PiClock

User Manual

Jacob Alspaw
Arbazuddin Ahmed
Kareem Taleb
Benjamin Young

An open source, smart alarm clock platform that aims to improve upon the functionality of traditional alarm clocks by integrating new and useful technologies to motivate users. PiClock increases productivity by helping users overcome their early morning exhaustion and providing general information about their upcoming day.

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1. Introduction

The PiClock is a Raspberry Pi-based alarm clock that aims to wake its users up more effectively by forcing them to beat a game to shut off the alarm. It also offers a variety of widgets to enhance the user's morning experience. PiClock offers many customizations to the user, including setting the alarm time, the game to play when the alarm sounds, the widgets to be displayed on the screen, and other general settings. The following document will discuss how the user can setup, customize, and then use their very own PiClock.

2. Installation and Setup

2.1 Installing Raspbian

The PiClock software runs on a Raspberry Pi optimized, free Debian-based operating system called Raspbian Jessie. This section will guide uses through the installation process of Raspbian Jessie on their Raspberry Pi.

1. Download the latest version of Raspbian.
2. Load a micro SD card into your computer.
3. Open a disk utility tool and format the SD card to FAT-32.
4. Using a disk imaging tool, load and flash the Raspbian OS onto your SD card.
5. Insert the SD card into your Raspberry Pi and reboot the system.

2.2 Installing PiClock Dependencies

The PiClock software requires SQLite Libraries to run properly. This section will guide users through the installation process of a SQLite package provided through *apt-get*.

1. Boot up the Raspberry Pi.
2. Navigate to the terminal.
3. Run system command "sudo -s" to access root level privileges.
4. Run system command "apt-get install sqlite3" to install required package

2.3 Downloading PiClock Software

The PiClock software is free and open source. The software can be found on the development team's leader's public GitHub page. This section will guide uses through the download process of the PiClock software.

1. Navigate to the terminal on any personal computer.

2. Ensure that git is installed.
3. Run system command "git clone https://github.com/jaa134/EECS-393.git" to retrieve project files.
4. Ensure the folder "EECS-393" was created in the current directory.

2.4 Running PiClock

The PiClock software is intended to run on a Raspberry Pi. As it currently stands, the PiClock executable is only compiled for desktop versions of Linux based operating systems. This section will guide users through the compilation process that will produce an executable for their Raspberry Pi.

1. To cross compile the PiClock software for the Raspberry Pi's ARM Cortex processor, follow the QT guide: https://wiki.qt.io/Raspberry_Pi_Beginners_Guide. The result should be a new executable intended for the Raspberry pi.
2. Move the project and all included files onto the Raspberry Pi and into a folder accessible by the pi user.
3. Optionally setup the Raspberry Pi to operate in Kiosk mode which can be configured to automatically launch the PiClock application on boot.

2.5 Configuring PiClock

The PiClock application often uses third-party resources as means to collect data. These resources sometimes require users to use geolocations and pre-shared keys as forms of network request validation. The PiClock users will need to setup personal accounts to ensure all features work as intended. This section will guide users through the configuration process of the PiClock software setup.

1. Startup the PiClock software on the Raspberry Pi and navigate to the settings page and the widgets tab.
2. On your personal computer make an account for the Apixu Weather API at https://www.apixu.com/. Enter the API key in the Weather API key input. Also add a zipcode to the location. This will finish setup of the weather and forecasts widgets.
3. To setup the commute widget, another account must be made using the Bing Maps Dev Center at https://www.bingmapsportal.com/. Create an account and then enter the provided key in the Commute API key input. Also enter starting and ending location coordinates.
4. To setup the news widget, a last account must be made at https://newsapi.org/. Enter the News API key in the input.
5. Restart the Raspberry Pi.

3. Settings

To get to the settings, click the settings icon in the top right corner of the screen. Here, users will find several tabs discussed in further detail below. To return back to the home screen, simply click the back arrow as shown.

