

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🔄 Version History

- **v2.0** (Current): Dynamic AI parsing, 300 DPI processing, 25MB limit
- **v1.0**: Hardcoded layouts, 200 DPI processing, 10MB limit

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Last updated: [Current Date] - For the latest version, check the GitHub repository