# Analog Clock Reader

Vaibhav Agrawal

Center for Visual Information Technology,
International Institute of Information Technology, Hyderabad

**Abstract**

Here we present a CNN-based model that can take as input the image of an analog clock, and output the time on it. Note that the images are computer generated, and therefore do not contain random noise that is generated in camera-clicked images. However, the clocks can be of different designs, for example, they may have differently styled hands, digits, wallpapers and shapes.

## 1 Introduction

Being able to read the time on an analog clock is a difficult problem in Computer Vision. Here, we try to see if a simple CNN-based model is able to handle this task.

### Model Architecture

As an example, this template includes a "sample.bib" file containing the references in BibTeX.

### Equations

Equations should be provided in a text format, rather than as an image. Equations should be numbered consecutively, in round brackets, on the right-hand side of the page by using the "\begin{equation}" command. They should be referred to as Equation 1, etc. in the main text.

For example, see Equation 1 and Equation 2 below.

$$a^2 + b^2 = c^2 \tag{1}$$

$$\begin{aligned} A &= \frac{\pi r^2}{2} \\ &= \frac{1}{2}\pi r^2 \end{aligned} \tag{2}$$

## Figures

Figures should be called out within the text and numbered in the order of their citation in the text. Every figure must have a descriptive title beginning with "Figure [Number] ..." All figure titles should be either a phrase or a sentence; do not mix the two styles. See Figure 1 for example.

Figure 1: This is an example figure.

Figures should be displayed on a white background. When preparing figures, consider that they can occupy either a single column (half page width) or two columns (full page width), and should be sized accordingly.

If a figure consists of multiple panels, they should be ordered logically and labelled with roman letters (i.e., A, B, C, etc.). All labels should be explained in the legend. See Figure 2 for example.

Upon acceptance, authors will be asked to provide the figures as separate electronic files. At that stage, figures should be supplied in Adobe Portable Document Format (PDF), PostScript (PS), or Encapsulated PostScript (EPS) for illustrations or diagrams; Tagged Image File Format (TIFF), JPEG, PNG, PhotoShop (PSD), EPS, or PDF for photography or microscopy. Bitmap (BMP) images should be of at least 300 dpi resolution, unless due to the limited resolution of a scientific instrument. If a bitmap image has labels, the image and labels should be embedded in separate layers.

(a) (b)

Figure 2: This is an example of a figure consisting of multiple panels. (a) This is the first panel. (b) This is the second panel.

## Tables

Tables should supplement, not duplicate, the text. They should be called out consecutively within the text and numbered in the order of their citation in the text.

Every table must have a descriptive title beginning with "Table [Number] ..." as noted in Table 1. If numerical measurements are given, the units should be included in the column heading. Every vertical column should have a heading, followed by a unit of measure (if any) in parentheses. Units should not change within a column. Vertical rules should not be used.

Centered headings of the body of the table can be used to break the entries into groups. Do not use footnotes in column heads; include any such details in sentence form in the table legend. Footnotes should contain information relevant to specific cells of the table; use lowercase letters in alphabetical order, as needed: a, b, c, etc.

# 2 Materials and Methods

The materials and methods section should provide sufficient information to allow replication of the results. This section should be broken up by subheadings. Under exceptional circumstances, when a particularly lengthy description is required, a portion of the materials and methods can be included in the Supplementary Materials.

## 2.1 Experimental Design

Begin with a section titled Experimental Design describing the objectives and design of the study as well as prespecified components.

## 2.2 Statistical Analysis

If applicable, include a section titled Statistical Analysis that fully describes the statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the results. The values for N, P, and the specific statistical test performed for each experiment should be included in the appropriate figure legend or main text.

## 2.3 Human and Animal Research

For investigations on humans, a statement must be including indicating that informed consent was obtained after the nature and possible consequences of the study was explained.

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# 3 Results

The results should describe the experiments performed and the findings observed. The results section should be divided into subsections to delineate different experimental themes.

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Table 1: This is an example table.

| Column 1 | Column 2 | Column 3 |
|---|---|---|
| Cell 1 | Cell 2 | Cell 3 |
| Cell 4 | Cell 5 | Cell 6 |

- Figures and tables must be called out in numerical order. For example, the first mention of any panel of Fig. 3 cannot precede the first mention of all panels of Fig. 2. The supplementary figures (for example, fig. S1) and tables (table S1) must also be called out in numerical order.

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Include a Discussion that summarizes (but does not merely repeat) your conclusions and elaborates on their implications. There should be a paragraph outlining the limitations of your results and interpretation, as well as a discussion of the steps that need to be taken for the findings to be applied. Please avoid claims of priority.

# Acknowledgments

Anyone who made a contribution to the research or manuscript, but who is not a listed author, should be acknowledged (with their permission). Types of acknowledgements include:

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Thank others for any contributions, whether it be direct technical help or indirect assistance

## Author Contributions

Describe contributions of each author to the paper, using the first initial and full last name.

Examples:
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"E. F. Mustermann and J. F. Smith conducted the experiments."
"All authors contributed equally to the writing of the manuscript."

## Funding

Name financially supporting bodies (written out in full), followed by the funding awardee and associated grant numbers (if applicable) in square brackets.

Example:
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Describe any supplementary materials submitted with the manuscript (e.g., audio files, video clips or datasets).

Please group supplementary materials in the following order: materials and methods, figures, tables, and other files (such as movies, data, interactive images, or database files).

Example: Fig. S1. Title of the first supplementary figure.
Fig. S2. Title of the second supplementary figure.
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