3.1 General Tab

The first tab is the general settings, where users can customize a few broad settings for the PiClock. This includes the time of the clock and slide duration for widgets. Users will see a bar that allows them to change how long each widget is portrayed in the slideshow. *(Depicted in figure 1)*

3.2 Alarm Tab

The second tab is the alarm tab. It allows users to set an alarm and to customize the game required for play when the alarm begins. Users cannot set an alarm without choosing a game. Here is where users select the difficulty of the game as well. The alarm to trigger next is evaluated every time the PiClock user saves the settings. *(Depicted in figure 2)*

3.3 Widgets Tab

The third tab allows users to customize which widgets they would like to see. When users go to this tab, there will be a list of all the supported widgets. Here users can select and deselect the widgets they want to display in the slideshow. They will also be able to setup requirements for widgets that need additional setup. There are inputs that allow users to input locations and key sequences that the PiClock must use to update its widgets. *(Depicted in figure 3)*

4. Games

The PiClock consists of four games to choose from to stop the alarm. There is also a difficulty attribute that can make the game selected either easy, medium, or hard. The game and its difficulty can be selected and changed in the settings. There are four games to choose from: a Math Game, a Trivia Game, a Tic-Tac-Toe Game and a Memory Card Game. The user has 5 minutes to complete the game and turn off the alarm, otherwise the alarm will continue blaring. After the game is completed and the user has won, the alarm will stop blaring and the user will be redirected to the home screen. *(Depicted in figures 4-7)*

4.1 Math Game

In this game, the user is presented with a math problem, displayed in the format of a number followed by an operation (+,-,/,*) followed by another number. There will be 4 options presented, and one of the options will be the correct answer. If the user selects the correct answer, the number of questions needed to get right to win the game and stop the clock decreases. The user needs to correctly answer 3, 5, and 7 questions on easy, medium, and hard difficulty, respectively. *(Depicted in figure 4)*

4.2 Trivia Game

In this game, the user is presented with a trivia question. There will be 4 options presented, and one of the options will be the correct answer. If the user selects the correct answer, the number of questions needed to get right to win the game and stop the clock decreases. The user needs to correctly answer 3, 5, and 7 questions on easy, medium, and hard difficulty, respectively. *(Depicted in figure 5)*

4.3 Tic-Tac-Toe Game

In this game, the user is presented with a Tic-Tac-Toe board. The user plays against a computer. Users place an X anywhere on the board, and the computer places an O somewhere else on the board. The user and the computer continue to alternate turns until someone has placed three of their symbols in a row along a row, column, or diagonal. If the board fills up and neither player has accomplished this, the game is a tie. Users receive 2 points for a win, 1 for a tie, and 0 for a loss. They will need to accumulate 4, 6, and 8 points for a win on easy, medium, and hard difficulty, respectively. *(Depicted in figure 6)*

4.4 Concentration Card Game

In this game, the user is presented with a 4x4 board of cards with identical backs. Each of the cards has a color on the face-down side. There are two cards in each of eight colors. The user touches two cards to flip them over. If the two cards are the same color, then they stay flipped over and the user gains two points. If they are different colors, then they flip back over. The user will need to continue flipping over cards until they have accumulated 4, 6, or 8 points on easy, medium, and hard difficulty, respectively. *(Depicted in figure 7)*

5. Widgets

Widgets are helpful applications that run continuously in a rotating slideshow on the PiClock's home screen. Users can toggle which widgets appear in the slideshow and the duration of each widget in the settings. *(Depicted in figures 8-15)*

5.1 Main Clock and Date

The time and date appear in the upper left corner of the home screen. Users can choose between a 12 and 24-hour clock in settings. If the time seems to be out of synch with the user's local time, try reconfiguring the local time on the Raspberry Pi system. *(Depicted in the top left of figures 8-15)*

5.2 Current Weather

Shows the current weather in a user's area. Data updates every ten minutes. A location for weather can be setup in the settings. If the weather widget does not update or appears to be displaying incorrect results, users may find that adjusting the settings will suit their needs. *(Depicted in figure 8)*

5.3 Four Day Forecast

Shows the predicted weather in a user's area for the next four days. Data updates every ten minutes. A location for the forecast can be setup in the settings. If the forecast widget does not update or appears to be displaying incorrect results, users may find that adjusting the settings will suit their needs. *(Depicted in figure 9)*

5.4 Quotes

This widget shows a randomly selected quote and author. Every time it is shown in the slideshow, the widget shows a different quote. *(Depicted in figure 10)*

5.5 World Clock

World Clock shows the time of different cities around the world. The cities cannot be customized. Times are updated once every minute. *(Depicted in figure 11)*

5.6 Holiday Countdown

Shows the number of days until the next significant Holiday. As of right now, the holidays cannot be customized. *(Depicted in figure 12)*

5.7 System Statistics

Shows the Raspberry Pi's CPU, memory, hard drive, and network usage as a percentage of the total available. *(Depicted in figure 13)*

5.8 Commute

Shows the expected time required to drive to your work, school or other daily obligation. Users can specify the start and end location in the settings. *(Depicted in figure 14)*

5.9 News

Displays random headline information from the day's most popular news articles collected from a variety of sources. The displayed article is updated on every slideshow cycle. *(Depicted in figure 15)*
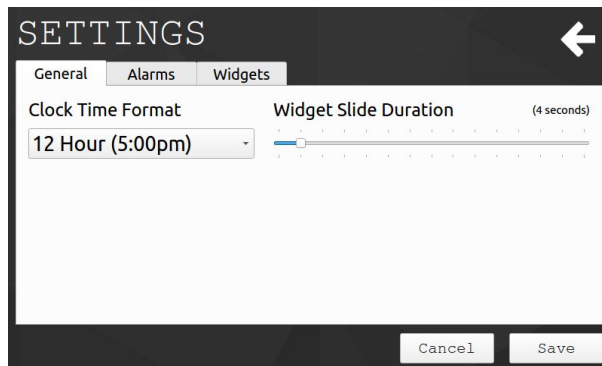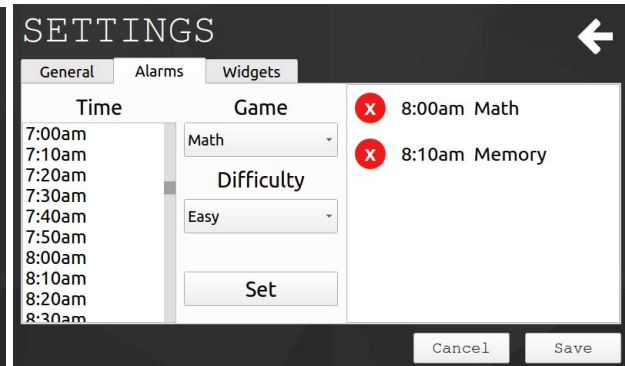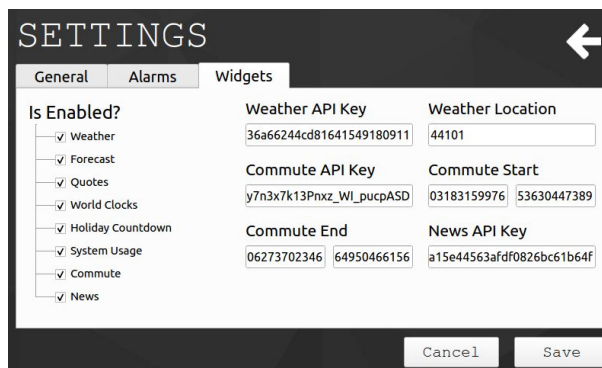
6. Figures

Figure 1: General settings

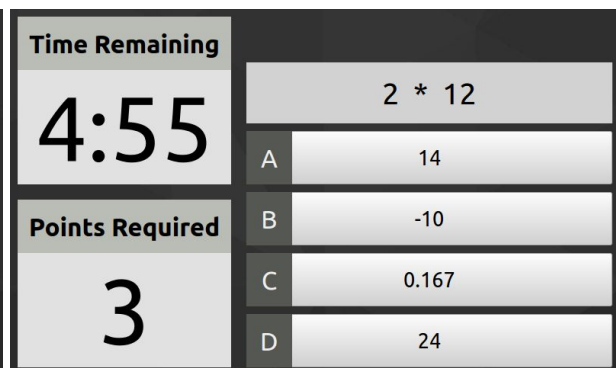
Figure 2: Alarm settings

Figure 3: Widget settings

Figure 4: Math Game

Time Remaining

4:59

Which state of the United States is the smallest?

A	Maine
B	Massachusetts
C	Rhode Island
D	Vermont

Points Required

3

Figure 5: Trivia Game

Time Remaining

4:55

Points Required

4

Figure 6: Tic Tac Toe Game

Time Remaining

4:59

Points Required

4

Figure 7: Concentration Game

7:59pm
Thu, Dec 6

Cleveland, Ohio

33

Pericipitation: **0.04 in**
Humidity: **69%**
Wind: **21.7 mph WN'**
Cloud Cover: **100%**
Visibility: **9 mi**

Figure 8: Weather Widget

8:00pm
Thu, Dec 6

Fri	**Sat**	**Sun**	**Mon**
High: **30**	High: **28**	High: **32**	High: **35**
Low: **25**	Low: **23**	Low: **14**	Low: **27**

Figure 9: Four Day Forecast

8:01pm
Thu, Dec 6

She was the Judy Garland of American poetry.

James Dickey

Figure 10: Quotes Widget

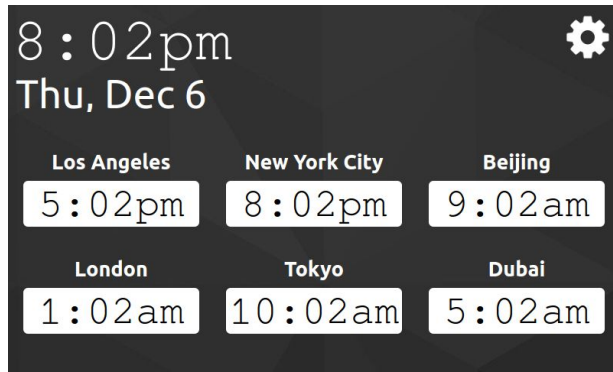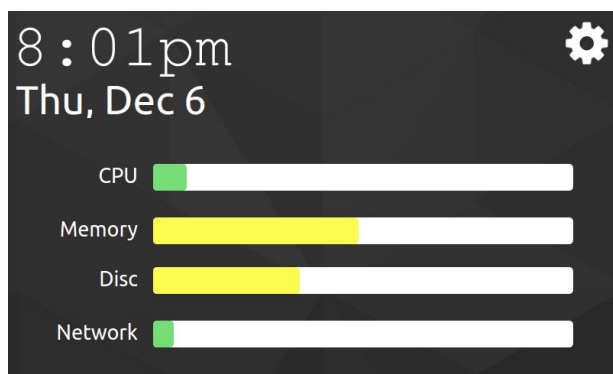**Figure 11: World Clock Widget**

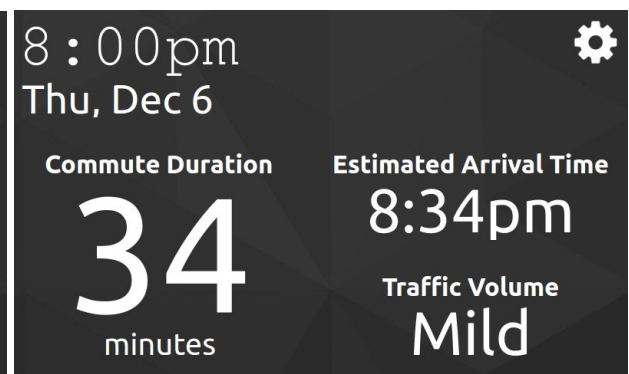**Figure 12: Holiday Countdown Widget**

Figure 13: System Usage Statistics

Figure 14: Commute Widget

Figure 15: News Widget